Prepared for

Ministry of Transport, Public Works and Water Management
Directorate-General of Transport
Directorate-General for Public Works and Water Management
The Hague and Rotterdam

February 1996

Final report

International Comparison of Forecasts

Appendices

By

HAGUE-CONSULTING-GROUP

The Hague, Netherlands

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Contents

1. Introduction

This report contains the appendices of the main report entitled *International Comparison of Forecasts (report number 5051/1, HCG, The Hague, 1995).* The *International Comparison of Forecasts* has been prepared by Hague Consulting Group for the Netherlands Ministry of Transport, Public Works and Water Management.

The objective of the project is to provide information on traffic and transport forecasts in selected European countries and in the European Union and for this information to be compared with the Netherlands.

The emphasis has been on strategic traffic and transport forecasting systems which are used for policy evaluation at the national level. The research aimed to provide answers to specific questions, such as:

- *Which traffic forecasts are being produced?*
- *What model types form the basis for the forecasts and what major assumptions are used?*
- *Which organisations provide the forecasts?*
- *What is the status of these forecasts?*
- *How often are the forecasts produced and what are the current base and forecast year?*
- *Are the forecasts publicly available?*

To provide answers to these questions, desk top research has been carried out using available relevant documents. The main data, however, has been collected through telephone and fax contacts and by means of questionnaires which were presented to representatives of selected countries. A limited number of face to face interviews was carried out.

This document contains the country-specific background information collected in the course of the project. Countries and institutions included are:

- Netherlands
- Germany
  - Nordrhein-Westfalen
  - Baden-Württemberg
  - Hamburg
- France
  - Alsace
- Great Britain
- Belgium
  - Brussels-Capital Region

- Flanders
- Sweden
- Austria
- European Union
- ECMT
- OICA
- IEA

A separate chapter is dedicated to each country or institution selected for inclusion in the research.

2 Netherlands

2.1 Introduction

In the Netherlands, there are three administrative levels; central government, provinces and municipalities. Central government, through the Ministry of Transport Public Works and Water Management, is responsible for all matters relating to (inter)national transport infrastructure and communication. Although provinces are responsible for their own transport planning, they receive substantial financial support from the central government.

The Ministry of Transport is organised in four Directorates. The Directorate General Rijkswaterstaat is responsible for land based, water and air based transport infrastructure planning, management and maintenance. It is structured in national divisions and regional directorates. The Transport Research Centre (Adviesdienst Verkeer en Vervoer) is Rijkswaterstaat's national organisation charged with research and development. One of its assigned areas is demand modelling, both for personal travel and freight transport. The Transport Research Centre collaborates regularly with the National Institute of Public Health and Enviromental Protection (RIVM) in the production of the National Environmental Outlook, an important RIVM publication. In particular, AVV's transport models are used to provide information on the developments in the transport sector which is then combined with environmental forecasting models.

The model systems used for these forecasts, whilst being owned by the Transport Research Centre, are operated by consultants. Consultants associated with the production of national personal travel forecasts are:

HAGUE CONSULTING GROUP BV
Surinamestraat 4
2285 GJ THE HAGUE
tel. +31 (70) 346 94 26
fax. +31 (70) 346 44 20

Consultants associated with the national freight transport forecasts are:

NEA
Postbus 1969
2280 DZ RIJSWIJK
tel. +31 (70) 398 83 88
fax. +31 (70) 395 41 86

NEI - NEDERLANDS ECONOMISCH INSTITUUT
Postbus 4175
3006 AD ROTTERDAM
tel. +31 (10) 453 88 00
fax. +31 (10) 453 07 68

2.2 Strategic forecasts for passenger traffic

2.2.1 Introduction

Forecasts for personal travel are carried out for:

MINISTERIE VAN VERKEER EN WATERSTAAT
Directoraat-Generaal Rijkswaterstaat, Transport Research Centre AVV
P.O. Box 1031
3000 BA ROTTERDAM
tel. +31 (10) 282 66 00
fax. +31 (10) 282 90 29

and for:

NATIONAL INSTITUTE FOR PUBLIC HEALTH AND ENVIRONMENTAL PROTECTION
P.O. Box 1
3720 BA Bilthoven
tel. +31 (30) 74 91 11
fax. +31 (10) 74 29 71

The national forecasts are being produced by the developer and operator of the traffic forecasting system:

HAGUE CONSULTING GROUP BV
Surinamestraat 4
2285 GJ THE HAGUE
tel. +31 (70) 346 94 26
fax. +31 (70) 346 44 20

For personal travel there is one official national forecast which is generated with the Netherlands National Model System. Alternative forecasts for different socio-economic scenario's exist, as do forecasts for transport policy alternatives within a given socio-economic scenario. The official forecast is reviewed and adjusted regularly in the light of new exogeneous developments and progress with the implementation of policy.

2.2.2 Type of forecasts

The official national traffic forecasts for personal travel cover the following:

Driving licence holding:	yes
Car ownership forecasts:	yes
Number of trips:	yes
modes distinguished:	car drive

	car passenger
	train
	bus
	slow
purposes distinguished:	home based work
	home based business
	non home based business
	school
	shopping
	other
Kilometrage travelled:	yes
modes distinguished:	car driver
	car passenger
	train
	bus
	slow
purposes distinguished:	home based work
	home based business
	non home based business
	school
	shopping
	other
Time dimensions:	average working day, AM, PM, off peak periods
Future year O/D matrices:	car
	train

2.2.3 Types of traffic models

The Netherlands National Model System consists of a number of sub-models:

prototypical sample:	procedures with which a base year sample of households is expanded to the forecast year using external targets.
driving licence holding:	discrete choice model operating at level of individuals and households
car ownership:	discrete choice model operating at the level of individuals and households
trip frequency model:	purpose specific discrete choice models operating at the level of individuals
mode/destination choice:	simultaneous logit type choice models
assignment model:	congested assignment procedures for car, all or nothing for public transport
feed back congestion effects:	congestion effects are fed back both to route choice and mode/destination choice models
time of day choice:	congestion effects on departure time choice modelled

suitability for demand evaluation:	yes
suitability for supply evaluation:	yes
zoning:	400 zones, 1300 subzones 350 zones within the country 50 zones abroad

To derive car and train matrices for the forecast year, the NMS is used as a pivot point model, in which changes are being forecasts between base and forecast year. These changes are used to generate forecast matrices using observed base matrices. Where no base matrices exist, model results are presented in relative terms only. Currently base matrices are available for car driver and train travellers.

AVV and RIVM are both involved in producing forecasts. RIVM's rôle is to estimate car ownership, based on data (e.g. on fuel prices, fiscal policy) provided by the Central Planning Bureau. RIVM then uses the FACTS model (Forecasting air pollution by Car Traffic Simulation) to forecast emissions by private cars under alternative policies. In this process the estimation of car ownership and car use are modelled simultaneously.

AVV's rôle is to produce mobility forecasts under different scenarios using NMS. NMS estimates mobility characteristics (e.g. numbers of trips, kilometrage, travel hours, travel costs, mode split, congestion, time of day etc.) for an average working day and offers capabilities to estimate effects of a wide range of policy measures. It uses a range of disaggregate choice models, including licence holding and car ownership models (see also above). The models calculate the probability of chosing a specific alternative from a set of alternatives available to travellers. Different types of travellers are distinguished in this process, according to personal characteristics and the circumstances in which choices are made. Behavioural preferences are represented in the disaggregate choice models.

2.2.4 Base and forecast years

The base year and the forecast year commonly used in the official forecast for The Netherlands are:

Base year:	1990
Forecast year:	2010

Work has commenced to re-base the model to base year 1994. Alternative forecast years, such as 2000, 2015 and years beyond, are occasionally used.

2.2.5 Key input data/underlying assumptions

This paragraph presents the underlying assumptions used in generating the official national personal travel forecasts.

Table 2.1: *Key input data for 1990 and 2010.*

Variable	*1990*	*2010*
Population (mln)	14.9	16.4
Population (base=100)	100	110
Household size	2.50	2.30
Household size (base=100)	100	92
Participation (>15 yr)	43	48
Participation (base=100)	100	112
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	183
Car ownership (mln) *)	5.2	7.8
Car ownership (base=100)	100	150
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	0.35	0.48
Car / Inhabitant (base=100)	100	137
Driving licence (mln)	-	-
Driving licence (base=100)	-	
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	131
Real PT prices (base=100)	100	122-138
Real parking costs (base=100)	100	200

Source: Resultaten LMS voor SVV Evaluatie (SVV EVA Euro I, HCG rapport 307), (- = not available)

2.2.6 Key forecasts results

The levels of forecasts presented under this heading relate to the most recent official forecasts for the 'SVV EVA Euro I' scenario. The global characteristics of this scenario consist of restraining car traffic growth and the demand for new roads, continuation of public transport provisions and significant increases in real transport costs. This policy scenario has been the result from political debates and analyses of policy options.

Table 2.2: *Level of base and forecasts in trips, kilometrage and trip length by mode*

Mode	*Trips (bln)*			*Kilometrage (bln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Car driver	-	-	121	-	-	125	-	-	103
Car pass.	-	-	93	-	-	94	-	-	102
Train	-	-	104	-	-	101	-	-	97
Bus	-	-	87	-	-	89	-	-	101
Slow	-	-	112	-	-	108	-	-	96
Other	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: Resultaten LMS voor de SVV Evaluatie (HCG rapport 307). Slow=walk+bicycle

Table 2.3: *Level of base and forecasts in trips, kilometrage and trip length by purpose*

Mode	*Trips (bln)*			*Kilometrage (bln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Work	-	-	114	-	-	114	-	-	101
HBBus.	-	-	149	-	-	151	-	-	101
NHBBus.	-	-	126	-	-	127	-	-	101
Education	-	-	104	-	-	98	-	-	95
Shopping	-	-	111	-	-	108	-	-	98
Other	-	-	111	-	-	109	-	-	99
Total	-	-	112	-	-	113	-	-	101

Source: Resultaten LMS voor de SVV Evaluatie (HCG rapport 307). Slow=walk+bicycle

As already mentioned, the 'SVV EVA Euro I' scenario has been the result from the analysis of a range of policy options. The effects of different policies can be usefully illustrated on the basis of the effects on car kilometrage. A 'No change' scenario was modelled during an earlier planning excercise and generated a kilometrage index of about 170 (please note the base year being 1986=100; index would be about 146 by 1990=100).

2.2.7 Status of forecasts

The LMS 2010 forecasts for 'SVV EVA Euro I' scenario are the current official forecasts of the Netherlands Department of Transport. Policy alternatives are evaluated against this reference. The package of policy measures adopted in the context of the National Transport Structure Plan reduces the kilometrage index to about 125 (1990=100). This package of policy measures is often considered to represent 'targets', both at the national and at the regional level. As has been mentioned in the previous paragraph, a 'No change' scenario would result in an incease in car kilometrage of about 156 (1990=100).

The National Transport Structure Plan has been jointly prepared by the Netherlands Ministry of Transport and the Ministry of the Environment. Other parties such as Netherlands Railways and the Rijksplanologische Dienst have been consulted in the process.

2.3 Strategic forecasts for freight traffic

2.3.1 Introduction

There are two models in use in the Netherlands to produce forecasts for freight transport. These models are TEM II and ATTACK. In this paragraph both systems are reviewed.

The Transport Economisch Model (TEM II) is a forecasting model which is used to generate forecasts of freight transport within and in relation to the Netherlands. It is based on assumptions regarding the economic growth.

TEM II is operational since 1991. In the economic models of TEM II, forecasts are being made of economic production and attraction in tonnes.

ATTACK II is a freight forecasting model which is based upon the extrapolation of logistic trends. The model produces forecasts for road based kilometrage of goods vehicles, by vehicle type.

Forecasts are carried out for:

MINISTERIE VAN VERKEER EN WATERSTAAT
Directoraat-Generaal Rijkswaterstaat, Transport Research Centre AVV
Postbus 1031
3000 BA ROTTERDAM
tel. +31 (10) 282 66 00
fax. +31 (10) 282 90 29

The TEM II forecasting model is developed by:

NEA
Postbus 1969
2280 DZ RIJSWIJK
tel. +31 (70) 398 83 88
fax. +31 (70) 395 41 86

The ATTACK forecasting model is developed by:

NEI
Postbus 4175
3006 AD ROTTERDAM
tel. +31 (10) 453 88 00
fax. +31 (10) 453 07 68

Publications on the model systems and forecasts are:

DIRECTORAAT-GENERAAL RIJKSWATERSTAAT
1993a *Goederenverkeer in 2015 volgens de nieuwe CPB-scenario's.* Rotterdam: Directoraat-Generaal Rijkswaterstaat, Adviesdienst Verkeer en Vervoer.

DIRECTORAAT-GENERAAL RIJKSWATERSTAAT
1993b *Prognose Goederenverkeer 1993. 1986-1991...2010 in het kader van de SVV-verkenning 1993. Herziene versie.* Rotterdam: Directoraat-Generaal Rijkswaterstaat, Adviesdienst Verkeer en Vervoer.

NEA
1991 *TEM II. Hoofdrapport.* (910139/12574). Rijswijk: NEA.

NEI - NEDERLANDS ECONOMISCH INSTITUUT
1993 *ATTACK. Een Interactief Computer-Simulatiemodel voor het Bedrijfs-voertuigenpark; Functionele Specificatie.* (T1668 UIT/YD 09-03-1993). Rotterdam: NEI.

NEI - NEDERLANDS ECONOMISCH INSTITUUT
1995 *ATTACK 2.0. Alternatieve Definitiestudie. Concept.* (T2584 BUS/YD 17-08-1995). Rotterdam: NEI.

2.3.2 Type of forecasts

2.3.2.1 ATTACK

The ATTACK forecasts for freight traffic forecasts cover the following:

Total tonnage	Yes
Total tonnage by commodity class	Yes
Distinguished classes	Agriculture Other nutrition Mineral fuel Oil / Oil related products Ore / Ore related Metal / Metal products Intermediate products Agri-waste products Chemicals Other/Unknown
Total tonnage by mode	Yes
Distinguished modes	Road (10 types of road vehicle)
Total ton kilometrage by class	Yes
Distinguished classes	Agriculture Other nutrition Mineral fuel Oil / Oil related products Ore / Ore related Metal / Metal products Intermediate products Agri-waste products Chemicals Other/Unknown
Total ton kilometrage by mode	Yes
Distinguished modes	Road (10 types of road vehicles)
Types of movements forecast	National International (in/out) Transit
Number of vehicles by mode	Yes (10 types of road vehicles)

Additional features:

- ATTACK also computes estimates for fuel consumption and emissions levels, for different types of road vehicles.
- The forecasts produced by ATTACK may be segmented to speed classes.

2.3.2.2. TEM II

The TEM II forecasts for freight traffic transport cover the following:

Total tonnage	Yes
Total tonnage by commodity class	Yes (16 groups)
Distinguished classes	27 types
Total tonnage by mode	Yes
Distinguished modes	Road Rail Inland water
Total tonne kilometrage by com. class	Yes
Distinguished classes	27 types [not known yet]
Total tonne kilometrage by mode	Yes
Distinguished modes	Road Rail Inland water
Types of movements forecast	National International (in/out) Transit
Number of vehicles by mode	No

Additional features:

- Combinations of modes (chains) are incorporated in the modal split procedures.

2.3.3 Type of freight transport model

2.3.3.1 ATTACK

The ATTACK model system consists of various components:

Production/Attraction model	Based on trend analysis
Distribution model	Based on trend analysis
Mode choice model	Mode choice restricted to road vehicles.
Time dimension	Year

Additional features:

- Relevant dimensions in the models are economy, spatial and logistic organisation of products and consumption and technology of vehicle, fuel and emissions.
- ATTACK covers, in addition to freight transport by road, also busses.
- Growth is based on economic growth per commodity sector and on elasticities for tonne kilometrage per sector.
- Only road freight vehicles are forecasted with the model system.

2.3.3.2 TEM II

The components of the TEM model are:

Production/Attraction model	Based on analytical model
Distribution model	Based on analytical model
Mode choice model	Based on analytical model
Time dimension	Year

Additional features:

- The model doesn't include the simulation of network changes, impact of congestion, impacts of EU-rules and legislation on axle-loads and vehicle size, or policies of other EU countries.

2.3.4 Base and forecast years

2.3.4.1 ATTACK

The base and forecasts years are:

Base year	1989
Future year	2000 and 2010

2.3.4.2 TEM II

The base and forecasts years are:

Base year	1990
Future year	2000, 2010, 2015

2.3.5 Key input data

2.3.5.1 ATTACK

The key input for ATTACK concerns for the base year the transported tonnes (kilometrage) of goods, the number of vehicles (by class), degree of vehicle load, transport elasticities per commodity. emissions by vehicle type, and vehicle specifications.

The functional specification of ATTACK (NEI, 1993a) presents a lot of key input data (mentioned above), on which forecasts are based.

2.3.5.2 TEM II

TEM II uses socio-economic variables as key input data. Table 2.4 presents the main socio economic variables used.

Tabel 2.4: *Main socio-economic variables (exogeneous entities) for 2015 European Renaissance (1990=100).*

Entity	*Index*
Population	110
Number of workers	126
Yearly mutations in %	
GNP volume	2.8%
Private consumption volume	2.9%
Employment	0.7%
Collective expense quote	56.5%
Collective tax quote	51.4%
Finance deficit	3.3%

Source: Directoraat-Generaal Rijkswaterstaat, 1993a

2.3.6 Level of forecasts

2.3.6.1 ATTACK

Forecasts by ATTACK show an increase of total transported volume by road between 1986 and 2010 (European Renaissance) by an index of 178.

Tabel 2.5: *Transported volume (mln tonnes) by mode in 1986, 2000 and 2010 European Renaissance*

	Volume tonnes			*Index*		
Mode	*1986*	*2000*	*2010*	*1986*	*2000*	*2010*
Road	456	663	810	100	145	178

Source: Directoraat-Generaal Rijkswaterstaat, 1993b

Other key results are presented in table 2.6. In this table a number of values are presented concerning the transported volume as well as changes concerning the vehicles.

Table 2.6: *Global results for ATTACK for 2010 European Renaissance (1986=100).*

Variable	*Index*
Tonnage	183*
Increase trip length	145
Tonne kilometrage (in Netherlands)	266
Extra modal shift	-4%
Efficiency	-14%
Effect of change in nr vehicles	-2%
HLV kilometrage	216
Vans kilometrage	240

Source: Directoraat-Generaal Rijkswaterstaat, 1993a
* = ecxl. policy impact

2.3.6.2 TEM II

TEM II is being used to produce forecasts for several scenarios. The most important one (European Renaissance) is presented in this paragraph. In table 2.7 a summary overview of the results for European Renaissance is presented.

