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NEW POLICY DEVELOPMENTS CONCERNING TRAFFIC, FREIGHT TRANSPORT, AND ENVIRONMENT IN THE NETHERLANDS

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INTRODUCTION

Never before has the government of a Western European country fallen over an environmental issue, let alone a question related to the reduction of car use. Yet on May 2, 1989, the seven year-old Lubbers Government, a coalition of centre Christian-Democrats and right-wing Liberals, split over the question of curtailing tax benefits for (car) commuters in the Netherlands. A Dfl. 650 million commuter tax reform was proposed as a funding basis for several environmental and public transport programmes.
It was just one of a great many projects contained in the new National Environmental Policy Plan 1990-1994 ("NMP") but it caused a political crisis for a largely successful coalition.
And so, for the very first time, environmental policy was a high ranking issue during the 1989 Parliamentary elections. In June 1990, the new coalition government (Christian-Democrats and Labour Party) issued an updated and tightened up version of the NMP in the "NMP-plus", in order to accelerate the implementation of the new environmental policy. Parallel to the NMP-plus, an updated version of the Second Transport Structure Plan (SVVII) provided the guiding principles and measures for an integrated traffic and environmental policy.
It is worthwhile examining what environmental problems and traffic policy concerns are at stake in the Netherlands, and which measures are being developed under the responsibility of environmental and traffic policies. This contribution describes current developments in the Netherlands' policy for the reduction of pollution due to motorized road traffic (including freight transport). Particular attention is paid to the reduction targets contained in the NMP, the three-track approach to traffic pollution - including management of traffic demand - and the integrated traffic and environmental policy measures presented in the SVVII. The final part of this contribution focuses attention on road freight and transport policy.

ROAD TRAFFIC AND ENVIRONMENT

Transport and communication activities represent more than 7 per cent of gross national product in the Netherlands, surpassing even the agriculture sector in economic output.
The main negative effects of road transport activities include accidents, congestion, air pollution and noise, wastes, soil

pollution from spilled fuels, energy consumption, and consumption of land use, other resources for infrastructure and vehicle use. The non-internalized social costs of road transport probably amount to several per cent of the gross national product. Emissions from the transport sector represent a large share of total man-made emissions. Also, the contribution of the transport sector to total emissions of air pollutants and noise is higher than in the past, compared to the contribution of other sectors.

Road traffic is the largest single source of air pollution and noise nuisance. More than six million motor vehicles travel a total of about 100 billion kilometres a year (1988), producing 723,000 tonnes of carbon monoxide (CO), 198,000 tonnes of hydrocarbons (HC), and 299,000 tonnes of nitrogen oxides (NO_x). Its CO_2 output (about 25 million tonnes) represents 15 per cent of the Netherlands' contribution to CO_2 emissions.

Furthermore road traffic is by far the largest source of environmental pollution in urban areas, not only for the compounds mentioned above but also for particulates, asbestos, SO_2, and noise nuisance. Table 1 shows the volume of air pollutants produced predominantly by road traffic in the Netherlands.

TABLE 1: Road traffic emissions (NL), in tonnes per year and percentage

	1970	road freight transport 1988	all vehicles 1988	share in total
Lead	1,700	20	340	80%
CO	1.470,000	98,000	723,000	65%
NO_x	147,000	134,000	299,000	59%
HC	280,000	49,000	198,000	45%
Asbestos	n.a.	n.a.	480	35%
Particles	13,000	23,000	36,000	23%
CO_2	13,300,000	7,480,000	25,000,000	15%

The effects of vehicle emissions can be divided between those relating to human health and those affecting the environment as a whole. Those affecting human health are:

a. **nuisance:** noise, odour, haze and decrease in visibility due to mild smogs;
b. **irritation:** of respiratory systems, eyes, skin, etc. by nitrogen oxides, sulphur oxides, oxidants, particulates;
c. **toxic systematic action:** carbon monoxide, lead compounds, certain hydrocarbons;
d. **mutagenic/carcinogenic action:** particulates, asbestos and certain hydrocarbons (polycyclic aromatic hydrocarbons, dioxins, benzene).

High concentrations of these air pollutants are found chiefly in urban areas, near busy motorways and inside motor vehicles. High ozone concentrations due to transboundary pollution and domestic

traffic emissions occurred several times in the Netherlands during the hot spring and summer of 1989.
Apart from the widespread ecological damage and general land use effect, the long term/long range environmental effects of road traffic are well illustrated by its share in acidification and photochemical air pollution (ozone formation). In the Dutch situation, road traffic contributes substantially to both forms through its share of over 55 per cent in NO_x and 45 per cent in HC emissions (Table 1).

NMP AND NMP-PLUS

Since the early 1980's "acid rain" and the long-term consequences of global warming, such as rising sea levels, brought the environmental issue to the forefront of public interest and concern. At the same time, the Government's environmental policy shifted towards a more effect-oriented approach, resulting in stricter emission reduction goals and a solid scientific foundation for stricter products/process emission standards. Since 1987 Our Common Future from the World Commission on Environment and Development ("Brundtland Committee") and the report "Concern for Tomorrow" by the National Institute of Public Health and Environmental Protection have set the terms for a more fundamental discussion of the environment issue from a global and long-term perspective.
Also the Government itself started political discussions on the problems of traffic planning and environment and on far reaching emission reductions (70-90 per cent) for acidifying substances. The time was ripe for the environment to become a cornerstone of public policy. The fall of the centre-right coalition and the 1989 Parliamentary elections symbolise this development.

On May 25, 1989, the National Environmental Policy Plan 1990-1994 was issued as a first step towards the implementation of "sustainable development" between now and 2010 and the strategy for a new environmental policy in the 1990's. Execution of this plan will add more than 6 billion Dutch guilders a year to the costs of environmental investments and expenditures.

It became apparent in the course of the formation of the new coalition government (Christian Democrats/Labour Party) that environmental policy would have to be tightened up on a number of points if the targets in the plan were to be achieved as quickly as possible. The aim of the plan, which is to ensure that environmental problems are not passed on to subsequent generations, can only be achieved if we change our current patterns of production and consumption.
The government policy statement of November 27, 1989, listed the points on which environmental policy required tightening up:

* reducing carbon dioxide emissions;
* stepping up policy on acidification;
* stepping up policy for the conservation and development of nature;
* management of entire waste chains, also viewed in relation to product policy;
* cleaning up soil and underwater soil;
* energy conservation policy.

The tightening up on these points does mean an acceleration of the introduction of NMP measures so that the long-term objectives needed for sustainable development are likely to be achieved

earlier. The consistency of policy is guaranteed because the points of departure of the National Environmental Policy Plan still hold true.
In June 1990, the National Environmental Policy Plan Plus (NMP-plus) was launched by the (4) Ministers of Environment, Transport, Agriculture and Economic Affairs.

New emission reduction targets and abatement policy

New and stricter reduction goals and abatement measures concerning acidification and all "contributing" sources have been laid down in the NMP and NMP-plus. Total acid deposition (averaging 5,000 acid equivalents per hectare per annum) is to be reduced in the long run to 400 to 700 equivalents in order to prevent any ecological damage from occurring. This implies emission reductions (for SO_2, NH_3, NO_x and HC) of a magnitude of 70 to 90 per cent, which are goals that cannot be met by the year 2000. So, the NMP laid down a set of maximum achievable emission reduction targets for the year 2000, aiming at 50 to 80 per cent reductions compared to 1980 emissions (Table 2). Together with parallel reductions by transboundary sources (especially from Germany) this may result in an average yearly deposition of 2400 equivalents before the year 2000. Sadly enough, this will only slow down the continued mortality of the Dutch forests and the continuation of other forms of damage. Eighty per cent of Dutch forests will still be at risk!

The NMP-plus deals not only with acidification but also with all other kinds of pollution. The following emission ceilings and targets have been set for the traffic and transport sector:

TABLE 2

Emission reduction targets	1986	2000	2010
NO_x passenger cars	163,000	40,000(-75%)	40,000 (-75%)
NO_x lorries,buses	122,000	72,000(-35%)	25,000 (-75%)
HC passenger cars	136,000	35,000(-75%)	35,000 (-75%)
HC lorries, buses	46,000	30,000(-35%)	12,000 (-75%)
CO_2 road traffic	23,000,000	23,000,000(0)	20,700,000(10%)
Noise passenger cars[3]	80	74	70
Noise lorries/buses[3]	81-88	75-80	70
Noise nuisance serious[4]	260,000	130,000(-50%)	
Noise nuisance to any degree[5]	2,000,000	1,800,000(-10%)	1,000,000(-50%)

[3] target values for the maximum noise production of vehicles in dB(A).

[4] number of dwellings exposed to an unacceptably high noise level, reduced by 50 per cent in 2000 through measures at source and in the transmission zone.
[5] dwellings subject to noise loading of more than 55 dB(A).

The intensified policy contained in the NMP-plus is aimed especially at reducing CO_2 emissions. This policy must produce a stabilisation in CO_2 emissions in 1994/1995 at the level of 1989/1990 (182 million tonnes per year). The NMP assumed stabilisation in the year 2000. The NMP-plus anticipates an absolute reduction of 3 to 5 per cent in 2000.
For road traffic this will imply a net cut-off of the expected autonomous growth (of 8 per cent) of CO_2 emissions within 5 years.

So, the CO_2 target for the transport sector is:
a. to stabilise emissions at current levels in 1994-1995;
b. to stabilise at 1986 levels in 2000;
c. to reduce emissions by 10 per cent relative to the 1986 level by 2010.

CO_2 emissions from road traffic will be reduced by the same three-track approach already being developed in connection with acidification reduction policy (see Figure 1).

Additional abatement measures for all acidifying sectors must make it possible to achieve the current acidification objective (2400 acid equivalents per hectare per annum) some years earlier than the year 2000, as scheduled until now. For transport and traffic this implies the need for even stricter measures during the 1990's than was foreseen in the NMP and the draft SVVII (1989).