Table 2.7: *Main results for 2015 European Renaissance (1990=100).*

Entity	*Index*
Tranported tonnes per year	170
Yearly tonne kilometrage	199
Vehicle kilometrage	161

Source: Directoraat-Generaal Rijkswaterstaat, 1993a

These main results can be split into the different modes, for both national and international traffic. The main results are presented in table 2.8.

Table 2.8: *TEM II results (tonnes per year) by mode and zoning for 2015 European Renaissance (1990=100).*

Mode	*Index*
National	149
Road	151
Ship	138
Rail	176
International	192
Road	245
Ship	156
Rail	218
Total	170

Source: Directoraat-Generaal Rijkswaterstaat, 1993a

2.3.7 Status of the forecasts

2.3.7.1 ATTACK

ATTACK produces strategic forecasts for annual kilometrage for goods vehicles by road. The results are being used for transport planning purposes by government agencies. They are however not the only set of forecasts being used, as similar forecasts of kilometrage are derived from TEM. The ATTACK forecasts for kilometrage are considered to be authoritative.

2.3.7.2 TEM II

TEM II is applied for national multi-modal freight forecasts. It generates information on tonnage from which kilometrage information can be derived. TEM is the only model producing forecasts of tonnage and in this sense the forecasts are authoritative. However when additional information is available, this will be taken into account.

3 Germany

3.1 Introduction

In the federal republic of Germany there are three administrative levels; central government, the states and municipalities. The Bundesministerium für Verkehr is responsible for transport infrastructure and for telecommunication. The Ministry is in charge of the national road and rail networks. Executive responsibilities have been discharged to individual states and some larger cities, which are responsible for planning, management and maintenance.

The Bundesministerium is charged with the responsibility to produce traffic forecasts, for, amongst other, the Bundesverkehrswegenplan. Forecasts are, however, also produced at the state level in support of state policies.

Consultants associated with the production of national personal travel forecasts are:

INTRAPLAN CONSULT GMBH
Orleansplatz 5a
8000 MÜNCHEN 80
tel. +49 (89) 448 48 04
fax. +49 (89) 447 05 93

and

INSTITUTE FUR ANGEWANDTE VERKEHRS- UND TOURISMUSFORSCHUNG E. V.
Kreuzaeckerstrasse 15
7100 HEILBRONN

Consultants associated with the production of national freight transport forecasts are:

KESSEL+PARTNER VERKEHRSCONSULTANTS
Schwimmbadstrasse 15
FREIBURG i.Br.
tel. +49 (761) 743 80
fax. +49 (761) 743 88

3.2 Strategic traffic forecasts

3.2.1 Introduction

The strategic forecasts for personal travel are carried out for:

BUNDESMINISTERIUM FÜR VERKEHR
Robert Schumanplatz 1
5300 BONN 2
tel. +49 (228) 300 0
fax. +49 (228) 300 34 29

The most recent forecasts, taking account of effects of the recent re-unification of East and West Germany, are carried out by a collaboration between Intraplan Consult Gmbh and IVT e.V.

INTRAPLAN CONSULT GMBH
Orleansplaz 5a
8000 MÜNCHEN 80
tel. +49 (89) 448 48 04
fax. +49 (89) 447 05 93

There is only one official national forecast for personal travel. Alternative forecasts for transport policy options within a given socio-economic scenario exist.

The publicly available document containing the background information on forecasts and results is:

INTRAPLAN CONSULT UND IVT
1991 *Personenverkehrsprognose 2010 für Deutschland; Schlußbericht (Langfassung).* (Forschungs- und Entwicklungsvorhaben FE-Nr. 90300/90 des Bundesminister für Verkehr). München/Heilbron: Intraplan und IVT.

3.2.2 Type of forecasts

The official national traffic forecasts for personal travel cover the following:

Driving licence holding:	no
Car ownership forecasts:	yes
Number of trips:	yes
modes distinguished:	walk
	bicycle
	car
	train
	bus
	air
	total
purposes distinguished:	work (<24 hr)
	education (<24 hr)
	shopping

	business (>24 hr) holiday (>5 days) private/leisure (<5 days)
Kilometrage travelled:	yes
modes distinguished:	walk bicycle car train bus air total
purposes distinguished:	work (<24 hr) education (<24 hr) shopping business (>24 hr) holiday (>5 days) private/leisure (<5 days)
Time dimensions:	year

3.2.3 Types of traffic models

demographic model:	forecast for population by segment and car ownership category
trip frequency model:	trip rates by segment and purpose
distribution model:	gravity model
modal split model:	log linear mode split models based on segment specific mode choice probabilities licence holding by person car ownership by person and household
assignment model:	not included
congestion feed back:	fixed speed reduction for forecast year assumed in mode choice model.
time of day choice	no
suitability for demand evaluation	yes
suitability for supply evaluation	yes
zoning:	443 zones 281 zones within West Germany 77 zones within East Germany 2 zones for Berlin 83 zones abroad (NL=4 zones)

The national forecasts for Germany are based on a model system for short distance travel (<50km) and a model system for long distance travel (>50km). The long distance model consists of a base matrix and three sub-models each of which impacts at three levels.

The sub-models are the socio-economic development sub-model, transport supply sub-model, and costs and policy sub-model. Each model operates at the level of traffic generation, distribution and modal split.

It has been reported that recent supplementary work also includes forecasts at network level.

3.2.4 Base and forecast years

The base and forecast years for the German models are:

Base year: 1988

Forecast year: 2010

3.2.5 Key input data/underlying assumptions

A summary of key input data for the traffic forecasting model are:

Table 3.1: *Key input data for 1988 and 2010.*

Variable	*1988*	*2010*
Population (mln)	77.9	78.1
Population (base=100)	100	100
Household size	2.2	2.2
Household size (base=100)	100	100
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	190
Car ownership (mln) *)	32.9	45.5
Car ownership (base=100)	100	138
Car / household	0.92	1.27
Car / household (base=100)	100	138
Car / Inhabitant	0.42	0.58
Car / Inhabitant (base=100)	100	139
Driving licence (mln)	-	-
Driving licence (base=100)	100	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	130
Real PT prices (base=100)	100	-
Real parking costs (base=100)	-	1-10 DM

Source: Verkehrsministerium Verkehr , 1995
(- = not available)

It is important to note that it is assumed that the standard of living in the former East Germany will be levelled with the living standard in West Germany.

3.2.6 Level of forecasts

The levels of forecasts presented under this heading relate to a Reference Scenario which include increased user costs, parking restraint measures the effects of congestion. The effects of these as compared with a No Change policy are best illustrated by the resulting increase in car kilometrage. The Reference Scenario has an index 142 for this indicator and the No Change scenario an index of 152

Table 3.2: *Level of base and forecasts in trips, kilometrage and trip length for modes per annum.*

Mode	*Trips (bln)*			*Kilometrage (bln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Car driver	26.1	33.1	127	418.9	595.8	142	-	-	-
Car pass.	8.6	7.0	81	228.1	242.1	106	-	-	-
Train	1.62	1.62	100	62.3	88.0	141	-	-	-
Bus	8.00	7.41	93	86.3	110.3	127	-	-	-
Bike	10.34	8.34	81	25.5	21.3	84	-	-	-
Walk	24.21	24.89	103	27.6	28.2	102	-	-	-
Other	0.05	0.11	224	13.7	34.3	251	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: Verkehrsministerium Verkehr NRW, 1995. *) Walk means walk+bike.

There are many separate statistics available on long (>50km) and short distance (<50km) traffic.

3.2.7 Status of the forecasts

The ITP/IVT forecasts for 2010 are the official forecasts of the Bundesregierung which include the impact of the re-unification of East and West Germany. They are being used for policy evaluation and for the development of the BVWP. The forecasts also provide a framework for individual states to produce forecasts for base and alternative state policies.

3.3 Strategic forecasts for freight traffic

3.3.1 Introduction

The most recent strategic forecast for freight in Germany was carried out in 1991 for:

BUNDESMINISTERIUM FÜR VERKEHR
Robert Schumanplatz 1
5400 BONN 2
tel. +49 (228) 300 0
fax. +49 (228) 300 34 29

The forecasts were composed by:

KESSEL+PARTNER VERKEHRSCONSULTANTS
Schwimmbadstrasse 15
FREIBURG i.Br.
tel. +49 (761) 743 80
fax. +49 (761) 743 88

The results of the strategic forecast were published in:

KESSEL+PARTNER VERKEHRSCONSULTANTS
1991 *Güterverkehrsprognose 2010 für Deutschland; Schlußbericht.* (Forschungsprojekt FE-Nr. 90299/90 des Bundesminister für Verkehr). Freiburg: Kessel+Partner Verkehrsconsultants.

The forecasts involve an official reference and scenario's at a national level. In the scenario's mode choice and other impacts are being computed for freight. The forecasts are published in the report referred to above.

3.3.2 Type of forecasts

The official national forecast for freight traffic cover the following:

Total tonnage	Yes
Total tonnage by commodity class	Yes
Distinguished classes	Agricultural products Nutrition, Food Coal Oil Mineral oil Iron ore Other ore Iron,Steel,Metal Rocks, Deposits Chemical products Investment goods Consumer products
Distinguished modes	Road (distance > 50 km) Rail Wate-
Total tonne kilometrage by class	Yes
Distinguished classes	Agricultural products Nutrition,Food Coal Oil Mineral oil Iron ore Other ore Iron,Steel,Metal Rocks, Deposits Chemical products Investment goods Consumer products

Distinguished modes	Road (distance > 50 km) Rail Water
Types of movements forecast	National International (in/out) Transit
Number of vehicles by mode	No (the report doesn't present them, but they might be available (see p. 3, pt. 5))

3.3.3 Type of freight transport model

The component of the model system are:

Production/Attraction model	Based upon trend analysis (1970-1988 extrapolated)
Distribution model model	Based upon trend analysis (1970-1988 extrapolated). The depends upon socio-economic variables in a region. Growth from 1988 to 2010 was estimated by extrapolation.
Mode choice model	The modal split models were derived from the Bundesbahn. Modal split is dependent on type of goods to be transported and the relative differences between road, rail and ship.
Time dimension	Year

3.3.4 Base and forecast years

The base and forecast years are:

Base year	1988
Future year	2010

3.3.5 Key input data

Table 3.3 presents the net product value (prices 1980) for different products in Western Germany. The overall annual growth is estimated at 2.9 % per annum. This results in a growth index of 167.3 between 1988 and 2010.

Tabel 3.3: *Net product value (DM 1980) for West-Germany in 1988 and 2010*

Products	*1988*	*2010*	*Index*	*Annual. Growth*
Agriculture	33.4	41.3	123.7	1.0%
Mining	53.6	63.8	119.0	0.8%
Chemical	86.7	150.7	173.8	3.2%
Rocks,Deposits	18.1	29.3	161.9	2.7%
Steel products	36.2	45.2	124.9	1.1%
Investment goods	140.1	240.8	171.9	3.1%
Consumer products	157.3	328.9	209.1	4.7%
Nutrition	50.1	70.9	141.5	1.8%
Building related	88.8	140.3	158.0	2.5%
Total	664.3	1111.2	167.3	2.9%

Source: Kessel+Partner Verkehrsconsultants, 1991

3.3.5 Level of base and forecasts

In table 3.4 an overview is presented for the amount of products being transported in Germany in 1988 and 2010. The origin of the products is in the western part of Germany. The overall growth index estimated for the period 1988-2010 is 128.9.

Note the different commodity classes between table 3.4 and 3.3.

Tabel 3.4: *Products in mln tonnes (origin West-Germany), in 1988 and 2010*

Products	*1988*	*2010*	*Index*
Agricultural products	16.1	16.1	100.0
Nutrition,Food	70.3	95.9	136.4
Coal	92.6	98.7	106.6
Crude Oil	1.5	0.6	40.0
Mineral oil	53.7	52.8	98.3
Iron ore	22.7	24.4	107.5
Other ore	20.1	25	124.4
Iron,Steel,Metal	74.9	89.8	119.9
Rocks, Deposits	129.5	138.3	106.8
Chemical products	72.6	99	136.4
Investment goods	32.4	46.4	143.2
Consumer products	122.9	233.6	190.1
Total	709.3	920.6	129.8

Source: Kessel+Partner Verkehrsconsultants, 1991

Table 3.5 shows a condensed goods matrix for Germany. The figures for Germany include goods to and from Eastern-Germany. The figures for 1988 have been estimated using available data, as only aggregate values of imports and exports are known. Between 1988 and 2010 a growth of product in 1000 tonnes was estimated with an index of 128,9.

Table 3.5: *Products in 1000 tonnes in 1988 and 2010 within, from, to and through Germany.*

From/To	*Year*	*Germany*	*Europe*	*Total*
Germany	2010	**894835**	**302315**	**1197150**
	1988	888948	162141*)	1051089
	Index	*100.7*	*186.5*)*	*113.9*
Europe	2010	**422319**	**76506**	**498825**
	1988	226502*)	38134	264636
	Index	*186.5*)*	*200.6*	*188.5*
Total	2010	**1317154**	**378821**	**1695975**
	1988	1115450	200275	1315725
	Index	*118.1*	*189.2*	*128.9*

Source: Kessel+Partner Verkehrsconsultants, 1991.
*) These figures were estimated for 1988 by HCG. Import and totals to 388643.

Apart from the tables presented above, forecasts have also been produced in terms of billions tonne kilometres per year. In 1988 the amount for Germany was 450 billion tonne kilometres per year. For 2010 this variable was estimated for three scenario's, which mainly contained a modal split effect. The total amount for 2010 was estimated at 870 billion tonne kilometres, i.e. an index of 193.

The tonne kilometrage was estimated for road, rail and ship. For 1988 the tonne kilometrage was respectively 188, 167 and 95. For 2010 this depends upon the scenario used, but they all sum up to 870 billion tonne kilometres. (Kessel 1991; p. 34, pt. 2).

3.3.7 Status of the forecasts

The 1991 freight forecast for Germany is the most recent one available. The forecasts were made for the Bundesministerium für Verkehr. The reference forecasts and the scenario forecasts, provide a framework for the definition of infrastructural needs and building programs.

4 Nordrhein-Westfalen

4.1 Introduction

Nordrhein-Westfalen is one of the 16 states of the federal republic of Germany. It is charged with responsibilities for planning and maintenance of its road infrastructure for motorways, as a task delegated from the central government. The state is responsible in its own right, for all non motorway roads.

4.2 Strategic forecasts for passenger traffic

4.2.1 Introduction

In 1994 a strategic forecast for personal travel in the Bundesland Nordrhein-Westfalen was carried out for:

MINISTERIUM FÜR STADTENTWICKLUNG UND VERKEHR DES LANDES NRW
Dr.-Ing. Manfred Ueberschaer
Breite Straße 27
40190 DÜSSELDORF
tel. +49 211 837 43 22
fax. +49 211 837 44 44

The forecasts were produced by the ministry, in collaboration with:

INGENIEURGRUPPE IVV
Aachen
tel. +49 241 946 910
fax. +49 241 531 1622

The forecasts have a restricted availability to cities, counties and public transport companies.

The results of the strategic passenger forecasts were published in:

MINISTERIUM FÜR STADTENTWICKLUNG UND VERKEHR DES LANDES NRW
1994 *Verkehrsentwicklung in Nordrhein-Westfalen; Verkehrsanalyse 1990. Verkehrsprognose 2010.* (MSV-Dokumentationen DOK 20/94). Düsseldorf: Ministerium für Stadtentwicklung und Verkehr.

4.2.2 Type of forecasts

The official national forecast for passenger traffic cover the following:

Driving licence holding	No
Car ownership	Yes
Number of trips	Yes
Distinction by mode	Private car Public Transport Walking Bike
Distinction by purpose	Travel to and from work Business Education Recreation Private business
Kilometrage travelled	Yes
Distinction by mode	Private car Public transport Bike Walk
Distinction by purpose	Travel to and from work Business Education Recreation Private business
Time dimension of the forecasts	All day (24 hour) Year

4.2.3 Type of passenger traffic model

The type of passenger traffic models are based upon:

Driving licence model	No model applied
Car ownership model	Trend analyses
Trip frequency model	Disaggregate analytical model
Distribution model	Disaggregate analytical model
Mode choice model	Disaggregate analytical model
Assignment model	Car: congested technique PT: all-or-nothing technique PT: congested technique
Feedback congestion	Yes
Time-of-day choice	No
Model suitable for demand evaluation	Yes

Model suitable for supply evaluation	Yes

4.2.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2010

4.2.5 Key input data

From table 4.1 it becomes clear that the overall growth is moderate compared to other parts of Germany and compared to other countries in Europe. However, the number of cars per household is fairly high for both base year and future year, with value of respectively 1.07 and 1.21.

Table 4.1: *Key input data for 1990 and 2010.*

Variable	*1990*	*2010*
Population (mln)	17.35	17.53
Population (base=100)	100	101
Household size	2.3	2.2
Household size (base=100)	100	104
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	146
Car ownership (mln) *)	8.12	9.55
Car ownership (base=100)	100	118
Car / household	1.07	1.21
Car / household (base=100)	100	113
Car / Inhabitant	0.47	0.54
Car / Inhabitant (base=100)	100	116
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	125-135
Real PT prices (base=100)	100	105
Real parking costs (base=100)	100	150-200

Source: Verkehrsministerium Verkehr NRW, 1995; (- = not available)

4.2.6 Level of the forecasts

The forecasts have been based on the scenario H for Germany, which is being used as a Reference Scenario. The forecasts for Nordrhein-Westfalen are embedded in the forecasts for Germany. This is also the case with the policies. In the tables 4.2 and 4.3 below, some key figures are presented for Nordrhein-Westfalen. As can be seen the growth in trips and kilometrage is moderate.

Table 4.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Private car	27.96	32.06	115	422.23	502.11	119	15.10	15.66	104
PT	5.74	6.42	112	75.15	93.61	125	13.09	14.57	111
Walk *)	19.17	19.04	99	29.14	29.98	103	1.52	1.57	104
Bike	na	na	na	na	na	na	na	na	na
Total	52.88	57.52	109	526.52	625.70	119	9.96	10.88	109

Source: Verkehrsministerium Verkehr NRW, 1995. *) Walk means walk+bike.