Other goals and objectives

The use of carcinogenic or other harmful substances in vehicles must be reduced by the year 2000 to a level where the risks are negligible, and the quantity of reusable materials must be raised to 85 per cent.
In terms of land use, further "scatteration" in rural areas will be prevented. If new infrastructure is absolutely necessary, compensatory measures will be taken where possible so that, on balance, fragmentation does not increase. The problem of soil and air pollution at petrol stations will result shortly in legislation on new and existing facilities regarding sanitation, vapour-return etc.

Specifically, the objectives of the NMP-plus for traffic and transport have been formulated as follows:
- vehicles be as clean, quiet, economical and safe as possible and made of parts and materials which are optimally suitable for reuse;
- the choice of mode for passenger transport must result in the lowest possible energy consumption and the least possible pollution. This means a preference for public transport,car pooling and cycling for the coming decades.
Great attention must also be paid to reducing energy consumption and environmental pollution in freight transport;
- the locations where people live, work, shop and spend their leisure time will be coordinated in such a way that the need to travel is minimal.

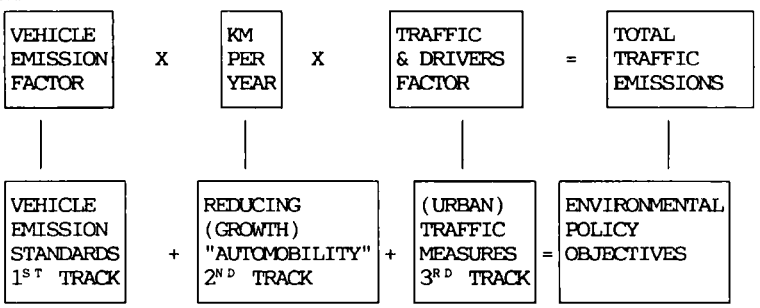
The policy conducted will be regularly checked to see whether it is effective. Calibration points are given for 1994 to see whether the reduction in the environmental impact in the period prior to 2000 is proceeding according to plan. If the calibration

point for 1994 is not achieved this will result in the timely preparation of supplementary policy.

MAIN ABATEMENT POLICY LINES

Environmental pollution from road traffic is produced in a three-step process, involving (1) the vehicle emission factor, (2) the "automobility" volume factor, and (3) the traffic/drivers factor. The Dutch environmental policy towards road traffic is set up along parallel lines (see Figure 1).

FIGURE 1



TECHNICAL VEHICLE STANDARDS (THE FIRST TRACK)

The first track approach is followed throughout the world as a natural and effective means of reducing vehicle pollution "at source" through regulations limiting air pollution and noise per (new) vehicle. Through regulations limiting air pollution step by step over a certain period of time, car and lorry manufacturers have been persuaded to start research and produce vehicles that emit up to 90 per cent less air pollution than similar vehicles in the past.

It should be realized that the European Community as a supranational body with 12 Member States has an almost exclusive legislative power regarding technical standards for products to be marketed within the Community. In doing so the EC establishes a harmonized regulatory framework in order to protect the free flow of products within the EC market.

As a Member State, the Netherlands participates in negotiations regarding pollution standards and tries to reach agreements on the highest possible levels of abatement and control.

The European Council of Ministers of the Environment has already agreed upon stricter emission standards for passenger cars in such a way that by the end of 1992 most new cars entering the EC market will comply with standards equivalent to current US standards. Stricter standards for air pollution and noise from lorries, vans and buses are being negotiated within the various EC bodies involved.

Considerable progress still has to be made on a wide variety of issues to be covered by EC standards, before all these regulations can be said to be equivalent to state-of-the-art technology. Reducing the total air pollution from road traffic requires constant screening of those factors that influence the real exhaust gas composition of all categories (including light and heavy duty lorries) under "real life" driving conditions.

Measures in the Netherlands

As from April 1, 1986, several measures entered into force in the Netherlands in order to promote the introduction of "clean" cars. Regular leaded gasoline was replaced by unleaded, and fiscal benefits were provided for the purchase of "clean" cars that comply with the new EC standards. As a result, today almost all newly sold (petrol) cars are catalyst-equipped. By mid-1990 already two out of three catalyst cars were equipped up to US '83 standards. The use of economic incentives has proven to be an effective way to "clean up" the passenger car fleet long before it could have been done with compulsory measures alone.

In addition to the introduction of cleaner passenger cars, the rapid introduction of cleaner lorries is also desirable. A gentlemen's agreement, signed with the manufacturers and importers on 29 September 1987, represented the first step in this direction, establishing a 10-15 per cent NO_x-reduction per vehicle for 80 per cent of all newly sold lorries as from 1988.

With regard to noise reduction a financial incentive approach has been applied successfully through subsidies for investments in lorries that meet future (stricter) noise standards. The following actions will be taken during the period covered by the National Environmental Policy Plan (Plus) (1990-1994).

Cleaner lorries and buses

Within the EC the Dutch Government is a strong supporter of tightening up exhaust gas standards by at least 50 per cent. The Government will also endeavour to reach agreement in the EC on a rapid introduction of cleaner lorries and buses by anticipating the entry into force of stricter new EC standards. The environmental investment subsidy programme has been raised for this purpose by an amount running to Dfl. 90 million per year, which is being funded through an increase in diesel excises. The programme, which started in August 1990, will be terminated once stricter European norms become effective.
Subsidies of up to Dfl. 6000 are being provided for (heavy duty) lorries and bus coaches that meet future (9 gr.) NO_x standards and of up to Dfl. 6500 for those vehicles that meet future 80 dB(A) noise standards.
It is expected that this policy, given the expected autonomous growth in freight traffic from 11 billion kilometres to 16.5 billion kilometres in 2010, will lead to about 30 per cent lower emissions of nitrogen oxides and hydrocarbons in 2000.

Of equally great importance is the development of even cleaner lorries and buses. In 2010 a 75 percent reduction in the emissions of NO_x and C_xH_y must be achieved, as well as considerable reductions of CO_2 and particulates. In 1989 the Ministry of Housing, Physical Planning and Environment and the Ministry of Transport and Public Works together with the manufacturing industry embarked on wide scale international research into promising new technologies.

Public transport and freight distribution in cities will serve as a spearhead in demonstrating and applying clean technologies. A wide range of possibilities is available, examples being alternatives fuels such as natural gas, electric vehicles, hybrid vehicles, storage of braking energy, use of particle filters etc. Many of the options can be applied simultaneously. In view of the specific circumstances the optimal solution will differ from case

to case. An attempt will be made in the next five years to ensure that public transport in cities is provided with clean vehicles. An annual amount running to Dfl. 30 million in 1994 has been set aside to support this development.

Periodic vehicle inspections will be extended to diesel cars and lorries to prevent unnecessarily high emissions of smoke and soot. An enforcement system will be developed and implemented similar to developments in Germany.

Reducing CO_2 emissions from the vehicle park

Vehicle technology, the composition of the vehicle park, driving behaviour and distances travelled are the factors which determine fuel consumption and thus CO_2 emissions from the vehicle park as a whole. The possibilities of influencing the amount of CO_2 emitted by individual vehicles and by the vehicle park as a whole through improved driving behaviour are being researched. The purchase of lighter and energy-efficient vehicles will also be promoted.
The Netherlands will seek the introduction by the EC of regulations concerning more energy-efficient vehicles.

Although individual classes of vehicle are in any case becoming more economical on average, this trend is being countered by the fact that vehicles in general are becoming heavier owing to the preference for cars with a larger cylinder capacity, greater power and more de-luxe extras.
Since this will adversely affect CO_2 emission trends, the possibility of varying the levy on cars to help obviate this tendency (e.g. by basing a levy on cylinder capacity or fuel consumption) pending EC regulation, is being examined; the aim would be to ensure that such a scheme was aligned with initiatives in other countries. The alternatives will be looked at to determine which provides a suitable basis for this: the motor vehicle tax or the special tax on new passenger cars.

Improved engine technology, the use of lighter materials and reduced rolling resistance can combine to produce vehicles which are more economical to run and which consequently emit less CO_2. It may be assumed that the trend towards more energy-efficient vehicles observed in recent years is set to continue provided that the move towards heavier and more powerful vehicles can be halted. This points to a CO_2 reduction of maximally 35 per cent for passenger vehicles and 25 per cent for goods vehicles (average per vehicle compared to 1986) by the year 2010.

REDUCING CAR USE (AUTOMOBILITY, THE SECOND TRACK)

Future levels of air pollution emitted by traffic will be determined by the average vehicle emission factor (emission per vehicle per km) and total distance travelled by all vehicles (Figure 1). The second track-approach is relatively new and will be further developed and implemented in the coming years. It follows that the expected growth in automobile use of 3 to 5 per cent a year if policy remained unchanged would inevitably consume a large part of the emission reductions resulting from the "clean" car and lorry programmes, thus frustrating environmental objectives for emission reductions on both an international and an urban scale.

Furthermore the "clean" car programme cannot solve the problems of noise nuisance, land-use and CO_2 emissions that are expected to increase with traffic growth.

Also it will take too long a period (from now to about 2000) before the total car and lorry population has been replaced by maximum feasible "clean" vehicles. This demonstrates how imperative it is to take adequate measures soon. One must also realize that the issue at stake is an adjustment in a socio-economic trend, which is no easy task and should not be delayed any longer.
Thus it is that the Second Transport Structure Plan (SVVII) which was issued by the new Government together with the NMP-plus, seeks a balance between accessibility on the one hand and environment on the other hand. It has been concluded that the only way of doing sufficient justice to both aspects is to control the use of cars.
Consequently, a set of new measures and improvements in current approaches are being developed to tackle the "automobility" problem. They must result in a reduction of the growth in automobility from 70 per cent to 35 per cent from 2010.
The second track brings about a fundamentally different approach from the "classical" approach in both traffic and environmental policy. However, even for reducing traffic jams a substantial reduction of car use is thought to be justified and effective. Thus both environmental and traffic policy goals may be reached simultaneously with the same instrument, reduction of car use.