Table 4.3 shows the same values as presented in table 5.2, but now for all the purposes. Now figures for kilometrage are available unfortunately.

Table 4.3: *Level of base and forecasts in trips, kilometrage and trip length for purposes.*

*Purpose *)*	*Trips (mln)*			*Kilometrage (mln)*			*Triplength (km)*		
	1990	2010	Index	1990	2010	Index	1990	2010	Index
Work	15.20	16.00	105	-	-	-	-	-	-
Business	2.90	3.20	110	-	-	-	-	-	-
Education	5.30	5.60	106	-	-	-	-	-	-
Shopping	16.00	17.30	108	-	-	-	-	-	-
Leisure	13.50	15.40	114	-	-	-	-	-	-
Total	52.90	57.50	109	526.52	625.70	119	9.96	10.88	109

Source: Verkehrsministerium Verkehr NRW, 1995 (- = not available). *) Shopping was defined as Private business, Leisure as Recreation.

4.2.7 Status of the forecasts

The strategic passenger forecasts for Nordrhein-Westfalen provide a firm framework for the definition of infrastructural needs. In fact it provides input for the Masterplans for roads and railways.

The traffic forecasts play an important role in the formulation of transport policy at both regional and state level. The forecasts are used for land use development plans.

4.3 Strategic forecasts for freight traffic

4.3.1 Introduction

A strategic forecast for freight in the Bundesland Nordrhein-Westfalen was carried out in 1994 for:

MINISTERIUM FÜR STADTENTWICKLUNG UND VERKEHR DES LANDES NRW

Dr.-Ing. Manfred Ueberschaer
Breite Straße 27
40190 DÜSSELDORF
tel. +49 (211) 837 43 22
fax. +49 (211) 837 44 44

The forecasts were produced by the ministry in collaboration with:

KESSEL+PARTNER VERKEHRSCONSULTANTS
Schwimmbadstrasse 15
FREIBURG i.Br.
tel. +49 (761) 743 80
fax. +49 (761) 743 88

INGENIEURGRUPPE IVV
AACHEN
tel. +49 241 946 910
fax. +49 241 53 1622

The results of the strategic freight forecasts were published in:

MINISTERIUM FÜR STADTENTWICKLUNG UND VERKEHR DES LANDES NRW
1994 *Verkehrsentwicklung in Nordrhein-Westfalen; Verkehrsanalyse 1990. Verkehrsprognose 2010.* (MSV-Dokumentationen DOK 20/94). Düsseldorf: Ministerium für Stadtentwicklung und Verkehr.

4.3.2 Type of forecasts

The official state forecasts for freight traffic cover the following:

Total tonnage	Yes
Total tonnage by commodity class	Yes
Distinguished classes	Agricultural products Nutrition,Food Coal Crude oil Mineral oil Iron ore Other ore Iron,Steel,Metal Rocks, Deposits Chemical products Investment goods Consumerproducts
Distinguished modes	Road (distance > 50 km) Rail Water
Total tonne kilometrage by commodity class	Yes
Distinguished classes (not published in tables)	Agricultural products Nutrition,Food Coal Oil Mineral oil Iron ore Other ore Iron,Steel,Metal

	Rocks, Deposits Chemical products Investment goods Consumerproducts
Distinguished modes	Road (distance > 50 km) Rail Water
Types of movements forecast	Regional National (in/out) International (in/out) Transit
Number of vehicles by mode	Yes, but only for road

4.3.3 Type of freight transport model

The forecasts for Nordrhein-Westfalen are embedded in the national forecasts and policies for Germany (reference forecast 'scenario H'). Basis for the forecasts are socio-economic data at the level of Germany. For 2010 a forecast for the socio-eccnomic variables is made which are input to the freight forecasts.

Production/Attraction model	Probably, but not referenced in the report.
Distribution model	Yes (a matrix was made for NRW. Therefore some distribution model was used somehow).
Mode choice model	Yes, no further details known.
Time dimension	Year

4.3.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2010

4.3.5 Key input data

In table 4.4 an overview is given for the volume of products being transported in NRW in 1990 and 2010. Overall it was estimated that a growth would occur with an index of 134.4 between 1990 and 2010. Compared to the results for Germany (Chapter 3) this level is somewhat higher (129.8 vs. 134.4).

Note that the commodity classes are the same as those used for Germany (see Chapter 3).

Tabel 4.4: *Products in mln tonnes (within, to, from and through Nordrhein-Westfalen) in 1990 and 2010.*

Products	*1990*	*2010*	*Index*
Agricultural products	15.89	17.46	109.9
Nutrition,Food	47.25	66.19	140.1
Coal	82.86	91.31	110.2
Crude Oil	0.64	0.19	29.7
Mineral oil	37.79	43.07	114.0
Iron ore	44.25	44.80	101.2
Other ore	15.05	13.11	87.1
Iron,Steel,Metal	70.79	84.18	118.9
Rocks, Deposits	85.98	103.10	119.9
Chemical products	60.23	98.16	163.0
Investment goods	21.51	37.23	173.1
Consumer products	78.05	154.50	198.0
Total	560.29	753.30	134.4

Source: Ministerium für Stadtentwicklung und Verkehr, 1994

4.3.6 Level of base and forecasts

Table 4.5 shows a condensed goods matrix for Nordrhein-Westfalen. Between 1990 and 2010 a growth index of 134.4 of products in millions tonnes has been estimated. The largest share of this growth stems from import, export and transit.

Table 4.5: *Products in mln tonnes in 1990 and 2010 within, from, to and through Nordrhein-Westfalen (NRW)..*

From/To	*Year*	*NRW*	*Out*	*Total*
NRW	2010	**119.63**	**218.32**	**337.95**
	1990	126.31	163.13	289.44
	Index	*94.7*	*133.8*	*116.8*
Out	2010	**200.74**	**214.62**	**415.36**
	1990	144.91	125.99	270.90
	Index	*138.5*	*170.3*	*153.3*
Total	2010	**320.37**	**432.94**	**753.31**
	1990	271.22	289.12	560.34
	Index	*118.1*	*149.7*	*134.4*

Source: Ministerium für Stadtentwicklung und Verkehr, 1994

Table 4.6 shows the share of transported goods by mode. As can be seen the largest amount of goods is transported by road. It is noted however, that this data only relates to traffic over distances greater than 50 km. When short distance freight transport is taken into account, the total amount of goods almost doubles to 1502.43 mln tonnes in 2010.

Table 4.6: *Products in mln tonnes in 1990 and 2010 by mode in Nordrhein-Westfalen (NRW)..*

	1990	*2010*	*Index*
Road	216.33	294.55	136.2
Rail	160.51	225.21	140.3
Ship	183.45	233.55	127.3
Total	560.29	753.31	134.5

Source:Ministerium für Stadtentwicklung und Verkehr, 1994

Apart from the tables presented above, some forecasts were made concerning the yearly amount of traffic, presented in billions of tonne kilometres per year. In 1990 the amount for NRW was 69 billion of tonne kilometres per year. The total amount for 2010 was estimated at 103 billion, an index of 148. Compared to the national growth (193) this is significantly lower.

Table 4.7: *Bln tonne kms in 1990 and 2010 by mode in Nordrhein-Westfalen (NRW).*

	1990	*2010*	*Index*
Road (> 50 km)	30.10	42.18	140.1
Rail	13.52	24.64	182.2
Ship	25.81	36.13	140.0
Total	69.43	102.95	148.3

Source: Ministerium für Stadtentwicklung und Verkehr, 1994

4.5.7 Status of the forecasts

The freight forecasts for the state of Nordrhein-Westfalen are embedded in the national forecasts for Germany. The status of the forecasts is the same as for the nation. Based upon scenario's impacts of policy alternatives have been estimated. These form a basis for plans on infrastructure (See NRW, 1994, foreword).

5 Baden-Württemberg

5.1 Introduction

Baden-Württemberg is one of the states of the federal republic of Germany. It is charged with responsibilities for planning and maintenance of its road infrastructure for motorways, as a task delegated from the central government. The state is responsible in its own right for all non motorway roads.

5.2 Strategic forecasts for passenger traffic

5.2.1 Introduction

A strategic forecast for passenger traffic in the Bundesland Baden-Württemberg was carried out for:

VERKEHRSMINISTERIUM BADEN-WÜRTTEMBERG
Dipl.-Ing. Jürgen Holzwarth
Hauptstätter Straße 67
D-70178 STUTTGART
tel. +49 (711) 644 21 21
fax. +49 (711) 644 21 99

The forecasts were produced by the ministry. It is not known whether the forecasts were made in jointly with consultants and there is no information on publications that may be referred to. Reference forecasts and forecasts for policy alternatives have been made. These forecasts are publicly available.

5.2.2 Type of forecast

The official national forecast for passenger traffic cover the following:

Driving licence holding	Yes
Car ownership	Yes
Number of trips	Yes

Distinction by mode	Private car Public Transport Walking Bike
Distinction by purpose	Travel to and from work (non) Homebased business Education Leisure Shopping
Kilometrage travelled	Yes
Distinction by mode	Private car Public transport Bike Walk
Distinction by purpose	No
Time dimension of the forecasts	All day (24 hour) Year

5.2.3 Type of passenger traffic model

The type of passenger traffic models are based on:

Driving licence model	Disaggregate analytical model
Car ownership model	Trend analyses Disaggregate analytical model
Trip frequency model	Disaggregate analytical model
Distribution model	Disaggregate analytical model
Mode choice model	Disaggregate analytical model
Assignment model	Car: congested technique PT: congested technique
Feedback congestion	Yes
Time-of-day choice	No
Model suitable for demand evaluation	Yes
Model suitable for supply evaluation	Yes

5.2.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2010

5.2.5 Key input data

From table 5.1 it becomes clear that the expected changes in socio-economic variables is moderate when compared to other parts of Germany and compared to other countries in Europe.

Table 5.1: *Key input data for 1990 and 2010.*

Variable	*1990*	*2010*
Population (mln)	9.82	10.60
Population (base=100)	100	108
Household size	-	-
Household size (base=100)	-	-
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	166
Car ownership (mln) *)	4.92	6.10
Car ownership (base=100)	100	124
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	0.50	0.58
Car / Inhabitant (base=100)	100	115
Driving licence (mln)	5.65	7.12
Driving licence (base=100)	100	126
Licence / Inhabitant	0.58	0.67
Licence / Inhabitant (base=100)	100	117
Real petrol prices (base=100)	100	160
Real PT prices (base=100)	100	130
Real parking costs (base=100)	100	130

Source: Verkehrsministerium Verkehr B-W, 1995
*) Another figure presented for 2010 was 6.59 mln
(- = not available)

5.2.6 Level of the forecasts

Table 5.2 presents a summary overview of the main results of the 'New Traffic Policy' forecasts. It appears that this scenario is based on the national reference scenario. All figures appear plausible, except for the growth of kilometrage for public transport. It may be that the kilometrage has to be 12.97 instead of 22.97 mln kilometres.

Comparing the total trips in the table (9.94 mln in 1990) with the number of inhabitants (9.82 mln) it becomes clear that the average number of trips made in one day is very low (1.01 trip per day). Compared to the number of trips made in the Netherlands (approximately 3.5) there is a difference of 2.5 trips.

Table 5.2: *Level of base and forecasts in trips, kilometrage and trip length by modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Private car	5.20	6.00	115	95.25	108.50	114	18.32	18.08	99
PT	0.90	0.90	100	12.34	22.97	186	13.71	25.52	186
Walk	2.65	2.78	105	3.92	4.37	111	1.48	1.57	106
Bike	1.20	1.26	105	3.64	4.00	110	3.03	3.17	105
Total	9.95	10.94	110	115.69	142.46	123	11.63	13.02	112

Source: Verkehrsministerium Verkehr B-W, 1995

Table 5.3 shows the same variables as presented in table 6.2, but now for all the travel purposes. Figures for kilometrage are not available. The difference in the total number of trips travelled is roughly in line with population growth.

Table 5.3: *Level of base and forecasts in trips, kilometrage and trip length by purposes.*

Purpose	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	2010	Index	1990	2010	Index	1990	2010	Index
Work	2.37	2.55	108	-	-	-	-	-	-
Business	0.39	0.44	113	-	-	-	-	-	-
Education	0.59	0.59	100	-	-	-	-	-	-
Shopping	2.20	2.41	110	-	-	-	-	-	-
Leisure	4.39	4.88	111	-	-	-	-	-	-
Total	9.94	10.87	109	115.69	142.46	123	11.64	13.11	113

Source: Verkehrsministerium Verkehr B-W, 1995 (- = not available)

5.2.7 Status of the forecasts

The strategic passenger forecasts for Baden-Württemberg provide a firm framework for the definition of infrastructural needs. In fact it provides a priority of state road upgrading.

Furthermore, the forecasts are used to formulate integrated transport policies, i.e. the general transport plan for Baden-Württemberg. The forecasts are used as a basis for the ex ante evaluation of policy options.

The forecasts provide a framework for the formulation of integrated multi-modal transport policies and play an important role in the formulation of transport policies at regional level.

5.3 Strategic forecasts for freight traffic

5.3.1 Introduction

A strategic forecast for freight in the Bundesland Baden-Württemberg was carried out for:

VERKEHRSMINISTERIUM BADEN-WÜRTTEMBERG
Dipl.-Ing. Jürgen Holzwarth
Hauptstätter Straße 67
D-70178 STUTTGART
tel. +49 (711) 644 21 21
fax. +49 (711) 644 21 99

The forecasts were composed by the ministry. It is not known whether the forecasts were made in collaboration with consultants. Neither is known to what publication can be referred.

At the level of Baden-Württemberg there is more than one forecast produced over the past years. These forecasts are publicly available.

The forecasts are based upon two scenarios. One was based on the same assumptions as the federal transport plan (reference scenario (H), the other assumed realisation of the state traffic policy (state scenario).

5.3.2 Type of forecast

The official national forecast for freight traffic cover the following:

Total tonnage	Yes
Total tonnage by commodity class	Yes (although the questionnaire indicates not, there is a distinction, see § 6.3.5!)
Distinguished classes	Agricultural products Nutrition,Food Coal Crude oil Mineral oil Iron ore Other ore Iron, Steel, Metal Rocks, Deposits Chemical products Investment goods Consumer products
Distinguished modes	Road Rail Water
Total tonne kilometrage	Yes
Distinguished modes	Road Rail Water

Types of movements forecast	Regional National (in/out) International (in/out) Transit
Number of vehicles by mode	Yes, but only for road

5.3.3 Type of freight transport model

The freight model consists of the following components:

Production/Attraction model	Yes, analytical models were used.
Distribution model	Yes, analytical models were used.
Mode choice model	Yes, analytical models were used.
Time dimension	Year

5.3.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2010

5.3.5 Key input data

Table 5.4 presents the main information. Compared to the national figures to the measure of overall growth over all economic sectors (138.1) is similar to the growth in Nordrhein-Westfalen (134.4).

Table 5.4: *Transported goods in mln tonnes for 1990 and 2010.*

Commodity	*1990*	*2010*	*Index*
Consumption goods	40.8	72.3	177.2
Investment goods	10.2	14.2	139.2
Chemical products	13.9	19.0	136.7
Minerals	36.9	40.2	108.9
Steel	9.6	15.2	158.3
Metal	3.9	5.7	146.2
Oil, gasoline	21.5	21.5	100.0
Coal	8.6	14.5	168.6
Food	16.9	23.3	137.9
Agriculture	4.7	4.8	102.1
Total	167.0	230.7	138.1

Source: Verkehrsministerium Verkehr B-W, 1995

5.3.6 Level of base and forecasts

The levels of base year and forecast year are based on the assumptions of the state scenario. Compared to the volumes of products in mln tonnes presented in table 5.4, the levels for the state scenario are much higher. This is probably due to road traffic. The figures presented in table 5.5 cover all road based transport.

Table 5.5: *Products in mln tonnes in 1990 and 2010 by mode in Baden-Württemberg*

	1990	*2010*	*Index*
Road	572	802	140.2
Rail	53	110	207.5
Ship	45	56	124.4
Total	670	969	144.6

Source: Verkehrsministerium B-W, 1995

Table 5.6: *Products in mln tonnes in 1990 and 2010 within, from, to and through Baden-Württemberg (B-W)*

From/To	*Year*	*B-W*	*Out*	*Total*
B-W	2010	**654**	**85**	**739**
	1990	467	63	530
	Index	*140.0*	*134.9*	*139.4*
Out	2010	**111**	**118**	**229**
	1990	71	67	138
	Index	*156.3*	*176.1*	*165.9*
Total	2010	**765**	**203**	**968**
	1990	538	130	668
	Index	*142.2*	*156.2*	*144.9*

Source: Verkehrsministerium Baden-Württemberg, 1995

Table 5.7 presents the yearly amount of traffic in billions tonne kilometres per year. In 1990 the amount for B-W was 48 billion tonne kilometres per year. The total amount for 2010 was estimated at 73 billion tonne kilometres, a growth by an index of 150. Compared to the growth in Nordrhein-Westfalen (148) it may be concluded that growth figures are very similar.

Table 5.7: *Products in bln tonne kms in 1990 and 2010 within, from, to and through Baden-Württemberg (B-W)*

	1990	*2010*	*Index*
Road	28.56	40.46	141.7
Rail	9.16	19.17	209.2
Ship	10,58	13.22	125.0
Total	48.30	72.85	150.3

Source: Verkehrsministerium B-W, 1995

5.3.7 Status of the forecasts

The freight forecasts for Baden-Württemberg are partially embedded in the national forecasts for Germany.

The freight forecasts provide a framework for the definition of infrastructural needs and building programs and for integrated freight policies. In the responses provided in the questionnaire references were made to the state and federal road network plans and to logistic networks and freight centres.

The forecasts are also used as an input and guidance for affiliated policies like the environmental impact forecasts.

6 Hamburg

6.1 Introduction

Traffic forecasts at the regional/municipal level do not strictly belong in this project. As Hamburg was on the list of regions for consideration, however, we have approached the Freie und Hansestadt Hamburg and have obtained information on traffic forecasting procedures, which is presented in this chapter.

6.2 Strategic forecasts for passenger traffic

6.2.1 Introduction

The strategic forecast for passenger traffic in Hamburg was carried out for:

BAUBEHÖRDE - FREIE UND HANSESTADT HAMBURG
Amt für Verkehr
Hauptabteilung Verkehrsplanung
Postfach 30 05 80
Dr. K.-H. Rehbein
20302 HAMBURG
tel. +49 (40) 349 13 32 47
fax. +49 (40) 349 13 27 61

The 'Baubehörde' is a division within the planning department. The forecasts were produced in cooperation with:

PROGNOS AG
MissionStrasse 62
CH 40M BASEL
tel. 00 41 61 327 3200
fax. 00 41 61 327 3300

KESSEL+PARTNER VERKEHRSCONSULTANTS
Schwimmbadstrasse 15
FREIBURG i.Br.
tel. +49 (761) 743 80
fax. +49 (761) 743 88

At the level of Hamburg there is more than one forecast produced over the past years. These forecasts have a restricted availability. The latest

forecasts are not yet finished; a draft report with preliminary results is to be discussed shortly. The reference for this draft report is:

BAUBEHÖRDE - FREIE UND HANSESTADT HAMBURG
1995 *Verkehrsentwicklungsplanung Hamburg. Leitlinien und Handlungskonzept für eine an Arbeit und Umwelt orientierte Verkehrspolitik in Hamburg. Entwurf.* Hamburg: Baubehörde Freie und Hansestadt Hamburg.

6.2.2 Type of forecast

The official municipal forecasts for passenger traffic cover the following:

Driving licence holding	No
Car ownership	Yes
Number of trips	Yes
Distinction by mode	Private car Public Transport Walking Bike
Distinction by purpose	Work Business Education Private Shopping
Kilometrage travelled	Yes
Distinction by mode	Private car Public transport
Distinction by purpose	No
Time dimension of the forecasts	All day (24 hour) Year

6.2.3 Type of passenger traffic model

The type of passenger traffic models are based upon:

Driving licence model	No
Car ownership model	Disaggregate analytical model
Trip frequency model	Disaggregate analytical model
Distribution model	Disaggregate analytical model
Mode choice model	Disaggregate analytical model
Assignment model	Car: congested technique PT: All-or-nothing technique

Feedback congestion	Yes, but only for modes, and not for destination choice.
Time-of-day choice	Yes
Model suitable for demand evaluation	Yes
Model suitable for supply evaluation	Yes

6.2.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2010

6.2.5 Key input data

Table 6.1 presents some key input data. These are somewhat lower typically, when compared to the available information at state and national level.

Table 6.1: *Key input data for 1990 and 2010.*

Variable	*1990*	*2010*
Population (mln)	1.66	1.63
Population (base=100)	100	98
Household size	-	-
Household size (base=100)	-	-
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	-	-
Car ownership (mln) *)	0.68	0.78
Car ownership (base=100)	100	114
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	0.41	0.48
Car / Inhabitant (base=100)	100	116
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	200
Real PT prices (base=100)	100	100
Real parking costs (base=100)	100	400

Source: Baubehörde - Freie und Hansestadt Hamburg, 1995 (- = not available).

6.2.6 Level of forecasts

Table 6.2 presents an overview of forecasted levels for the number of trips, kilometrage and trip length by mode for 2010. The figures for average

trip length show that the growth forecasted in Hamburg (index 105) is moderate.

Table 6.2: *Level of base and forecasts in trips, kilometrage and trip length by mode for 1990 and 2010 (working day)..*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Private car	2.2	2.4	109	34.0	38.0	112	15.5	15.8	102
PT	1.1	1.1	100	13.0	13.0	100	11.8	11.8	100
Slow	1.6	1.6	100	0.5	1.0	200	0.5	0.5	100
Total	4.9	5.1	104	47.5	52.0	109	9.7	10.2	105

Source: Baubehörde - Freie und Hansestadt Hamburg, 1995 (- = not available).

Table 6.3 shows the same values as presented in table 6.2, but now for all travel purposes. Figures for kilometrage are not available. The data for travel purpose 'education' has been estimated by HCG, all other data are taken from the questionnaire.

Table 6.3: *Level of base and forecasts in trips, kilometrage and trip length by purposes.*

Purpose	*Trips (mln)*			*Kilometrage (mln)*			*triplength (km)*		
	1990	2010	Index	1990	2010	Index	1990	2010	Index
Work	1.6	1.7	106	-	-	-	-	-	-
Business	0.5	0.5	111	-	-	-	-	-	-
Education	1.0	0.9	91	-	-	-	-	-	-
Shopping	0.7	0.7	106	-	-	-	-	-	-
Private	1.2	1.3	108	-	-	-	-	-	-
Total	4.9	5.1	104	47.5	52.0	109	9.7	10.2	105

Source: Baubehörde - Freie und Hansestadt Hamburg, 1995 (- = not available).

6.2.7 Status of the forecasts

The Hamburg forecasts use the origin-destination matrices produced in the context of the federal transport plan as a starting position.

The strategic forecasts for Hamburg are used for the formulation of integrated multi-modal transport policies and they therefore provide a basis for ex ante evaluation of policy options. Generally they are not used to define infrastructural building programs.

The forecasts play an important role in the formulation of transport policy at regional level and are used as input and guidance for affiliated areas such as land use and environment.

6.3 Strategic forecasts for freight traffic

6.3.1 Introduction

The strategic forecast for freight traffic in Hamburg was carried out for:

BAUBEHÖRDE - FREIE UND HANSESTADT HAMBURG
Amt für Verkehr
Hauptabteilung Verkehrsplanung
Postfach 30 05 80
Dr. K.-H. Rehbein
20302 HAMBURG
tel. +49 (40) 349 13 32 47
fax. +49 (40) 349 13 27 61

The forecasts were produced in cooperation with:

PROGNOS AG
MissionStrasse 62
CH 40M BASEL
tel. 00 41 61 327 3200
fax. 00 41 61 327 3300

KESSEL+PARTNER VERKEHRSCONSULTANTS
Schwimmbadstrasse 15
FREIBURG i.Br.
tel. +49 (761) 743 80
fax. +49 (761) 743 88

At the level of Hamburg there is more than one forecast produced over the past years. These forecasts have a restricted availability. The latest forecasts are not yet finished; a draft report with preliminary results is available. The reference for this draft report is:

BAUBEHÖRDE - FREIE UND HANSESTADT HAMBURG
1995 *Verkehrsentwicklungsplanung Hamburg. Leitlinien und Handlungskonzept für eine an Arbeit und Umwelt orientiert Verkehrspolitik in Hamburg. Entwurf.* Hamburg: Baubehörde Freie und Hansestadt Hamburg.

6.3.2 Type of forecasts

The official regional forecasts for freight traffic cover the following:

Total tonnage	Yes
Distinguished commodity classes	12 classes are distinguished
Distinguished modes	Road
	Rail
	Water
Total tonne kilometrage	Yes
Distinguished commodity classes	None
Distinguished modes	None
Types of movements forecast	Regional

	National International Transito
Number of vehicles by mode	Yes, but only for road

6.3.3 Type of freight transport model

The model system consists of a number of components:

Production/Attraction model	Analytical models
Distribution model	Analytical models
Mode choice model	Analytical models
Time dimension	Average working day

6.3.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2010

6.3.5 Key input data

The nationwide forecasts from the German Transport Department are used as input data.

6.3.6 Level of base and forecasts

The level of base year and forecast year for Hamburg are based upon the assumptions of the state scenario. In table 6.4 values for transported goods in mln tonnes by mode are presented. The overall growth rate of transported products between 1990 and 2010 is 144. This figure is somewhat lower than the assumed economic development over all sectors.

Table 6.4: *Transported products in mln tonnes in 1990 and 2010 by mode Hamburg*

	1990	*2010*	*Index*
Road	121	178	147
Rail	24	32	133
Ship	9	11	122
Total	154	221	144

Source: Baubehörde, 1995

6.3.7 Status of the forecasts

The forecasts provide a framework for the formulation of integrated freight transport policies on which ex ante evaluations of policy options are based. Furthermore, the forecasts play an important role as input for affiliated areas like economy and environment. The road transport data for example is used for air-pollution and noise-reduction forecasts. However, the freight forecasts are not used for the definition of infrastructural building programs.

7 Belgium

7.1 Introduction

In Belgium there are four administrative levels: the central authorities, the regional authorities, i.e. Brussels, Flanders and Wallonia, and the provincial and municipal authorities. From a national/regional planning point of view the regional authorities are most important. Responsibilities for traffic and transport are bundled in the Department of Infrastructure and the Environment of the regional government. Within this Department, the Transport Research Centre (Mobiliteitscel) is responsible for traffic and transport forecasts. However, not every region possesses appropriate forecasting tools. Trans-regional matters are controlled by ICVI (the Inter-ministerial Conference on Traffic and Infrastructure).

7.2 Strategic passenger travel forecasts

Official national forecasts for use in the context of policy preparation do not exist. Available policy documents, such as *Ministry of the Flemish Community, 1995*, contain some information on possible future growth patterns, which is drawn form a variety of sources. This information is presented in the following paragraphs. There is currently no information about the way in which these data have been assembled.

Table 7.1: *Nationwide passenger forecasts for Belgium*

personkilometres	reference period	annual change (per cent)	total change over period	source
road	1990-2005	+2.5 á +2.9	+44 á +53	NCB
public transport	1990-2055	-1.1 á +1.4	-18 á +24	NCB
rail	1990-2020	+0.8	+17	NMBS
road	1987-2020	+1.4	+39	NMBS
all modes	1990-2005	+2.1 á +2.5	+36 á +44	NCB
all modes	1987-2020	+0.9	+35	NMBS
all modes	1987-2020	+1.9 á +2.9	+28 á +45	Meersman'91

Source: Ministry for the Flemish Community, Policy document 'Ruimtelijk geordend en veelzijdig mobiel', October, 1995.

7.3 Freight transport

The recently published policy statement of the Flemish Minister for Transport contains some information on national freight transport forecasts. Although these are by no means official national forecasts, they are contained in the policy document mentioned as a reference. This data is presented here in the absence of official national freight forecasts.

Table 7.2: *Nationwide freight transport forecasts for Belgium*

tonne kilometres	reference period (per cent)	annual change over period	total change	source
road	1987-2020	+0.9	+36	NCB, 1990
inland water	1990-2005	+0.8 á +3.6	+12 á +69	NCB, 1991
rail	1990-2005	-2.0 á +2.1	-34 á +36	NCB, 1991
road	1990-2005	+3.8 á 6.4	+75 á 155	NCB, 1991
all modes	1990-2005	+2.7 á +5.5	+49 á +124	NCB, 1991
all modes	1990-2005	+0.4 á 4.2	+5 á 71	Meersman 91

Source: Ministry for the Flemish Community, Policy document 'Ruimtelijk geordend en veelzijdig mobiel', October, 1995.

8 Flanders

8.1 Introduction

The Department for the Environment and Infrastructure of the Ministry for Flanders has recently initiated the development of a traffic forecasting model for Flanders. This model is to include a freight forecasting component. The development of the traffic model for Flanders will probably be completed to an operational level in the course of 1996.

The only other model system available in the Flanders, is the traffic model for Antwerp province. This recently completed model system is substantially based on the Randstad Model of the Netherlands. It is the intention that passenger traffic models for the 4 remaining provinces in the Flanders will be completed in the course of 1996.

The traffic model for Antwerp has been developed by a consortium of consultants, including Tractabel (freight model) and DHV (passenger traffic model). The latter is also an appropriate point of contact:

DHV RAADGEVEND INGENIEURSBUREAU BV
Postbus 85
3800 AB AMERSFOORT
Netherlands

8.2 Strategic passenger forecasts

8.2.1 Introduction

Carried out for:

MINISTRY FOR FLANDERS
MOBILITEITSCEL
WTC toren 3
Simon Bolivarlaan 30
B-1210 BRUSSELS

Carried out by:

CONSORTIUM TRAFFIC MODEL FOR ANTWERP
c.o. DHV Raadgevend Ingenieursbureau BV
Postbus 85
3800 AB AMERSFOORT
Netherlands

The official forecasts for personal travel and freight transport for Antwerp province are generated with the Traffic Model for Antwerp. Alternative forecasts for transport policy options within a given socio-economic scenario can be generated.

8.2.3 Type of forecast

The official traffic forecasts for personal travel cover the following:

Driving licence holding:	No
Car ownership forecasts:	Yes
Number of trips:	Yes
Modes distinguished:	Car Public transport Bicycle
Purposes distinguished:	Work School Other
Kilometrage travelled:	Yes
Modes distinguished:	Car Public transport Bicycle
purposes distinguished:	Work School Other
Time dimensions:	PM (16.30-17.30)
Future year O/D matrices:	Car Public transport Bicycle

8.2.3 Type of traffic models

The Traffic Model for Antwerp consists of a number of sub models:

licence holding model:	No
car ownership:	Based time series analysis
trip frequency model:	Trip end rates by purpose, by car availability (0/1) segments
Destination choice:	simultaneous with mode choice model, gravity model

Mode choice:	simultaneous with distribution model, iterative friction factor procedure
Assignment model:	congested assignment procedures for car (capacity restraint), all or nothing for public transport
feed back congestion effects:	congestion effects are fed back to route choice. Single feedback congested speeds to mode/destination.
time of day choice:	congestion effects on departure time are not modelled
suitability for demand evaluation:	Yes
suitability for supply evaluation:	Yes

8.2.4 Base and forecast years

The base and forecast years used are:

Base year:	1991
Forecast year:	2010

8.2.5 Key input data/underlying assumptions

This paragraph presents the underlying assumptions used in generating the official forecasts for personal travel. In table 8.1 some key figures are presented. Except for the parking costs growth (index 330) there is a moderate change over all variables.

Table 8.1: *Key input data for 1991 and 2005.*

Variable	*1991*	*2010*
Population (mln)	1.60	1.68
Population (base=100)	100	101
Household size	2.52	2.29
Household size (base=100)	100	91
Participation rate (%)	35	37
Participation rate (base=100)	100	107
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	146
Car ownership (mln) *)	0.77	1.0
Car ownership (base=100)	100	130
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	-	-
Car / Inhabitant (base=100)	-	-
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	100
Real PT prices (base=100)	100	128
Real parking costs (base=100)	100	330

Source: HCG Questionnaire 1995

8.2.6 Level of forecasts

The levels of forecasts for 'Business as Usual' scenario are presented under this heading. In table 8.2 some key values are shown.

Table 8.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	*2010*	*Index*	*1990*	*2010*	*Index*	*1990*	*2010*	*Index*
Private car	-	-	-	-	-	136	-	-	-
Bus	-	-	-	-	-	115*)	-	-	-
Train	-	-	-	-	-	-	-	-	-
Slow	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: HCG Questionnaire 1995 (- = not available). *) Index for public transport.

8.2.7 Status of forecasts

The 2010 forecasts of the Traffic Model for Antwerp for the 'Business as Usual' scenario are the official forecasts for Antwerp province. Policy alternatives are evaluated against this reference.

8.3 Strategic forecasts for freight traffic

8.3.1 Introduction

Official forecasts based on analytical models are created at the provincial level with the freight transport module which forms part of the Traffic Model for Antwerp.

Carried out for:

MINISTRY FOR FLANDERS
MOBILITEITSCEL
WTC toren 3
Simon Bolivarlaan 30
B-1210 BRUSSELS

Carried out by:

CONSORTIUM TRAFFIC MODEL FOR ANTWERP
c.o. TRACTABEL DEVELOPMENT NV
Arianelaan 7 Bus 3
B-1200 BRUSSELS

8.3.2 Type of forecasts

The freight forecasts for Antwerp province cover the following:

Total tonnage:	Yes
Total tonnage by commodity class	Yes
Commodity classes distinguished:	10 (NVS categories)
Modes distinguished:	Road Rail Inland waterway
Total ton kilometres	Yes
Commodity classes distinguished:	None
Modes distinguished:	Road Rail Inland waterway
Type of movements	Regional National International (in/out)
Number of vehicles on the road	Yes (based on average loading assumptions)
Zoning system	65 inland zones 25 foreign zones

8.3.3 Type of freight transport model

The base year data on freight transport is obtained through the Belgium National Institute for Statistics which holds freight data at the level of 'arrondissements'. Growth is assumed in line with GDP developments. Further assumptions, based on professional judgements, are used to derive modal shares for forecast year and forecasts for goods vehicles on the road.

8.3.4 Base and forecast year

The base and forecast years used are:

Base year	1991
Forecast year	2010

8.3.5 Key input data

The limited information available is:

Economic growth by sector	2% per annum

8.3.6 Level of forecasts

The freight transport model generates freight transport volumes per day. Road freight traffic is re-calculated into PM peak hour volumes and used as input for the road passenger traffic forecasts. It has been estimated that PM peak hour road freight traffic increases between base and forecast year by an index of 118.

8.3.7 Status of forecasts

The forecasts are the only available official forecasts. They are used in transport planning activities.

9 Brussels-Capital Region

9.1 Introduction

The regional authority for Brussels initiated the development of a traffic forecasting model for Brussels. The Traffic Model for Brussels is developed and operated by consultants.

The consultant associated with the production of land based personal travel traffic forecasts for Brussels are:

STRATEC
Mr. Claude Rochez (director)
boulevard A. Reyers, 156
B 1040 BRUSSELS
tel. +32 (2) 735 09 95
fax +32 (2) 735 49 17

9.2 Strategic passenger forecasts

9.2.1 Introduction

Carried out for:

BRUSSELS-CAPITAL REGION
Administration de l'Equipement et de la Politique des Deplacements
Service A1
Rue du Progres 80/1
B 1030 BRUSSELS

Carried out by:

STRATEC
Mr. Claude Rochez
Boulevard A. Reyers 156
B - 1040 BRUSSELS
tel. +32 (2) 735 09 95
fax. +32 (2) 735 49 17

The official forecast for personal travel for Brussels-Capital Region is generated with the Traffic Model for Brussels. Alternative forecasts for

different socio-economic scenario's exist, as do forecasts for transport policy alternatives within a given socio-economic scenario.

9.2.2 Type of forecasts

The Traffic model for Brussels covers the following:

Driving licence holding:	no
Car ownership forecasts:	yes
Number of trips:	yes
modes distinguished:	car public transport
purposes distinguished:	home based work home based school home based other non home based
kilometrage travelled:	yes
modes distinguished:	car public transport
purposes distinguished:	home based work home based school home based other non home based
Time dimensions:	AM peak period
Future year O/D matrices:	car public transport

9.2.3 Type of traffic models

The Traffic Model System for Brussels consists of a number of sub models:

license holding model:	no
car ownership:	based time series analysis
trip frequency model:	trip rates by segment and purpose
destination choice:	growth factor model by segment on the basis of base year O/D matrices
mode choice:	aggregate analytical model by purpose
assignment model:	congested assignment procedures for car, all or nothing for public transport
feed back congestion effects:	congestion effects are fed back both to mode and route choice. There is no feed back to destination
time of day choice:	congestion effects on departure time are not modelled

suitability for demand evaluation:	no
suitability for supply evaluation:	yes
zoning:	up to 304 zones

9.2.4 Base and forecast years

The base and forecast years used are:

Base year:	1991
Forecast year:	2005

9.2.5 Key input data/underlying assumptions

This paragraph presents the underlying assumptions used in generating the official forecasts for personal travel.