Limits to the reduction of car use

Undoubtedly, any substantial reductions in traffic volume can only be realized when both Parliament and society as a whole are willing to change the balance of interest between environment and unlimited mobility.

To what extent may car use - or at least the growth of total kilometrage - be limited without disturbing the economy or society as a whole? Several studies show that a considerable part of car use in the Netherlands is not "essential". Indeed, an estimated 60 per cent of all car rides may be judged as having a reasonable substitute in public transport, car pooling, telecommunications or the bicycle.
Nearly half of all car movements are performed within reasonable cycling distance (five km) or even walking distance (two km).

With regard to air pollution both long distance daily travelling (NO_x) and frequent, short, cold start-and-stop trips by car (shopping, commuting, social and educational visits) with relatively high CO and HC emissions should be substituted with priority.

The Netherlands is provided with the most effective and ecological answer to the needs for short distance mobility: 15 million bicycles. Moreover public transport is relatively well developed. On the other hand, a great many factors structurally favour car use. It may be expected that government measures that raise the cost of car use in order to influence present drivers' behaviour will meet with strong opposition from various sectors of society.

Given current social and political circumstances there are evidently no simple measures which can have direct and major impacts on the volume of traffic. This is because the guiding principles in the current decision-making process assume: no limitation of car ownership; guarantees for freedom of mobility for social, business and distribution purposes; and the superiority of a market-oriented approach over regulation. Given the importance of the automobile in modern society, substantial limitation of its use requires fundamental measures, capable of structuraaly influencing people's attitudes and behaviour.

VARIOUS MEASURES FOR REDUCING CAR USE

Only a wide-ranging package of complementary measures can have any significant effect.
Certainly, within the last three years the issue of "automobility" has developed from taboo into a political battleground and widely recognized problem.
"Sustainable development" in traffic and transport means that a shift will have to occur in modes of transport towards modes which are less energy-consuming and less polluting.

To be effective a balanced package will have to include the following elements:

* a strong increase in variable (driving) costs, possibly in combination with a reduction in fixed costs through "variabilisation", tolls, taxation etc;
* reduced parking facilities for commuter traffic through action on pricing, volume, regulation;
* increased attractiveness of public transport through improvements in capacity and infrastructure, service and comfort, speed and price;
* optimal use of physical planning via concentration, and public transport orientation of land uses;
* neutralizing existing tax allowances and other financial incentives for commuters and for the use of business cars;
* promotion of cycling, and education and information on mobility behaviour.

Increasing variable car costs

- Excises on petrol will be increased and a CO_2-levy introduced in 1990/1991. The Netherlands will also tie in with EC measures to raise and harmonise duties on mineral oils and fuels.
- Physical/electronic tolls will be introduced on a number of access roads and infrastructural works (tunnels) in the west of the country in 1995 (road pricing and peak hour charges will not be introduced because of strong Parliamentary opposition).
- To control public transport sector operating deficits, public transport fares will be allowed to reflect cost trends, but may not exceed increases in variable car costs.
- The possibility of imposing excise duties on LPG will be investigated. A levy of this kind would reduce the incentive to drive a lot which stems from current low variable costs for LPG users.
- The municipalities will be urged to raise parking charges and reduce the number of free parking places. Parking norms are proposed for this purpose in the SVVII.
- The standard tax deduction for commuter traffic has been partially cut for those commuters who travel long distances. The allocation of the revenues generated by this measure will be in favour of those who use or will use public transport, of car poolers and of other environmentally friendly traffic measures.
- Consideration will be given to whether current tax regulations relating to traffic have an undesirable effect on car use.

Increasing attractiveness of public transport

Improving and extending service by public transport will include the following:
- investments in public transport infrastructure (to be raised from Dfl. 12.4 billion to more than Dfl. 20 billion until 2010)
- investments in bicycle facilities near bus and railway stations;
- fare and ticket integration ;
- contribution to public transport operating cost deficit;
- encouraging cooperation between transport regions;
- automobile kilometre reduction and business transport management plans;
- research and public information.

Tightening up physical planning policy

Physical planning policy will concentrate on discouraging labour-intensive businesses and amenities attracting numerous visitors in locations which are less readily accessible by public transport. Physical planning and environmental policy instruments will be deployed to prevent buildings being constructed in unsuitable locations. The municipal authorities are being asked to view existing building plans in this light and possibly reconsider them.
Every effort will be made to prevent or reduce further fragmentation of the countryside by the construction of infrastructure and other human activity.

Effects of measures

The mobility measures are part of a package; it is not possible to judge their effectiveness individually. The effectiveness of the whole set of measures is expressed in a curbing of the growth in the use of cars in relation to the forecast for unchanged policy and the proposed policy in the SVVII.
The following index figures for private vehicles use have been laid down as a goal for the coming years:

	1989	1994*	2000	2010
-(1986=100)	117	125	130	135
- "unchanged policy" forecast in 1986		124	140	172

* It has been assumed that measures can be taken in 1990.

Total investment in roads may diminish as a result of the lower growth in car traffic. These savings will first occur in the second half of the SVV planning period since there are currently backlogs which have to be caught up to reach the level of completion intended. The new Government is to reduce road construction budgets more substantially in favour of public transport infrastructure investments (Dfl. 13.3 billion will be available for new highway construction until 2010).