Table 9.1: *Key input data for 1991 and 2005.*

Variable	*1991*	*2005*
Population (mln)	1.53	1.54
Population (base=100)	100	101
Household size	-	-
Household size (base=100)	-	-
Participation rate	-	-
Participation rate (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	-	-
Car ownership (mln) *)	-	-
Car ownership (base=100)	-	-
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	0.40	0.46
Car / Inhabitant (base=100)	100	114
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	-	-
Real PT prices (base=100)	-	-
Real parking costs (base=100)	-	-

Source: questionnaire, 1995

9.2.6 Key forecasts results

The levels of forecasts for 'Business as Usual' scenario are presented under this heading.

Table 9.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1991	*2005*	*Index*	*1991*	*2005*	*Index*	*1991*	*2005*	*Index*
Car	-	-	137	-	-	138	-	-	-
Car pass.	-	-	-	-	-	-	-	-	-
PT	-	-	94	-	-	87[a]	-	-	-
Walk	-	-	-	-	-	-	-	-	-
Bike	-	-	-	-	-	-	-	-	-
Total	5.117	5.520	108	-	-	-	-	-	-

Source: questionnaire 1995, [a] = bus only (- = not available)

9.2.7 Status of forecasts

The 2005 forecasts of Brussels Traffic Model for the Reference scenario are the official forecasts for Brussels Capital Region. Policy alternatives are evaluated against this reference.

9.3 Strategic freight forecasts

9.3.1 Introduction

Formal forecasts based on analytical models do not exist for the Brussels-Capital Region.

10 France

10.1 Introduction

In France the Ministère de l'Equipement des Transports et du Tourisme is responsible for the national transport infrastructure: the 'routes nationales' and 'autoroutes', rail network, waterways, ports and airports planning.

Inside the Ministry, each 'mode' is represented by a Direction: Direction des Routes, Direction des Transports Terrestres, Direction Générale de l'Aviation Civile (DGAC), Direction des Ports et de la Navigation Maritime.

By law (Aménagement du Territoire,1994), the French Administration has to produce Strategic Planning of Transport for 2015: this would be the sum of five separate plans (« Schémas Directeurs »), one per mode and/or type of movement.

The development of these schemes is currently on the way and relies on interactions between various administrations developing forecasts at various levels of geographic detail. The nature of the official forecast made by the Ministry is a global forecast for the entire country. Each administration or transport company (like SNCF) provides forecasts for each separate project.

General forecasts are produced by OEST (Ministère des Transports) and the Direction de la Prévision (Ministère des Finances).

Specific forecasts are produced by SNCF for the rail network, DGAC and Air France for air traffic, Direction des Routes and SETRA for the road network.

Other governmental research agencies (like INRETS) develop multimodal approaches, but this is seen as being more of a 'research' domain not directly used in the planning process.

No external consultants are directly associated with the forecasts produced and used by the Ministry.

The information reported has been collected at the OEST, Département des Etudes et de la Planification. OEST plays a key role in the transportation forecast process in France, for passenger traffic and for freight traffic.

OEST
Ministère de l'Equipement, des Transports et du Tourisme
Mr. Maurice Girault
Pascal B
52055 PARIS - La Defense Cedex 04

10.2 Strategic forecasts for passenger traffic

10.2.1 Introduction

The official national forecasts are macro-economic forecasts, and are the result of discussion and dialogue between the various administrations and Ministries.

Official forecasts rely on a series of scenarios based on :

- macro-economic scenarios ;
- transport scenarios (infrastructures and costs).

The results of the forecasts are publicly available at the end of the forecast process. These results are available at the OEST, and the resulting infrastructure plan is part of the law « Aménagement du territoire ».

10.2.2 Type of forecasts

The forecasts made cover the following topics and dimensions:

Driving licence model	No
Car ownership model	Yes
Number of trips	Yes
Modes distinguished	Car
	Rail
	Air
Purposes distinguished	None
Kilometrage travelled	Yes
modes distinguished	Car
	Rail
	Air
purposes distinguished	None
Time dimension	Year

The product of these are growth factors, each being estimated separately for each mode.

10.3.3 Type of passenger model

Car ownership
The car ownership model works on the basis of population forecasts produced by INSEE (Institut National des Statistiques) with a demographic model: it is applied to segments of households, deriving car ownership categories (trend analysis).

Car use
The kilometrage by mode model is a macro economic model working at the national level. It is not a mode choice model in the sense that each mode is treated separately, producing growth factors (trend analysis).

These growth factors can then be used by mode specific administrations (e.g. Direction des Routes) to evaluate specific projects through network assignment procedures, but this is not part of the global planning process.

The models are suitable for evaluating strategic policies for demand through the action on costs (price) levels. One of the ideas for future development is to internalise external costs of use of infrastructure (socio-economic and environmental costs) into specific mode price levels.

The models are suitable for evaluating strategic policies for supply through the action on the number of kilometres of infrastructure (road, rail) built.

10.3.3 Base and forecast years

The base year is usually 1992. For rail forecasts however, the base year is 1995.

Forecast year is 2015.

10.3.4 Key input data

The key macro economic input data used for developing scenarios are the following for the forecast period :

Table 10.1: *Key input data for 1992 and 2015.*

Variable	*1992*	*2015*
Population (mln)	58	66
Population (base=100)	100	113
Household size	-	-
Household size (base=100)	-	-
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth low (base=100)	100	154
GDP growth high (base=100)	100	192
Car ownership (mln) *)	23.1	30.0
Car ownership (base=100)	100	130
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	-	-
Car / Inhabitant (base=100)	-	-
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	117
Real PT prices (base=100)	100	118
Real parking costs (base=100)	100	130

Source: OEST, 1995 (- = not available).

10.3.5 Level of forecasts

The key forecasts results are the following for the forecast period :

- national roads and autoroute traffic : +2,3% to +3% a year
- air traffic : +2,5% to +3,9% a year
- rail traffic : +1,6 to +2% a year

10.3.6 Role and status of the forecasts

The role and status of forecasts produced by the Ministry is that they form part of a global planning process.

These official forecasts produced a framework for specific mode by mode evaluation of infrastructure and policy options.

They are used as a base, guidance and check of forecasts produced by specific administrations and operators, at the national or at the regional level.

10.4 Strategic forecasts for freight traffic

Freight forecasts are mainly produced by the OEST. Some other models are also operated by SNCF or the Waterways Authority. The type of models and forecasts presented hereafter are the ones developed by OEST.

10.4.1 Type of freight forecasts

The forecasts made cover the following topics and dimensions:

- total tonnage;
- tonnage by commodity class (about 15 categories);
- tonnage by mode (road, rail, water);
- total tonne kilometrage;
- tonne kilometrage by commodity class (about 15 categories);
- tonne kilometrage by mode (road, rail, water);
- number of road vehicles, trains and barges;
- time dimension: year.

Total tonnage is mainly produced for international movements, and tonne kilometrage for internal traffic.

10.4.2 Type of freight models

Freight forecasts models are based on separate models by type of commodity (>15 classes) and cover:

- a production model by type of commodity (trend analysis);
- a mode choice model : this is an analytical model based on fuel costs and autoroute tolls that determines the road traffic share.

10.4.3 Base and forecast years

The base year is 1992 and the forecast year is 2015.

10.4.4 Key input data

The forecast model uses macro-economic forecasts based on the NAP40 (40 types of products) segmentation.

As an example the industrial production indicator (one of the main indicator used) varies in the different scenarios from 1,3 to 2,8% per year. International trade is also a key input data and ranges form 3 to 6% per year.

Since forecasts are produced at the national level (no zoning system) final consumer demand is not directly taken into account.

10.4.5 Level of forecasts

At this stage of the forecasting process, the only number available is the global trend of tonne kilometrage which ranges from +1,6 to +2,9% a year, depending on the type of scenario.

The experience of OEST is that the growth of freight traffic is very similar (globally) to the evolution of passenger demand.

As a matter of comparison, a previous national transport study (« Transports 2010 », dated 1992) retained the following figures for the annual change of tonne kilometrage :

- total freight : -0,8 to +2,7%
- road freight : -0,8 to 3,6%
- rail freight : -1,7 to +0,3%
- waterways : -4,8 to -1,4%

In the same document, OEST reported a range of 1,2 to 4,4% for the total growth of truck movements in France.

10.4.6 Role and status of the forecasts

As for the passenger forecasts, the freight forecasts are part of the global planning process and produce the framework for specific mode by mode evaluation of infrastructure and policy options.

They are used as a base of forecasts produced by specific administrations and operators, both at the national or at the regional level (e.g. Alsace Region).

11 Alsace

11.1 Introduction

The regions form the second administrative level in France. They are responsible for planning and maintenance of regional transport facilities. The Alsace region has initiated the development of a regional traffic model. Not all regions do have such models available.

11.2 Strategic forecasts for passenger traffic

11.2.1 Introduction

A strategic forecast for passenger traffic in the Alsace was carried out for:

DIRECTION REGIONAL DE L'EQUIPEMENT
Division des Transports
Dr. Domimique Ritz
tel. +33 () 88 41 51 86
fax. +33 () 88 60 06 08

The forecasts are produced by:

HCG FRANCE
30, rue St. Lazare
75009 PARIS
tel. +33 (1) 48 74 56 25
fax. +33 (1) 48 74 56 26

In the Alsace region there is one reference forecast. Forecasts for policy alternatives have been generated with the model system. The forecasts are publicly available.

11.2.2 Type of forecast

The official traffic forecasts for Alsace region cover the following:

Driving licence holding	Yes
Car ownership	Yes

Number of trips	Yes
Distinction by mode	Car driver Car passenger Public Transport Slow
Distinction by purpose	Work Business Education Shopping Other
Kilometrage travelled	Yes
Distinction by mode	Car driver Public transport
Distinction by purpose	Work Business Education Shopping Other
Time dimension of the forecasts	All day (24 hour) Year

The Alsace model system has been designed on the basis of the Dutch National Model System. Some of its components have been transfered and for other components similar model structure has been used.

11.2.3 Type of passenger traffic model

The type of passenger traffic models are based upon:

Driving licence model	Trend analyses
Car ownership model	Trend analyses
Trip frequency model	Disaggregate analytical model
Distribution model	Disaggregate analytical model
Mode choice model	Disaggregate analytical model
Assignment model	Car: All-or-nothing PT: All-or-nothing
Feedback congestion	No
Time-of-day choice	No
Model suitable for demand evaluation	Yes
Model suitable for demand evaluation	Yes

11.2.4 Base and forecast years

The base and forecast years used are:

Base year	1990
Future year	2020

11.2.5 Key input data

From table 11.1 it becomes clear that the overall changes in socio-economic variables is moderate (maybe except for the number of cars) compared to other parts of Europe.

Table 11.1: *Key input data for 1990 and 2020.*

Variable	*1990*	*2020*
Population (mln)	1.62	1.77
Population (base=100)	100	109
Household size	2.64	2.40
Household size (base=100)	100	91
Participation rate	42%	40%
Participation rate (base=100)	100	94
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	-	-
Car ownership (mln) *)	0.68	1.05
Car ownership (base=100)	100	154
Car / household	1.11	1.42
Car / household (base=100)	100	128
Car / Inhabitant	0.42	0.59
Car / Inhabitant (base=100)	100	141
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	-	-
Real PT prices (base=100)	-	-
Real parking costs (base=100)	-	-

Source: HCG France, 1995

11.2.6 Level of forecasts

In table 11.2 an overview is presented of the number of trips, kilometrage and trip length in the base year and the forecast year.

The index of kilometrage for car driver is relatively high at 154. However, looking at the increase of the number of cars (154 as well) and looking at the growth of the number of cars per household (128), the significant growth can be explained.

Table 11.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	*2020*	*Index*	*1990*	*2020*	*Index*	*1990*	*2020*	*Index*
Car driver	1.643	2.220	135	23.824	36.630	154	14.5	16.5	114
Carpass.	-	-	-	-	-	-	-	-	-
PT	49	49	100	1.127	1.176	104	23.0	24.0	104
Walk	-	-	-	-	-	-	-	-	-
Bike	-	-	-	-	-	-	-	-	-
Total	5.117	5.520	108	-	-	129	-	-	119

Source: HCG France, 1995 (- = not available)

Table 11.3 shows the number of trips, kilometrage and trip length by purpose. Unfortunately hardly anything is known about the growth of the several purposes between 1990 and 2020. Only some indices are known for the purposes 'work', 'business' and 'other'.

Table 11.3: *Level of base and forecasts in trips, kilometrage and trip length for purposes (values based upon public transport and car driver).*

Purpose	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1990	2020	Index	1990	2020	Index	1990	2020	Index
Work	-	-	122	-	-	-	-	-	-
Business	-	-	133	-	-	-	-	-	-
Education	-	-	151	-	-	-	-	-	-
Shopping	-	-	-	-	-	-	-	-	-
Leisure	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: HCG France, 1995 (- = not available)

11.2.7 Status of the forecasts

The strategic passenger forecasts for Alsace provide a framework for the definition of infrastructural needs.

The forecasts are used to formulate transport policies at a regional level.

11.3 Strategic forecasts for freight traffic

11.3.1 Introduction

For the Alsace region no strategic freight traffic forecasts are available.

12 Great Britain

12.1 Introduction

The Department of Transport is directly responsible for the trunk road network in England. Local roads are generally the responsibility of the county councils. The Scottish Office and the Welsh Office deal with trunk roads in Scotland and Wales. The Department of Transport, National Roads Policy Directorate, Highway Economics and Traffic Appraisal Division, produces national traffic growth factors and a general guidance for traffic modelling.

British Rail is responsible for the planning and running of the railways. The present government plans to privatise British Rail in the near future. Most other forms of public transport are deregulated and run by the private sector.

The model system used for the production of national forecasts for individual roads projects are generally developed and operated by consultants.

12.2 Strategic forecasts for person travel

12.2.1 Introduction

The Department of Transport is responsible for the production of national forecasts for personal travel and goods traffic.

DEPARTMENT OF TRANSPORT
Great Minister House
Mr. Derrick Jones
76 Marsham Street
LONDON SWIP 4BU
tel. +44 (171) 271 50 16
fax. +44 (171) 271 50 16

Forecasts are published by HMSO (Her Majesty's Stationery Office) in the form of N.R.T.F. (National Road Traffic Forecasts). The latest version available is:

DEPARTMENT OF TRANSPORT
1989 *National Road Traffic Forecasts (Great Britain) 1989.* (HMSO Books). London: HMSO (2nd. ed).

12.2.2 Type of forecasts

The Department of Transport produces macro-economic forecasts of traffic growth. These are available as a basis for general and project specific planning studies. The official national traffic forecasts for personal travel cover the following:

Driving licence holding:	Yes
Car ownership forecasts:	Yes
Number of trips:	Yes
Modes distinguished:	Car Air
Purposes distinguished:	Home based work Home based business Non home based business Other (school, business, other)
Kilometrage travelled:	Yes
Modes distinguished:	Car
Purposes distinguished:	None
Time dimensions:	Year

12.2.3 Type of person travel model

The UK approach at the national level differs from the conventional network based approach to transport modelling, in that it only produces growth rates for car ownership and car use, and trip ends (car only) at District level. The forecasts produced at national level serve as a basis for more convential regional traffic forecasting, carried out typically for the purposes of evaluating road schemes.

The components of the forecasting models are:

National Planning Data Files
The National Planning Data Files contains for each District total population, number of households, resident workers and jobs.

National Road Traffic Forecasts
National Road Traffic Forecasts contains forecasts of vehicle kilometrage, separately for cars and lorries, for each year for a period of thirty years into the future. A 'high' and a 'low' forecast is produced using optimistic and pessimistic sets of assumptions. The forecast combines forecasts of car ownership, car use and population growth.

National Car Ownership Forecasts

This model estimates car ownership by District, produced for five yearly intervals. High and low growth assumptions are being used. The latest year for which forecasts are available is 2011.

National Trip End Model
This model estimates the origins and destinations in each District, for different trip purposes. The trip purposes being distinguished are:

- home based work
- home based (employers') business
- home based other
- non-home based trips.

National Trip End Model trip ends are produced both for high and low economic growth assumptions. Trip ends are modelled by 3 home bases and 1 non home based purpose.

National Forecast Adjustment Factor
National Forecast Adjustment Factors are required to make local forecasts consistent with the National Road Traffic Forecasts. National Forecast Adjustment Factors are defined as the ratio of the growth in vehicle kilometres from the National Road Traffic Forecasts for Great Britain as a whole and the growth in trip ends produced by National Trip End Model. There is therefore a single National Forecast Adjustment Factor for each of low and high growth scenario and for each forecast year.

12.2.4 Base and forecast year

The base and forecast years used are:

Base year:	1988
Forecast years:	all years up to 2025

12.2.5 Key input data

A selection of key figures is presented in table 12.1.

Table 12.1: *Key input data for 1988 and 2025.*

Variable	*1988*	*2025*
Population (mln)	55.8	58.3
Population (base=100)	100	104
Household size	2.50	2.43
Household size (base=100)	100	97
Participation rate	-	-
Participation rate (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth low (base=100)	100	201
GDP growth high (base=100)	100	315
Car ownership (mln) low	18.5	29.6
Car ownership (mln) high	18.5	34.0
Car ownership low (base=100)	100	160
Car ownership high (base=100)	100	184
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant low	0.33	0.53
Car / Inhabitant high	033	0.63
Car / Inhabitant (base=100)	100	160
Driving licence (mln)	-	-
Driving licence (base=100)	100	116
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	100	112
Real petrol prices low	100	121
Real petrol prices high	100	161
Real PT prices (base=100)	-	-
Real parking costs (base=100)	-	-

Source: [NRTF], 1989

Growth indices for car ownership for the period 1988-2000 are estimated to range between 124 and 136.

Growth indices for GDP for the period 1988-2000 are estimated to range between 126 and 146.

Growth indices for real petrol prices for the period 1988-2000 are estimated to range between 108 and 145.

12.2.6 Level of forecasts

In the table below some key figures are presented for the level of base and forecast year.

Growth indices for car kilometrage for the period 1988-2000 are estimated to range between 129 and 149.

Table 12.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1988	*2025*	*Index*	*1988*	*2025*	*Index*	*1988*	*2025*	*Index*
Car low	-	-	-	270000	491000	182	-	-	-
Car high	-	-	-	270000	632000	234	-	-	-
Carpass.	-	-	-	-	-	-	-	-	-
PT	-	-	-	-	-	-	-	-	-
Walk	-	-	-	-	-	-	-	-	-
Bike	-	-	-	-	-	-	-	-	-
Total	5.117	5.520	108	-	-	-	-	-	-

Source: NRTF, 1989 (- = not available)

12.2.7 Status of the forecasts

The National Road Traffic Forecasts are adopted as a matter of policy. Although they are essentially intended to help scheme appraisal, they provide and are used to give aggregate information on traffic levels in terms of indices for vehicle kilometrage.

National traffic forecasts (NRTFs) are reviewed from time to time. They were first issued in 1980 and first review in 1984. The current NRTFs are based on the latest revision published in 1989. Since then the SACTRA has submitted its report in 1994 on Traffic Generation resulting from Trunk Roads. SACTRA has identified a number of reasons for forecasting procedures to be extended to include induced traffic. In the interim period, the government has issued preliminary guidelines to adjust scheme appraisal forecasts which are established with the traditional procedures.

12.3 Strategic forecasts for freight traffic

12.3.1 Introduction

The official forecasts are also prepared by the Department of Transport and published by HMSO in bulletin NRTF 1989. The base and forecast years are the same as those adopted for the personal travel forecasts.

Heavy Goods Vehicles (HGVs) are distinguished into two categories. OGV1 (Other Goods Vehicle 1) refer to two axles with dual rear wheels, 3 axles rigid and 3 axles articulated (5% of all motor traffic), and OVG2 (Other Goods Vehicle 2) 4 axles rigid and 4 or more axles articulated (2.5% of all motor traffic). Light Goods Vehicles (LGVs) are those with two axles and single real wheels, generally up to 30 cwt tare. These are predominately vans, used for light deliveries and servicing equipment and appliances.

Forecasts are made separately for heavy and light goods traffic. The first stage in forecasting heavy goods vehicle traffic is predicting future tonne kilometres. The major influence here is growth in GDP. The forecasts are derived from an elasticity of tonne km with respect to GDP and an assumption on modal shares, both based on examination of past trends. The implications of other factors, such as changes in the nature of goods transported, have also been considered.

The second stage is predicting how forecast tonne kilometres will be distributed between different sizes of vehicles, to give the forecast of vehicle kilometres. It is expected that most of the growth in HGV traffic will occur in the heaviest categories.

For light goods vehicle kilometres, a pattern of growth broadly in line with GDP growth has been apparent for some time. This pattern is expected to continue in the future, and is the basis of the new forecasts.

Strategic forecasts for freight in Great Britain are carried out for:

DEPARTMENT OF TRANSPORT
HETA/NRPD
Brian Turner
Great Minister House
76 Marsham Street
LONDON SWIP 4BU
tel. +44 (171) 271 50 16
fax. +44 (171) 271 50 16

The freight forecasts for Great Britain are produced at a national level. There is only one forecast available. They are reviewed regularly. Latest forecasts are form NRTF 1989. The forecast for freight traffic are published and available in :

DEPARTMENT OF TRANSPORT

1989 *National Road Traffic Forecasts (Great Britain) 1989.* (HMSO Books). London: HMSO (2nd. ed).

12.3.2 Type of forecast

The official national forecast for freight traffic cover the following:

Total tonnage	Yes
Total tonnage by commodity class	No
Tonnage by mode	Only road
Total tonne kilometrage	Yes, road only
Types of movements forecast	All
Number of vehicles by mode	No

12.3.3 Type of freight transport model

Overall the models are based mainly on professional judgement and assumptions. The ratio of road tonne kilometrage to GDP is assumed to remain constant throughout the period of the forecasts.

12.3.4 Base and forecast years

The base and forecast year used are:

Base year	1994
Future year	any year up to 2025

12.3.5 Key input data

The key input data consists of Gross Domestic Product. In table 12.3 an overview is given of the assumed growth of GDP (1994=100) between 1994 and 2025.

Table 12.3: *Range of assumed growth of GDP in 2000, 2010 and 2025 (1988=100)..*

Year	*Low growth*	*High growth*
2000	126	146
2010	152	199
2025	201	315

Source: Department of Transport, 1989

12.3.6 Level of forecasts

In short and according to the returned questionnaire B, there is no modelling approach behind the goods vehicle traffic forecasting. The

forecasts are based on the GDP growth as mentioned above. The NRTF publication gives the following table:

Table 12.4: *Road vehicle indices for forecast years.*

	LGV		OGV1		OGV2		HGV		
	Low	High	Low	High	Low	High	Low	(a)	High
1988	100		100		100		100		
1990	104	107	102	102	103	107	102		104
1995	115	125	106	110	116	128	109		117
2000	126	146	110	119	130	154	117		131
2025	201	315	135	173	223	365	167		241

(a) The sum of OGV1 and OGV2.

Base values for kilometrage in 1988 are:

total vehicle traffic:	327.9 billion vehicle kilometres
cars	82.4%
LGVs	8.9%
HGVs (OGV1 and OGV2)	7.6%
buses	1.1%

12.3.7 Status of the forecasts

The forecasts for growth rates of freight traffic form a basis for the production of regional forecasts, mainly for scheme appraisal.

13 Sweden

13.1 Introduction

In Sweden the Ministry of Transport is the government department responsible for all matters relating to transport infrastructure and communication. This responsibility is being discharged through the National Road Administration and the National Rail Administration, and to government organisations at regional an local level.

The responsibility for the production of forecasts for both passenger and freight traffic is with the Swedish Institute for Transport and Communication analysis (SIKA), a government organisation established as recently as summer 1995 and responsible for coordinated infrastructure planning. The brief of SIKA also includes, amongst other specified responsibilities, the development of forecasting methods. This is an area which has been receiving substantial attention during recent years by the development of comprehensive travel demand models. The model development phase has recently been substantially completed and the system is currently being used to generate new forecasts. The most recent national forecasts are reported here.

The model systems used for these forecasts are developed by SIKA with assistance from consultants as appropriate. The models are operated by SIKA in collaboration with consultants.

Consultants associated with the production of personal travel forecasts:

TRANSEK
mr. Staffan Algers
Solna Torg 3
17145 SOLNA
Sweden
Tel.: 00 46 8 735 2020
Fax: 00 46 8 735 2030

13.2 Strategic passenger forecasts

13.2.1 Introduction

National traffic forecasts for Sweden are produced for:

MINISTRY OF TRANSPORT AND COMMUNICATIONS
S-103 33 Stockholm
SWEDEN
Tel. 00 46 8 405 00 00

The forecasts are co-ordinated by SIKA. Passenger traffic forecasts are carried out by:

SWEDISH INSTITUTE FOR TRANSPORT AND COMMUNICATIONS ANALYSIS (SIKA)
P.O. Box 3118
S-103 62 Stockholm
Tel: 00 46 8 453 59 70
Fax: 00 46 8 21 58 72

NATIONAL ROAD ADMINISTRATION
S-781 85 Borlänge
Tel: 00 46 243 750 00

NATIONAL RAIL ADMINISTRATION
S-781 85 Borlänge
Tel: 00 46 243 450 00

TRANSEK
Solna Torg 3
S-171 45 Solna
Tel: 00 46 8 735 20 20
Fax: 00 46 8 735 20 30

SWEDISH MINISTRY FOR TRANSPORT
Swedis Institute for Transport and Communication Analysis
SIKA
Mr. Staffan Widlert
Tel: 00 46 8 453 5983
Fax: 00 46 8 215 872

For personal travel there is one official national forecast. Three different socio-economic scenarios are tested, but as the difference between the scenarios are small only one scenario is presented.

13.2.2 Type of forecast

The Swedish national traffic forecasts for personal travel cover the following:

Car ownership forecasts:	yes
Number of trips:	yes
modes distinguished:	walk

	bicycle
	car
	train
	bus
	air
purposes distinguished:	home based work
	home business
	non home based business
	shopping
	school
	personal business
	personal visits
	recreation
	other
kilometrage travelled:	yes
modes distinguished:	walk
	bicycle
	car
	car passenger
	train
	bus
purposes distinguished:	home based work
	home based business
	non home based business
	other (school, business, other)
Time dimensions:	average working day, AM, PM peak
Future year O/D matrices	car
	train

13.2.3 Type of traffic models

The national forecasts are made up from regional models covering short distance (<100km) trips and models for long distance trips.

The newly developed model system has been developed on the basis of the state-of-the-art techniques of transport modelling. Some of its features are:

- Disaggregate models operating at level of persons/households
- Models based on the tour-concept
- Primary destination choice
- Primary mode choice
- Discrete choice models

Modes distinguished at the regional level are: car, public transport, walk and bicycle whilst at the national level car, train, bus and air (including access modes) are being modelled.

The Swedish national model consists of a number of sub-models:

prototypical sample:	procedures with which a base year sample of households is expanded to the forecast year using external targets.

car ownership:	discrete choice model operating at the level of individuals
trip frequency model:	purpose specific discrete choice models operating at the level of individuals
mode/destination choice:	simultaneous choice models
assignment model:	congested assignment procedures for car, all or nothing for public transport
feed back congestion effects:	congestion effects are fed back both to route choice and mode/destination choice models
time of day choice:	not available
suitability for demand evaluation:	yes
suitability for supply evaluation:	yes
zoning:	national approx. 1000 zones each regional model >1000 zones

To derive car and train matrices for the forecast year the system is used as a pivot point model, in which changes are being forecasts between base and forecast year. These changes are used to generate forecast matrices using observed base matrices.

13.2.4 Base and forecast years

The base and forecast years used are:

Base year:	1993
Forecast year:	2010 and 2020

13.3.5 Key input data

The model system is being used at present to provide new forecasts. Tabel 13.1 presents the key input data used in this process.

Table 13.1: *Key input data for 1993 and 2010 en 2020.*

Variable	*1993*	*2010*	*2020*
Population (mln)	8.75	9.23	9.46
Population (base=100)	100	105	108
Household size	2.20	2.24	2.24
Household size (base=100)	100	102	102
Participation rate (%)	-	-	-
Participation rate (base=100)	-	-	-
Participation female	-	-	-
Participation female (base=100)	-	-	-
GDP growth (base=100)	100	133	154
Car ownership (mln) *)	3.74	4.28	4.77
Car ownership (base=100)	100	114	128
Car / household	0.94	1.04	1.13
Car / household (base=100)	100	111	120
Car / Inhabitant	0.40	0.46	0.50
Car / Inhabitant (base=100)	100	115	125
Driving licence (mln)	5.25	6.18	6.72
Driving licence (base=100)	100	118	128
Licence / Inhabitant	0.60	0.67	0.71
Licence / Inhabitant (base=100)	100	112	118
Real petrol prices (base=100)	100	100-140	-
Real PT prices (base=100)	100	-	-
Real parking costs (base=100)	100	-	-

Source: HCG questionnaire 1995

13.3.6 level of forecast

The levels of forecasts for the reference scenario are presented under this heading. In table 13.2 some key values are shown.

Table 13.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1993	*2010*	*Index*	*1993*	*2010*	*Index*	*1993*	*2010*	*Index*
Private car	-	-	-	-	-	130	-	-	-
Bus	-	-	-	-	-	105	-	-	-
Train	-	-	-	-	-	191	-	-	-
Slow	-	-	-	-	-	100	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: HCG questionnaire 1995 (- = not available).

Table 13.3 contains similar statistics, but only for long distance travel (over100km).

Table 13.3: *Level of base and forecasts in trips, kilometrage and trip length for modes, long distance (>100km) travel only.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Trip length (km)*		
	1993	*2010*	*Index*	*1993*	*2010*	*Index*	*1993*	*2010*	*Index*
Private car	-	-	115	-	-	117	-	-	-
Bus	-	-	100	-	-	110	-	-	-
Train	-	-	167	-	-	189	-	-	-
Slow	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: HCG questionnaire 1995 (- = not available).

13.3.7 Status of the forecasts

This forecast which is co-ordinated by SIKA and produced for the Ministry of Transport and Communications is the official forecast of Sweden. The forecasts are being used for policy evaluation.

13.4 Strategic freight traffic forecasts

13.4.1 Freight transport

National traffic forecasts for Sweden are produced for:

MINISTRY OF TRANSPORT AND COMMUNICATIONS
S-103 33 Stockholm
SWEDEN
Tel: 00 46 8 405 00 00

The forecasts are co-ordinated by SIKA. The freight forecasts are carried out by:

SWEDISH INSTITUTE FOR TRANSPORT AND COMMUNICATIONS ANALYSIS (SIKA)
P.O. Box 3118
S-103 62 Stockholm
Tel: 00 46 8 453 59 70
Fax: 00 46 8 21 58 72

NATIONAL ROAD ADMINISTRATION
S-781 87 Borlänge
Tel: 00 46 8 750 00

NATIONAL RAIL ADMINISTRATION
S-781 85 Borlänge
Tel: 00 46 243 450 00

SWEDISH ROAD AND TRANSPORT RESEARCH INSTITUTE (VTI)
S-581 95 Linköping
Tel: 00 46 13 20 40 00
Fax: 00 46 13 14 14 36

TEMAPLAN AB
Sveavägen 90
S-113 59 Stockholm
Tel: 00 46 8 673 83 80
Fax: 00 46 8 673 83 90

13.4.2 Type of forecasts

The Swedish Road and Transport Research Institute has developed the current freight model based on the model originally developed (1983) by Temaplan Consultants. The model covers all freight transport within Sweden and between Sweden and other countries. The modelling concept is that the volume of freight is closely connected to the development of the economy. The model covers all land and water based modes. However road transport with vehicles carrying a load of less than 3.5 tons are not included.

The model consists of two parts:
- the economic model (the demand matrix); the economic model determines the demand matrix using variables exogenous to the transport sector
- the transport model; the transport model is a network model.The assignment to networks comprises simultaneously the assignment to mode and the assignment to route, based on system costs minimising conditions.

Total tonnage	Yes
Total tonnage by commodity class	Yes
15 classes	agriculture forestry mining nutrition, food consumer products timber paper pulp, paper products printing industry chemical products energy, oil rocks, deposits iron, steel metal products machine (cars, computers) other products
Total tonne kilometrage by class (3-5 classes)	Yes
distringuished modes	Road (distance > 25 km) Rail Water

Type of movements forecast	National (transit included) International (in/out)
Number of vehicles by mode	No, but some simple estimates can be done.

13.4.3 Type of freight transport model

The freight transport model consists of the following components:

Production model:	Macro economic equilibrium model
Distribution model:	The VTI-model see 13.4.1
Mode choice model:	The STAN-model with Swedish applications
Time dimension:	Year

13.4.4 Base and forecast year

The base and forecast years used are:

Base year:	1993
Future year:	2010 and 2020

13.4.5 Key input data

Table 13.4 presents the main information.

Table 13.4: *Net production of goods in bln tonnes for 1993 and 2010.*

Commodity	*1990*	*2010*	*Index*
Agriculture	12.01	19.67	163
Forestry	36.83	35.73	90
Mining	9.70	9.30	93
Nutrition, food	17.08	23.14	135
Consumer products	7.67	10.42	136
Timber	6.60	6.79	103
Paper pulp, products	3.74	4.00	106
Printing	7.13	7.83	110
Chemical products	6.93	8.87	128
Energy, oil	18.35	16.61	91
Rocks, deposits	28.47	31.67	111
Iron, steel	11.11	11.15	100
Metal products	0.73	0.74	101
Machinery	4.37	6.04	138
Other products	24.49	29.91	122
Total	195.2	221.9	113.7

Source: HCG Questionnaire, 1995

The assumed development for imports is 54.96 mln tonnes in 1993 and 66.8 miln tonnes in 2010 (22% increase). For exports the assumed

development is for 60.65 mln tonnes in 1993 to 109.5 mln tonnes in 2010 (an increase of 81%).

13.4.6 Level of forecasts

The levels of the forecasts are based on the assumptions referrred to previously. In terms of transported tonne kilometres goods flows will increase by about 25% between 1993 and 2010.

The division of this growth in volume of tonne kilometres over available modes is as in table 13.5.

Table 13.5: *Tonne kms in 1993 and 2010 by mode in Sweden*

	1993	*2010*	*Index*
Road	-	-	130
Rail	-	-	132
Ship	-	-	116
Total	-	-	125

Source: HCG Questionnaire, 1995

13.4.7 Status of the forecasts

This forecast which is co-ordinated by SIKA and produced for the Ministry of Transport and Communications is the official forecast of Sweden. The forecasts are being used for policy evaluation.

14 Austria

14.1 Introduction

In Austria the Department of Transport is responsible for the development of national transport infrastructure plans and for forecasting.

14.2 Strategic forecasts for passenger traffic

14.2.1 Introduction

A strategic forecast for passenger traffic in Austria was carried out for:

BUNDESMINISTERIUM FÜR ÖFFENTLICHE WIRTSCHAFT UND VERKEHR
Abteilung I/1
Mr. Thomas Spiegel
Radetzkystaße 2
A-1030 VIENNA
tel. +43 (1) 711 62 11 04
fax. +43 (1) 711 62 15 99

BUNDESMINISTERIUM FÜR WIRTSCHAFTLICHE ANGELEGENHEITEN
Dr. Wolfgang Gleissner
Stubenring 1
1010 VIENNA
tel. +43 (1) 711 00 55 50
fax. +43 (1) 714 27 21

BUNDESMINISTERIUM FÜR UMWELT
Sektion 1
Dr. Robert Thaler
Reisnnerstaße 4
1030 VIENNA
tel. +43 (1) 512 22

The forecasts were composed by the ministry. It is not known whether the forecasts were made in alliance with consultants. Neither is known to what publication can be referred.

At the level of Austria there are several forecasts produced over the past years. They are all considered out-of-data and the Department of Transport is currently involved in a major modelling project which aims to

generate new forecasting models at the national level for both personal travel and for freight. The new models are expected to be available in the course of 1996/97. The information below refers to 'old' forecasts which were produced in the context of the Austrian Environmental Plan.