(URBAN) TRAFFIC MEASURES (THIRD TRACK)

Due to problems of noise nuisance, air pollution, visual pollution, the problem of traffic safety and lack of space, the quality of the urban environment has seriously deteriorated. This is particularly the case in the big cities, where motorized traffic is the main cause of pollution. Most of the air pollutants present at street level originate from motor vehicles.

Table 3: Percentage of pollutants originating from motor traffic with respect to the total amount present

	CO	O_3	SO_2	Pb
Percentage in a busy street	90%	60%	30%	98%

Air pollution from carbon monoxide, benzene, lead and nitrogen dioxide originates mainly from passenger cars. In over 1000 urban streets in the Netherlands with intensities of over 10,000 vehicles per day, the concentration of these pollutants exceeds the ambient air quality standards for CO, Pb and NO_2, set in 1987.

Excessive levels of air pollution and noise nuisance cannot be eliminated entirely by tougher emission standards alone. In addition to the above mentioned general measures designed to reduce the use of cars, the following measures must help to alleviate the problem at a local scale:

* stricter enforcement of parking restrictions and speed limits;
* traffic management influencing driver's choice of routes;
* special routing for freight through-traffic;
* traffic-dosaging on approach roads to city centres;
* restructuring urban freight distribution;
* introduction of low speed zones;
* circulation schemes to calm traffic and to spread it more evenly over the road network;
* publicity designed to influence local people's driving habits;

This kind of approach combines environmental protection with road safety. The implementation of the policy outlined above will, in the first instance, be the responsibility of the municipalities.

Compliance with speed limits is of great concern. In the Netherlands the general highway speed limit for lorries and buses (80 km) is being exceeded by an average of 9 km. Our enforcement programme and publicity campaign are being executed with the help of the transport corporation branches. From practical experience it can be deduced that a consistent reduction in speeding and improved driving behaviour can reduce total fuel costs and engine and tire wear by over 20 per cent. With a view to both road safety and environmental protection the trucking branch must reduce speeding within a very short period. Compulsory introduction of speed retarders in lorries and buses will follow if speeding remains as frequent as today.

FREIGHT TRANSPORT

The Netherlands' favourable location at the mouth of the Rhine and the Meuse Rivers with ice-free harbors on the North Sea makes it excellently suited for the through-transport of goods into the vast European hinterland.

More than 70 per cent of the goods imported enter the country by way of ocean shipping and 29 per cent of the goods leaving the country depart by ship.

With a total value added of Dfl. 34 billion, the transport sector's economic importance for the Netherlands is beyond dispute. It should be noted that this amount is generated by the total sector consisting of transport, storage and communication companies. The sector contributes Dfl. 5 billion to the nation's balance of payments through the labour of the 340,000 individuals employed in this sector. They account for 7 percent of the Netherlands' total work force.

The 1989 volume of haulage of the three inland transport modes, in million tonnes conveyed, can be indicated as follows:

	domestic	transboundary
road transport	384	112
rail	5	12
inland shipping	90	167

The costs and quality of the transport sector are being put under a great deal of pressure by the increasing problem of accessibility. This is also harming the sector's competitive position. These growing problems are being caused to a significant extent by increasing private car use (this increase was 12 per cent during the period 1986 - 1989). The Netherlands' major ports - the airport Schiphol and the sea port Rotterdam - must have the best road, water, rail and telematic connections conceivable.

It is clear that ensuring good accessiblity can be at odds with the pursuit of a sustainable society.

It is for this reason that creative solutions must be sought for traffic and transport, solutions which make these economic activities possible within the context of a sustainable society.

The Dutch Government is choosing an integrated strategy for freight transport in order to mitigate this problem. The Government is striving to improve accessibility for the transport sector through large investments in freight transport by rail and in waterways and through necessary improvements to the trunk road network. It is also being improved through utilization of the opportunities offered by telematics.

Freight transport by road

In 1989 the Netherlands' fleet of freight vehicles consisted of 100,000 delivery vans, 80,000 lorries, and 27,000 trailer tractors. These vehicles conveyed nearly 500 million tonnes of cargo and travelled around 30 million tonne-kilometres in the process. Total domestic freight kilometrage amounted to about 12 billion kilometres.

Projections of economic growth and of growth in transport indicate that road transport will increase to 725 million tonnes in the year 2010. This projection already takes into account the fact that part of this growth will be absorbed by rail transport and inland shipping. The volume of haulage measured in tonne-kilometres is expected to increase by 70 per cent despite this shift. Road transport will remain the most important mode of transport. This makes it all the more necessary that the most effective measures be taken for abatement at the source, the vehicle itself.

Maintenance or enlargement of market share will not be automatic. In addition to the sector's own efforts, the government will have to provide support, particularly in the fiscal sphere, to a favourable business climate in order to maintain the international competitive position. A policy of stimulation and development aimed at innovation is also being pursued in order to strengthen this position wherever possible. The Dutch Government will set qualitative standards for transporters' entry into the market and for competitive conduct. In 1993 there will be one Europe with a free transport market; the competitive position in that market of the Dutch Mainports - Rotterdam and Schiphol airport - and of Dutch freight transport will have to be such that at least the current market share is preserved.