14.2.2 Type of forecast

The official national forecast for passenger traffic cover the following:

Driving licence holding	No
Car ownership	Yes
Number of trips	Yes
Distinction by mode	Private car Public Transport Slow
Distinction by purpose	Work Business Other
Kilometrage travelled	Yes
Distinction by mode	Private car Public transport Slow
Distinction by purpose	Work Business Other
Time dimension of the forecasts	All day (24 hour) Year

14.2.3 Type of passenger traffic model

The type of passenger traffic models are based upon:

Driving licence model	No model
Car ownership model	Trend analyses
Trip frequency model	Trend analyses
Distribution model	Trend analyses
Mode choice model	Trend analyses
Assignment model	No models used
Feedback congestion	No
Time-of-day choice	No
Model suitable for evaluation	Demand (elasticities) Supply (elasticities)

Remarks:

- A note was made concerning the use of the trip frequency model, the distribution model and the mode choice model. These models are not really separated.

14.2.4 Base and forecast years

The base and forecast years used are:

Base year	1991
Future year	2011 2021

14.2.5 Key input data

The main data provided is presented in table 14.1.

Table 14.1: *Key input data for 1991 and 2011.*

Variable	*1991*	*2011*
Population (mln)	-	-
Population (base=100)	100	106
Household size	-	-
Household size (base=100)	-	-
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	152
Car ownership (mln)	3.1	4.4
Car ownership (base=100)	100	142
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	-	-
Car / Inhabitant (base=100)	100	134
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	100 (200)
Real PT prices (base=100)	-	-
Real parking costs (base=100)	-	-

Source: Bundesministerium für öffentliche Wirtschaft und Verkehr Abteilung I/1, 1995

14.2.6 Level of forecasts

The newest results (dated january 1996) of the forecasting procedures are included in table 14.2.

Table 14.2: *Level of base and forecasts in trips, kilometrage and trip length for modes.*

Mode	Trips (mln)			Kilometrage (mln)			Trip length (km)		
	1990	2010	Index	1990	2010	Index	1990	2010	Index
Private car	-	-	-	60.000	76.000	127	-	-	-
Bus	-	-	-	12.300	14.300	116	-	-	-
Train	-	-	-	4.000	5.490	137	-	-	-
Slow	-	-	-	9.400	11.560	123	-	-	-
Total	-	-	-	85.700	107.350	125	-	-	-

Source: Bundesministerium für öffentliche Wirtschaft und Verkehr Abteilung I/1, 1995 (- = not available)

Information on the number of trips, kilometrage per purpose has not been provided.

14.2.7 Status of the forecasts

The forecast for the Austrian Environmental Plan provide a basis for ex ante evaluation of environmental policy options, such as the evaluation of CO_2 strategies.

14.3 Strategic forecasts for freight traffic

14.3.1 Introduction

A strategic forecast for freight traffic in Austria was carried out for:

BUNDESMINISTERIUM FÜR ÖFFENTLICHE WIRTSCHAFT UND VERKEHR
Abteilung I/1
Thomas Spiegel
Radetzkystaße 2
A-1030 VIENNA
TEL. +43 (1) 711 62 11 04
FAX. +43 (1) 711 62 15 99

BUNDESMINISTERIUM FÜR WIRTSCHAFTLICHE ANGELEGENHEITEN
Dr. Wolfgang Gleissner
Stubenring 1
1010 VIENNA
tel. +43 (1) 711 00 55 50
fax. +43 (1) 714 27 21

BUNDESMINISTERIUM FÜR UMWELT
Sektion I
Dr. Robert Thaler
Reisnnerstaße 4
1030 VIENNA
tel. +43 (1) 512 22

The forecast is produced by the ministry and it is not known whether they were made jointly with consultants. Neither is known to what publication can be referred.

14.3.2 Type of forecast

The official national forecast for freight traffic cover the following:

Total tonnage	No
Distinguished commodity classes	None
Distinguished modes	None
Total tonne kilometrage	Yes
Distinguished commodity classes	None
Distinguished modes	Road
	Rail
	Water
Types of movements forecast	National (only totals)
Number of vehicles by mode	Yes, but only for road

14.3.3 Type of freight transport model

The freight transport forecasts are based on time series analyses.

14.3.4 Base and forecast years

The base and forecast years used are:

Base year	1991
Future year	2011
	2021

14.3.5 Key input data

No key input data provided.

14.3.6 Level of forecasts

In the table below some key figures are presented for the freight transport levels of the base year and forecast year. There is some inconsistency in the data provided as the total over the modes does not exactly match the figure provided for total. If the actual sum over the modes is used, then the growth index will be 126 instead of 133.

Table 14.3: *Products in mln tonne kms in Austria in 1991 and 2011 by mode.*

	1990	*2010*	*Index*
Road	16.303	23.863	146
Rail	14.565	15.384	106
Ship	1.869	2.121	113
Total	31.147	41.367	133

Source: Bundesministerium für öffentliche Wirtschaft und Verkehr Abteilung I/1, 1995.

14.3.7 Status of the forecasts

No information about the status of these forecasts is provided. This probably relates to the fact that the forecasts are considered out of date and that the Ministry is currently in an interim period in anticipation of the results of new freight forecasting models.

15 European Union

15.1 Introduction

Contacts have been made with representatives of the European Commission as follows:

DIRECTORATE-GENERAL FOR TRANSPORT (DG VII/E/1)
Commission of the European Communities
Mr. Bastiaans
Mr. Ronny Rohart
200, Rue de la Loi
B-1049 BRUSSELS
tel. 296-8407
fax. 296-8352

From these contacts it has been established that the need for authoritative pan-European forecasts both for personal travel and for freight is strongly felt for some time. Projects have been let in the recent past to generate these forecasts. The Fourth Framework for R&D, currently under way, also addresses these issues.

With regards freight, DGVII advised that there now is a model system available, produced by NEA of the Netherlands. The summary report was made available and information from this document is contained in chapter 15.3.

Regarding forecasts for European personal travel, however, the information provided is that the Commission does not possess European forecasts. The project designed to deliver this information has incurred difficulty and delay and at present no information is available as to when, or if, such information will be forthcoming in the near future.

15.2 Strategic person travel forecasts

15.2.1 Introduction

The European Commission has been unable to provide information on personal travel forecasts, because of non-availability.

15.3 Strategic forecasts for freight traffic

15.3.1 Introduction

Strategic forecasts for freight in the European Union are carried out for:

DIRECTORATE-GENERAL FOR TRANSPORT (DG VII/E/1)
Commission of the European Communities
Mr. Ronny Rohart
200, Rue de la Loi
B-1049 BRUSSELS
tel. 00 31 2 296-8407
fax. 00 31 2 296-8352

There is at least one freight forecast accomplished for the European Union. It is published in:

NEA
1995 *Medium/Long Term Forecasts of European Goods Transport; Summary Report.* (950026/14002). Rijswijk: NEA.

15.3.2 Type of forecast

The international forecast for freight traffic cover the following:

Total tonnage	Yes
Total tonnage by commodity class	Yes
Distinguished classes	Agricultural Products Foodstuff Solid Minerals Fuel Crude Oil Ores and Metal Waste Metal Products Building Materials Fertilizers Chemicals Machinery and Manufactures Petroleum Products
Distinguished modes	Road Rail Inland waterways Sea Other (pipelines) Combination of modes
Total tonne kilometrage	No
Types of movements forecast	International national Interregional Intraregional
Number of vehicles by mode	No

15.3.3 Type of freight transport model

The models for freight forecasts are based on the assumption that transport demand is derived from economic activity. The system is composed of two models. The first one, the trade model, is based on changes in trade flows (independent of used mode) between base year and forecast year. For the base year a database is available in which transport and trade flows are related to several countries in Europe. The forecasts for 2005 are based on trends for the different commodity groups. These trend forecasts are provided by Prognos and the EU.

The second model provides a mode split. The chosen mode in the forecast year is dependent upon the characteristics of a commodity. The mode split is conditioned by a segmentation of the transport market. Time and costs play a role in the mode choice. The possibility for mode chains is taken into account.

15.3.4 Base and forecast years

The base and forecast year used in the freight forecasting model for the EU are:

Base year	1990
Future year	2005

15.3.5 Key input data

The key input data consists of trade flows for the base year and the annual growth of real GDP for the EU-countries. The growth in GDP ranges from approximately 1.8% up to 3.0% per annum.

15.3.6 Level of base and forecasts

In table 15.1 an overview is presented of the total trade in and between EU countries in 1990 and 2010, for all modes and all commodities. These figures are based upon the models from NEA. However, only figures for 2005 (Reference scenario) exist. A linear extrapolation was carried out to get an idea of the growth up to 2010. The table presents for every country the trade in mln tonnes with an origin or destination in that country (this includes import, export and national trade). The figures of the EU countries do not add up to the EU total because the EU has no import or export (double counts).

As can be seen in table 15.1 the overall growth in 2010 is estimated at an index of 134. The range of growth lies between 126 (Germany) and 156 (Spain). Compared to growth figures presented in other chapters for different countries, the growth in the EU countries is not as high as estimated for individual countries

Table 15.1: *Total trade (mln tonnes) in and between EU countries in 1990, 2005 (REF) and 2010 [1], for all modes and all commodities.*

	1990	*2005*	*2010*	*Index 90 - 10*
France	1.723	2.140	2.279	132
Belgium/Luxemburg	502	642	688	137
Netherlands	694	896	964	139
Germany [2]	819	982	1.036	126
Italy	1.082	1.321	1.401	129
Great Britain	1.938	2.363	2.505	129
Ireland	102	128	137	135
Denmark	219	265	280	128
Greece	214	269	287	134
Portugal	270	358	388	144
Spain	1.087	1.541	1.692	156
EU [3]	7.956	9.962	10.630	134

Source:NEA (1995).

1) Based upon calculations by HCG.
2) In Germany only traffic > 50 km is taken into account.
3) Total of EU is not total of table (to avoid double counts).

Table 15.2 shows the total amount of inter and intra-regional trade (mln tonnes) for 1990 and 2005 (REF) in the EU. The overall growth between 1990 and 2005 is moderate (index 125). Remarkable is the negative growth (index 97) between 1990 and 2005 of the intra-regional trade, as well as the growth of other modes (e.g. pipelines) for intra-regional trade (index 140).

Table 15.2: *Inter and intra-regional trade (mln tonnes) in and between EU countries in 1990, 2005 (REF).*

Mode	*1990*			*2005 REF*			*Index*		
	Intra	Inter	Total	Intra	Inter	Total	Intra	Inter	Total
Other	70	0	70	98	0	98	140	-	140
Road	1.803	4.952	6.755	2.327	6.211	8.538	129	125	126
Rail	330	141	471	408	149	557	124	106	118
Inland water	227	59	286	221	73	294	97	124	103
Sea	374	0	374	475	0	475	127	-	127
Total	2.805	5.151	7.956	3.529	6.433	9.962	126	125	125

Source:NEA (1995).

In table 15.3 the total trade for commodities is presented. The growth per commodity group ranges from 100 (crude oil) to 145 (machinery and mn). Crude oil doesn't grow between 1990 and 2005 (REF).

Table 15.3: *Inter and intra-regional trade (mln tonnes) in and between EU countries in 1990, 2005 (REF).*

Commodity group	*1990*	*2005*	*Index*
Agricultural Products	626	769	123
Foodstuff	963	1.127	117
Solid Metal F.	250	276	110
Crude oil	152	152	100
Ores and Metal Waste	169	182	112
Metal Products	344	421	122
Building Materials	3.032	3.740	123

Fertilizers	127	138	109
Chemicals	341	403	118
Machinery and Mn	1.469	2.113	145
Petroleum products	481	640	133
Total	7.956	9.962	125

Source: NEA (1995).

15.3.7 Status of the forecasts

The freight forecasts are the only forecasts available. There status has not been formalised, and currently their status is be described as 'forecasts produced by consultants to the EU'.

16 ECMT

16.1 Introduction

The European Conference of Ministers of Transport does not carry out forecasts themselves neither for person travel, nor for freight traffic. However ECMT publishes results of forecasts, based upon forecasts in member states. Some important publications are:

ECMT - ECONOMIC RESEARCH CENTRE

1992 *Structural Changes in Population and Impact on Passenger Transport Report of the eighty-eight Round Table on Transport Economics held in Paris on 13th-14th June 1991.* Paris: OECD Publications Service.

ECMT

1995 *European Transport Trends and Infrastructural Needs.* (European Conference of Ministers of Transport). Paris: OECD Publications Service.

The last publication comprises a survey like the one presented here. The main difference concerns the examined countries/regions/organisations and the objectives of the survey. The ECMT survey mainly deals with the results and the perspectives or strategies, while this study mainly deals with results and model types.

Postal address:

ECMT
2 rue André Pascal
F-75755 PARIS CEDEX 16
tel: +33 (1) 45 24 97 16
fax: +33 (1) 45 24 97 42

17 OICA

17.1 Introduction

OICA is an umbrella organisation for the European car industry, with headquarters in Paris. It produces forecasts of car ownership for Western Europe and elsewhere.

OICA
4, Rue de Berri
75008 Paris
Tel.: 00 33 43 59 00 13

17.2 Strategic person travel forecasts

17.2.1 Introduction

The car ownership forecasts produced by OICA mainly serve the industry as guidance for industrial planning and marketing strategies. Information on the OICA forecasts has been taken from information provided by OICA to AVV's Strategic Studies Division (September 1994):

OICA to AVV SRM
Information on Vehicle and Traffic Forecasts
September 8th, 1994

17.2.2 Type of models

The forecasts of OICA are based on the expectation that the growth of vehicle density follows an asymmetrical S-shaped curve, implying saturation as incomes per head of population grow beyond a certain level. As most European markets are maturing, the growth in vehicle density is slowing down. For extrapolation OICA has used a Gompertz function of the following shape:

$$D_t = D_S.e^{-abt}$$

D_t = car density (passenger cars)

D_S=saturation level

t= time

a,b= parameters

This curve takes account of changes in elasticity of vehicle density in relation to income over time. Assumptions on saturation levels are required and these may differ from country to country. OICA estimates that saturation for Germany will be reached at level Ds = 595 (cars per 1000 inhabitants). Their estimate for the Netherlands is Ds = 410 cars per 1000 inhabitants.

For population forecasts, OICA's forecasts rely upon United Nations forecasts.

17.2.3 Levels of forecasts

The OICA forecasts cover all of Europe (except Turkey). Within this European area distinction is made between five groups of countries:

Group 1: all countries in western Europe, excluding Turkey.

Group 2: the four major European countries Germany, France, United Kingdom and Italy.

Group 3: the Scandinavian countries of Denmark, Norway, Sweden and Finland.

Group 4: the Mediterranean countries of Greece, Portugal and Spain.

Group 5: the remaining countries of Western Europe such as Austria, Belgium, Luxembourg, Switzerland, Ireland and the Netherlands.

For the four groups of countries distinguished, OICA predicts the following annual growth in vehicle numbers and changes in car density.

Table 17.1: *Car ownership growth forecasts for Europe*

	annual growth in number of vehicle 2010/1993	changes in car density 1993	(cars/1000 population) 2010	annual change in cars /1000
Group 1 Western Europe	1.4%	417	509	1.2%
Group 2 European Big Four	1.2%	455	542	1.0%
Group 3 Scandinavia	1.1%	380	440	0.9%
Group 4 Mediterranean	2.7%	288	439	2.5%
Group 5 Remaining W. Europe	1.1%	391	448	0.8%

17.2.4 Status of forecasts

As has already been mentioned, the OICA produces its car ownership forecasts for the purposes of industrial planning and marketing. In information is not generated to assist government and planning agencies with policy formulation or scheme evaluations.

17.3 Strategic forecasts for freight traffic

17.3.1 Introduction

No information has been provided or found regarding forecasts of freight transport or goods vehicle forecasts produced by or on behalf of OICA.

18 IEA

18.1 Introduction

The International Energy Authority is a body which studies the supply and demand of energy of all types and for all sectors of the economy. The transport sector is important for the work of IEA as it constitutes the largest and most rapidly growing consumer of liquid fuels. In the OECD countries transport is the source of almost all increases in oil demand.

18.2 Strategic person travel forecasts

18.2.1 Introduction

The strategic person travel forecasts for the IEA are produced for and carried out by:

INTERNATIONAL ENERGY AGENCY
Mr. Norbert Wohlgemuth
2, rue André Pascal
F-75775 PARIS Cedex 16
tel. +33 (1) 45 24 94 93
fax. +33 (1) 45 24 79 21

The IEA produces the forecasts for personal travel using its *IEA World Energy Model.* This model has been used for several forecasts, which are publicly available.

The IEA model distinguishes three types of transport sector demand:

- road passenger
- road freight
- air travel usage.

18.2.2 Type of forecast

The official forecast for person travel cover the following:

Driving licence holding	No

Car ownership	No
Number of trips	No
Kilometrage travelled	Yes
Distinction by mode	Private car
Distinction by purpose	None
Time dimension of the forecasts	Year

Remarks:

Distance travelled by passenger car has been estimated for the US, Europe and Japan. The resulting travel projections are then combined with estimates of efficiency improvements, car turnover rates and assumptions on diesel/gasoline penetration in order to arrive at projections of fuel demand.

18.2.3 Type of passenger traffic model

Unfortunately, the IEA has not provided any information on the World Energy Model. From an available conference paper it is understood that the model treats transportation sector demand separately for road passenger, freight and air travel and that the key underlying driving forces of demand are modelled. These are: income, cost of travel, population, and efficiency.

The kilometrage travelled by car has been estimated for the USA, Europe and Japan. The resulting travel projections are then combined with estimates of efficiency improvements, car turnover rates and dies/gasoline penetration assumptions in order to arrive at projections of fuel demand.

18.2.4 Base and forecast years

The base and forecast years for the IEA World Energy Model currently are:

Base year	1992
Future year	2010

18.2.5 Key input data

There is very little known about the key input into the models used for the IEA. The main data is presented in table 18.1.