At the same time effective environmental measures will have to be taken. Empty return trips will have to be avoided as much as possible due to environmental considerations. This requires deregulatory measures. The Netherlands is an outspoken advocate of allowing cabotage, freedom to collect and deliver loads in other countries. It is estimated that the average capacity utilization in international road transport would rise 10 to 25 per cent were cabotage allowed. The Benelux countries (Belgium, the Netherlands and Luxemburg) have already agreed to allow cabotage as of January 1, 1991, or as quickly as possible thereafter. In addition, the Netherlands will continue to argue for a liberalization of dimensions and weights.
The Government's position is that a maximum length of 18.35 metres for a lorry combination plus a short-coupling system is the minimum. This makes it unnecessary to use additional vehicles to transport the same amount of cargo. Collaboration among both professional conveyance companies and with the transport departments of other companies can also lead to an efficiency gain. In time it should be possible to save 15 per cent in vehicle kilometres for a given volume of transport through measures aimed at improving efficiency.

Infrastucture

An infrastructure policy for freight transport by road is being pursued on three fronts, namely:
- quality of the international connections. In the first instance this involves the joining of the hinterland connections in the European road system. In addition, a European network of "principal routes" will be striven after;
- quality of the Dutch trunk road network. Separate lanes for among other things lorries will be built or designated in congested areas. The quality of the road infrastructure can be translated into a maximum chance of congestion of 2 per cent on the principal routes and 5 per cent on the remaining trunk road network;
- inner city accessibility. A selective infrastructural policy for urban areas should also be pursued. Solutions which keep cities

accessible and do not put an extra burden on the ambient environment can be found through transport regions - coordinated traffic planning and management in an agglomeration - and through active municipal policies.

Freight transport by rail

In 1989 the Dutch Railways had 9236 pieces of rolling stock with a total cargo capacity of 236 kilotonnes. They conveyed 17 million tonnes in 1989, 1 per cent of total domestic freight transport and 4 per cent of transboundary freight transport. The infrastructure and the performance of the Dutch Railways (NS) are equally critical for the maintenance and enlargement of rail's share of the freight transport market. The Dutch Railways are responsible for market performance and a client-oriented approach. The government must attend to a number of measures in the sphere of essential conditions. For example, the problem of the competitive disadvantage resulting from the allocation of infrastructure costs must be solved before 1994. NS freight transport must be self-sufficient for a commercial operation.
NS has taken action in the meantime through the presentation of a strategic reorientation. The number of loading and unloading sites is being reduced to 30 on a couple of major lines. After 1993, the Kijfhoek shunting yard near Rotterdam will be NS's only functioning shunting yard. A new combined shunting/transshipment yard will be completed on the Betuwe line around 2000. The Betuwe line is the planned rail connection for freight between Rotterdam and Germany, via Tiel and to the south of Arnhem.
NS's internal organization is becoming more client-oriented.
An important point here is the financing and allocation of costs for the construction and maintenance of the infrastructure. In the Netherlands the railroad company bears these costs itself, while the road and inland waterway modes of transport do not.
One of the possibilities for creating a more equitable position relative to competing modes of transport would be to transfer financial responsibility to the State while at the same time introducing a user's fee to be paid by the NS. This is being elaborated more fully in the Netherlands as well as in the context of the EC.
International cooperation among the nationally organized railroad companies is extra desirable in order to realize high quality, internationally integrated train management on the main international rail transport routes.

The Dutch railway infrastructure is directed primarily toward passenger transportation. Freight transport makes use of the remaining capacity.
Given all the stimulation measures, passenger transportation will make increasingly greater use of the capacity of the railway network. It is for this reason that capacity problems are expected for freight transport by rail, especially on the connections with the hinterland. This capacity can be claimed through coordination of these transport streams relative to freight transport on the domestic main routes.
The point of departure here is that the remaining (domestic) freight transport must be absorbed by the current network, especially through night operations.
Solving these capacity problems, increasing the axle load to 22.5 tonnes and making the modifications necessary for higher speeds require Dfl. 1.4 billion and are of special importance for preserving Rotterdam's competitive position.

Research demonstrates that infrastructural capacity specifically for rail freight transport is unavoidable. Increasing the volume of freight from 17 million tonnes in 1989 to a scheduled 50 million tonnes per year in 2010 will require an investment of Dfl. 2.5 billion. The lion's share of this amount is needed for improvements between Rotterdam and the German hinterland, via the Betuwe line. At the moment it is being assumed that 50 per cent of the financing for this line will be provided privately.

Freight transport by water

In 1989 the active inland fleet consisted of more than 6200 vessels with a total cargo capacity of 5800 kilotonnes. Many customers appear to be unacquainted with the possibilities offered by inland shipping. The sector itself has undertaken self-promotion activities in order to improve this situation. New markets are being developed and technological modernization is taking place. These developments should make it possible to increase the amount of cargo from 257 million tonnes in 1989 to around 370 million tonnes in 2010. About 35 million tonnes of this increase comes from the influence on the modal split to the disadvantage of road transport. The remainder comes from autonomous growth in this sector.
Inland shipping's dependence on international developments compels international consultations. The negative consequences of protectionism must be guarded against. The international scrapping scheme is currently being implemented. Possibilities for making the mercantile-exchange system commercial are being investigated in close collaboration with the organized industry.

A waterway is defined as a trunk waterway if at least 5 million tonnes of cargo are transported over it annually. Trunk waterways with equal amounts of transboundary freight shipments to and from the seaports are designated as principal routes. They connect the seaport areas of Rotterdam, Amsterdam and the western Scheldt with their fore and hinterlands. These routes must be able to carry push-tow trains of at least four barges. Due to a large backlog, hefty investments are needed for modernization, improvement and up-scaling.
The maintenance backlog must also be eliminated as quickly as possible. Possibilities for opening up Eastern Europe via waterways are being investigated. Other improvements have to make it possible to transport "just in time" freight shipments over water.

With regard to the infrastucture, the national government considers itself responsible for maintaining the trunk waterway network which connects the most important parts of the country with each other and with other countries and which also provides access to the hinterland from our most important seaports. The highest priority is being given to the principal routes. These routes are attuned to the best possible competitive position for inland shipping.
The other trunk waterways come next, followed by the national waterways which are not part of the trunk waterway network. This last category involves primarily eliminating maintenance backlogs; the national government will undertake no initiatives towards up-scaling.

Dfl. 4 billion is needed for investments between now and 2010. Maintenance of the waterways requires an annual budget of approximately Dfl. 340 million.

Inland shipping will have to make its own contribution in the area of environment and energy. Noise nuisance and air pollution, as well as water and soil pollution will have to be reduced further in an international context. Additional research is being carried out into the exact extent, composition and location of air polluting emissions from the inland shipping sector.

Combined rail-water-road transport

A significant share of the growth in rail transport and inland shipping will consist of combined transport. This transport consists of containers and swap bodies. Combined transport's current share is about 7.5 million tonnes. This is about 3 per cent of the total transboundary transport of freight. It is estimated to amount to about 65 million tonnes in the coming 10 to 15 years based on current expectations regarding growth in road transport. The routes most likely to grow include Rotterdam-Germany-Italy and Rotterdam-France-Spain. This will require a further expansion of the combined transport system (road/rail, water/rail and road/water). Industry bears the responsibility for this, but the government will contribute with stimulatory measures. An example of this would be participation by large road transport and shipping companies in the planning of route management (rail/road transport). In addition, a study has been started into the prospects of various forms of combined transport, including new concepts for "roll on-roll off" ships on the Rhine.
Recent experience, particularly with container transport, has proven that inland shipping fits well in the notion of more integrated transport. For the railways this involves primarily the introduction of regular service and shuttle trains. These will go from Rotterdam to Italy, among other destinations. In order to accomplish this, rail service centers are being planned and funds have been allotted for them. Container transport by train is expected to triple during the coming 15 years to 10 to 12 million tonnes per year. The national government is contributing to the cost of introducing a new container handling system into the railroad.

Telematics in freight transport

Telematics bring the supply of and demand for freight transport together through computer communication. Telematics also play a role in transport planning and implementation. This makes it possible to separate the physical stream of goods from the accompanying stream of information, the Electronic Document Interchange (EDI). For instance this is currently being studied for application to waste transports. The Netherlands can also serve as a logistical information interchange for freight streams which take place outside the country.
This advanced form of commerical service is a promising market for the Netherlands as a transport and distribution country.
Telematics can also improve the quality of inspections, make it possible to provide service more quickly and to intervene more adequately in the case of disasters. Demonstration projects will be undertaken first. Well-concerted guidance for the introduction of this new technology is of the utmost importance. The tachograph in lorries is obsolete and will be replaced by a dashboard computer. Field memories for roadside checks are being introduced.

CONCLUSION

With the publication of the Second Transport Structure Plan the Dutch Government has provided an integral vision of the development of transportation in the medium term. The strategy described will reduce the load on the ambient environment and ensure access for the economically necessary freight transport sector.
It is clear that measures must be taken comprehensively. Freight transport's greatest chance for success in a sustainable society lies with collaboration within the transport industry itself and within the European context.
Mobility is an essential requirement of our society, and so is the environment. To combine the conflicting demands of traffic and environment in the best possible way is a demanding task to which administrations at local, provincial and national level have to commit themselves. The execution of this task is not going to be easy. For the time being, four major uncertainties remain:

1) Will there be enough political support for the unpopular measures that effectively raise the costs of car use and reduce automobility?
2) Will such measures really induce the mass motorist behaviour response necessary?
3) Can we stay away in the long run from regulatory approaches to influencing people's choice of transport mode and of activity-locations?
4) Can we slow the growth rate of truck-kilometrage through influencing the freight transport modal split, without compromising (the Dutch position in international) transport and distribution?