Table 18.1: *Key input data for 1993 and 2010*

Variable	*1993*	*2010*
Population (mln)	439.06	460.16
Population (base=100)	100	105
Household size	-	-
Household size (base=100)	-	-
Participation male	-	-
Participation male (base=100)	-	-
Participation female	-	-
Participation female (base=100)	-	-
GDP growth (base=100)	100	151
Car ownership (mln)	-	-
Car ownership (base=100)	-	-
Car / household	-	-
Car / household (base=100)	-	-
Car / Inhabitant	-	-
Car / Inhabitant (base=100)	-	-
Driving licence (mln)	-	-
Driving licence (base=100)	-	-
Licence / Inhabitant	-	-
Licence / Inhabitant (base=100)	-	-
Real petrol prices (base=100)	100	115
Real PT prices (base=100)	-	-
Real parking costs (base=100)	-	-

Source: IEA, 1995

The principal determinants of road passenger transportation demand in the model are:

- Income (GDP)
- Cost of travel (approximated by fuel price and economy)
- Population
- Efficiency (necessary for deriving travel cost energy demand)

Economic growth assumptions for Europe for the period 1992-2010 is 2.3% per annum. The equivalent rate for the period 1971-1992 was 2.5%.

The actual projections for growth rates of personal travel and freight volumes for the period 1992-2010 are made for two scenario's. The main difference between scenario's concerns the fuel efficiency improvement and fuel prices.

The Energy Saving scenario (ES) assumes a substantial improvement in the autonomous efficiency improvement. The price-induced improvement is the same as in the Capacity Constraints scenario (CC).

European personal travel growth rates per annum (vehicle distances travelled):

	1971/1992	1992/2010 CC	1992/2010 ES
European big five: France, Germany, Italy Spain, UK	3.5%	1.9%	2.3%

These growth rates suggest a total increase in vehicle kilometrage over the period 1992-2010 of between 40 and 51% (see ch 20.2.6).

18.2.6 Level of forecasts

As with the case of the key input data there is very little known about the level of the forecasts. This is mainly due to the type of model being used. In table 18.2 some key figures for the passenger kilometrage for modes are presented.

Table 18.2: *Level of base and forecasts in trips, kilometrage and Trip length for modes.*

Mode	*Trips (mln)*			*Kilometrage (mln)*			*Triplength (km)*		
	1993	*2010*	*Index*	*1993*	*2010*	*Index*	*1993*	*2010*	*Index*
Private car	-	-	-	-	-	141	-	-	-
Bus	-	-	-	-	-	-	-	-	-
Train	-	-	-	-	-	-	-	-	-
Slow	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Source: IEA, 1995 (- = not available)

18.2.7 Status of the forecasts

The IEA forecast are produced to provide background information on the development of energy consumption, world-wide and by country. These forecasts do not directly affect governments or planning authorities with regards to transport policy and scheme appraisal.

18.2.8 Various aspects

The effects of possible government policy measures is not incorporated in the IEA model specification. Such factor could include:

1. increased energy and other vehicle operating and capital costs
2. improved vehicle fuel and emission controls
3. use of alternative fuels (also improvement over existing vehicle and fuel efficiency-supply technologies)
4. managing urbanisation in order to limit congestion (including increased road construction and traffic management, increased occupancy rates and road transport informatics)
5. modal shifts
6. increasing vehicle turnover rates
7. lifestyle changes
8. travel substitution by new telecommunication technology

From 1971 to 1992 world-wide energy use in the transport sector increased by 74%, an average of 2.7% per annum. The share of oil products

consumed in transport increased from 43% of total final oil products consumption in 1971 to over 55% in 1992.

Transport's share of energy consumption increased in OECD countries from less than 25% in 1971 to 32% in 1992 and is expected to reach 34% by 2010, with the transport sector responsible for 60% of oil consumption.

From 1992 to 2010 world-wide annual transportation oil demand is expected to increase by 800 Mtoe (million tonnes of oil equivalent, or 16 million barrels a day). a key uncertainty is the development in transportation efficiency, but consumer preferences for more comfortable means of transport, increased urban driving and congestion could offset efficiency improvements.

18.3 Strategic forecasts for freight traffic

18.3.1 Introduction

Several strategic forecasts for freight were carried out for the International Energy Agency (IEA):

INTERNATIONAL ENERGY AGENCY
Norbert Wohlgemuth
2, rue André Pascal
F-75775 PARIS CEDEX 16
tel. +33 (1) 45 24 94 93
fax. +33 (1) 45 24 79 21

The forecasts of the IEA are publicly available.

18.3.2 Type of forecast

The IEA forecast for freight traffic cover the following:

Total tonnage	No
Distinguished modes	None
Distinguished classes	None
Total tonne kilometrage	Yes
Distinguished modes	Road
Distinguished classes	None
Types of movements forecast	National
Number of vehicles by mode	No

18.3.3 Type of freight transport model

No information is available on the type of freight forecasting models used.

18.3.4 Base and forecast years

Base and forecast years used are:

Base year	1992
Future year	2010

18.3.5 Key input data

GDP base year information and projections are used. There is no sectoral disaggregation. The IEA uses and produces freight forecasts at an aggregated level. The main variable used is data on European GDP. Based on the GDP, forecasts for freight transport kilometrage are produced.

18.3.6 Level of forecasts

The results of the IEA model for freight transport are summarised in the table below.

European freight transport growth rates per annum (tonne kilometres):

	1971/1992	1992/2010 CC	19992/2010 ES
European big five: France, Germany, Italy Spain, UK	4.1%	2.1%	2.3%

These growth rates suggest a total increase in tonne kilometrage over the period 1992-2010 of between 45 and 51%.

For the base year the transported volume was 970.162 mln tonne kms, while in the forecast year this level is forecasted at 1.386.970 mln tonne kms. An increase with an index of 143. For road vehicles the total volume transported is estimated at 811.674 mln tonne kms in the base year and 1.178.920 mln tonne kms in the forecast year. An increase with an index of 145.

18.3.7 Status of the forecasts

No information has been provided on the status of the forecasts. It is not known to what framework the forecasts belong.

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DIRECTORAAT-GENERAAL RIJKSWATERSTAAT

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DIRECTORAAT-GENERAAL RIJKSWATERSTAAT

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ECMT - ECONOMIC RESEARCH CENTRE

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ECMT

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PLANCO CONSULTING GmbH

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Appendix A

Organsations and individuals contacted in the course of the project

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Departement Leefmilieu en Infrastructuur
Mobiliteitscel
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Simon Bolivarlaan 30
1031 Brussels

Mr. Luc de Rijck
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B-1040 Brussels

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F 00 46 8 453 5872

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F 00 46 8 686 1949

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Appendix B

Questionnaire International Comparison of Forecasts

Type A:

Land-based person travel

Germany
France
United Kingdom
Belgium
Sweden
Spain
Austria
Czech Republic
EU
CEMT
OICA
IEA

By

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Introduction

This research is carried out on behalf of the Transport Research Centre of the Ministry of Transport of The Netherlands.

The aim is to gather information on forecasting methods and levels which allows national traffic and transport forecasts to be placed in a European context.

The focus of the Type A questionnaire is on strategic personal travel forecasts which are produced to aid regional and central government policy making.

The principle questions to which answers are being sought are:

- ***Who produces strategic forecasts for passenger travel at regional/national level?***
- ***What is the structure of the forecasting methods used (in general and, if possible, also in detail)?***
- ***What are the underlying assumptions used?***
- ***What are the forecasted levels of growth, by mode and purpose?***
- ***What rôle do strategic personal travel forecasts play in policy formulation and decision making?***

The questionnaire is organised under seven headings.

We would like to ask you to complete the questionnaire and return it to:

Hague Consulting Group
Mark Gommers
Surinamestraat 4
2285 G The Hague
the Netherlands

or fax +31 70 346 4420

It would be very helpful also, if you could enclose concise documentation of the models, the forecasts or the policies (e.g. articles, conference papers etc.).
We are very grateful for your willingness to cooperate with this research.

1. Which organisation(s) produce(s) strategic traffic forecasts at meso (regional) /macro (national) level?

Is there more than one organisation involved in the production of strategic forecast for a specific region or country?

- ☐ one
- ☐ more than one

name and address of organisation 1

.....
.....
.....

- ☐ name contact person
  .....
  tel.: .....
  fax.: .....

name and address of organisation 2

.....
.....
.....

- ☐ name contact person
  .....
  tel.: .....
  fax.: .....

Are there one or more strategic forecasts produced for a specific region or country?

- ☐ one
- ☐ more than one

Are the traffic forecasts which are produced publicly available or are there restrictions on availability

- ☐ publicly available
- ☐ availability restricted
  because (pls. complete): .....

2. What types of strategic personal travel forecasts are being made at meso (regional) and/or macro (national) level?

Driving licence holding
- ☐ No
- ☐ Yes

Car ownership
- ☐ No
- ☐ Yes

Number of trips
- ☐ No
- ☐ Yes

Number of trips by mode
- ☐ No
- ☐ Yes
  - ☐ by private car
  - ☐ by public transport (train/other pt modes)
  - ☐ other modes, please specify .....
    .....

Number of trips by purpose
- ☐ No
- ☐ Yes
  - ☐ travel to and from work
  - ☐ (non) home based business
  - ☐ other purposes, please specify .....
    .....

Kilometrage travelled
- ☐ No
- ☐ Yes

Kilometrage by mode
- ☐ No
- ☐ Yes
  - ☐ by private car
  - ☐ by public transport (train/other pt modes)
  - ☐ other modes, please specify .....
    .....

Kilometrage by purpose

- ☐ No
- ☐ Yes
  - ☐ travel to and from work
  - ☐ (non) home based business
  - ☐ other purposes, please specify .....
    .....

What is the time dimension of the forecasts

- ☐ AM peak period
- ☐ PM peak period
- ☐ All day model
  - ☐ 12 hour day
  - ☐ 24 hour day
- ☐ year

3. What type of personal travel models are the forecasts based on:

- trend analysis i.e. based on economic/demographic/other indicators
- analytical models i.e. statistical/mathematical models and observed travel behaviour
  - aggregate = based on observed choices of groups of travellers or on average zonal relationships
  - disaggregate = based on observed choices of individual travellers

☐ driving licence holding model
☐ No
☐ Yes
  ☐ trend analysis
  ☐ analytical models ☐ aggregate ☐ disaggregate

☐ car ownership model
☐ No
☐ Yes
  ☐ trend analysis
  ☐ analytical models ☐ aggregate ☐ disaggregate

☐ trip frequency model
☐ No
☐ Yes
  ☐ trend analysis
  ☐ analytical models ☐ aggregate ☐ disaggregate

☐ distribution model
☐ No
☐ Yes
  ☐ trend analysis
  ☐ analytical models ☐ aggregate ☐ disaggregate

☐ mode choice model
☐ No
☐ Yes
  ☐ trend analysis
  ☐ analytical models ☐ aggregate ☐ disaggregate

☐ assignment model
☐ No
☐ Yes
car assignments
☐ all or nothing technique
☐ congested technique

public transport assignment
☐ all or nothing technique
☐ congested technique

Is there a feed back in the model system between congestion and mode and destination choice?
☐ No
☐ Yes

Is a time-of-day choice sub-model included in the model system?
☐ No
☐ Yes

Is the model system is suitable for evaluating strategic policies for
☐ demand
  ☐ No
  ☐ Yes
☐ supply
  ☐ No
  ☐ Yes

4. What is the base year and forecast year commonly used?

Base year

- ☐ 1986
- ☐ 1990
- ☐ 1994
- ☐ other, please specify .....
  .....

Forecast year

- ☐ 2000
- ☐ 2005
- ☐ 2010
- ☐ other, please specify .....
  .....

5. What are the key input data (if applicable) for base and forecast year for the study area?

Absolute or relative numbers, whatever is easiest.

	Base year	Forecast year
	.....	.....
population	.....	.....
household size	.....	.....
participation rate		
male	.....	.....
female	.....	.....
GDP growth (base year=100)	.....	.....
car ownership (millions)	.....	.....
driving licence holding (millions).....		.....
real petrol prices (base year=100)	.....	.....
real public transport price levels..... (base year=100)		.....
real parking costs (base year = 100)	.....	.....

6. What are the levels of the forecasts for a 'business as usual' policy, for:

Absolute or relative numbers, whatever is easiest.

	Base year 19..	Forecast year 20..
Driving licence holding	.....	.....
Car ownership	.....	.....
Number of trips	.....	.....
Number of trips by mode		
☐ by private car	.....	.....
☐ by public transport (train/other p.t.modes	.....	.....
☐ other modes,. pls. specify	.....	.....
	.....	.....
Number of trips by purpose		
☐ travel to and from work	.....	.....
☐ (non)HB business	.....	.....
☐ other purposes, pls. specify	.....	.....
.....	.....	.....
Kilometrage travelled (all modes)	.....	.....
Kilometrage by mode		
☐ by private car	.....	.....
☐ by public transport (train/other pt modes)	.....	.....
☐ other modes, pls. specify	.....	.....
.....	.....	.....
Kilometrage by purpose		
☐ travel to and from work	.....	.....
☐ (non) HB business	.....	.....
☐ other purposes, pls. specify	.....	.....
.....	.....	.....

7. What is the status or rôle of the traffic forecasts in policy making?

Forecasts provide a firm framework for the definition of infrastructural needs (roads and public transport) and building programs.

- ☐ No
- ☐ Yes

explanation/example:

Forecasts provide a firm framework for the formulation of integrated transport policies and they provide a basis for the ex ante evaluation of policy options.

- ☐ No
- ☐ Yes

explanation/example:

Forecasts provide a firm framework for the formulation of integrated multi-modal transport policies.

- ☐ No
- ☐ Yes

explanation/example:

Traffic forecasts play an important part in the formulation of transport policy at regional/national level and are also used as input and guidance for affiliated policy areas such as land use and environment?

- ☐ No
- ☐ Yes

explanation/example:

Questionnaire International Comparison of Forecasts

Type B:

Land based freight transport

Germany
France
United Kingdom
Belgium
Sweden
Spain
Austria
Czech Republic
EU
CEMT
OICA
IEA

By

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Introduction

This research is carried out on behalf of the Transport Research Centre of the Ministry of Transport of The Netherlands.

The aim is to gather information on forecasting methods and levels which allows national traffic and transport forecasts to be placed in a European context.

The focus of the Type B questionnaire is on strategic freight transport forecasts which are produced to aid regional and central government policy making.

The principle questions to which answers are being sought are:

- *Who produces strategic forecasts for freight transport at regional/national level?*
- *What is the structure of the forecasting methods used (in general and, if possible, also in detail)?*
- *What are the underlying assumptions used?*
- *What are the forecasted levels of growth, by mode ?*
- *What rôle do strategic freight traffic forecasts play in policy formulation and decision making?*

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2285 G The Hague
the Netherlands

or fax +31 70 346 4420

It would be very helpful also, if you could enclose concise documentation of the models, the forecasts or the policies (e.g. articles, conference papers etc.).

We are very grateful for your willingness to cooperate with this research.

1. Which organisation(s) produce(s) strategic freight forecasts at regional/national level?

Which organisations are involved in the production of strategic regional or national freight forecasts?

name and address of organisation 1

.....
.....
.....

☐ **name contact person**
.....
tel.: .....
fax.: .....

name and address of organisation 2

.....
.....
.....

☐ **name contact person**
.....
tel.: .....
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Are there one or more regional or national strategic freight forecasts produced?

☐ **one**
☐ **more than one**

Are the regional or national strategic freight forecasts publicly available or are there restrictions on availability

☐ **publicly available**
☐ **availability restricted**
because (pls. complete): .....

2. What types of freight forecasts are being made at the regional or national level?

Total tonnage
- ☐ No
- ☐ Yes

Total tonnage by commodity class
- ☐ No
- ☐ Yes

  How many different classes
  - ☐ 2-3 classes
  - ☐ 3-6 classes
  - ☐ >6 classes

Tonnage by mode
- ☐ No
- ☐ Yes
  - ☐ by road
  - ☐ by rail
  - ☐ by water

Total ton kilometrage
- ☐ No
- ☐ Yes

Ton kilometrage by mode
- ☐ No
- ☐ Yes
  - ☐ by road vehicle
  - ☐ by rail
  - ☐ by water

Ton kilometrage by commodity class
- ☐ No
- ☐ Yes
  - ☐ 1-3 classes
  - ☐ 4-6 classes
  - ☐ >6 classes

Type of movements forecast
- ☐ regional freight
- ☐ national freight
- ☐ inbound international freight
- ☐ outbound international freight
- ☐ transito freight
- ☐ other types of freight movement, pls. specify .....
  .....

Number of road vehicles/train/barges by mode

- ☐ No
- ☐ Yes
  - ☐ road vehicles
  - ☐ trains
  - ☐ barges

3. What type of freight transport models are the forecasts based on:

- trend analysis i.e. based on economic or other indicators
- analytical models i.e. statistical/mathematical models and observed choice patterns

production/attraction model
- ☐ No
- ☐ Yes
  - ☐ trend analysis
  - ☐ analytical models

distribution model
- ☐ No
- ☐ Yes
  - ☐ trend analysis
  - ☐ analytical models

mode choice model
- ☐ No
- ☐ Yes
  - ☐ trend analysis
  - ☐ analytical models

What is the time dimension of the model
- ☐ year
- ☐ average working day
- ☐ other, pls. specify .....

4. What is the base year and forecast year commonly used?

Base year

- ☐ 1986
- ☐ 1990
- ☐ 1994
- ☐ other, please specify .....
  .....

Forecast year

- ☐ 2000
- ☐ 2005
- ☐ 2010
- ☐ other, please specify .....
  .....

5. What are the key input data (if applicable) for base and forecast year for the study area?

Absolute or relative numbers, whatever is easiest

Economic development by sector - % annual growth		
agriculture/fisheries	.....	.....
minerals	.....	.....
industry	.....	.....
utilities	.....	.....
building industry	.....	.....
trade and leisure	.....	.....
transport/storage	.....	.....
banking	.....	.....
other services	.....	.....
consumers demand	.....	.....
international trade	.....	.....

6. What are the levels of the forecasts for a realistic 'business as usual' policy, for:

Absolute or relative numbers, whatever is easiest.

		Base year	Forecast year
Total tonnage		.....	.....
Total tonnage by commodity class			
all classes		.....	.....
specific classes	.....	.....	.....
	.....	.....	.....
Tonnage by mode			
by road		.....	.....
by rail		.....	.....
by water		.....	.....
Ton kilometrage		.....	.....
Ton kilometrage by mode			
by road vehicle		.....	.....
by rail		.....	.....
by water		.....	.....
Ton kilometrage by commodity class			
☐ 1-3 classes		.....	.....
☐ 4-6 classes		.....	.....
☐ >6 classes		.....	.....
Type of movements forecast			
☐ regional freight		.....	.....
☐ national freight		.....	.....
☐ inbound international freight		.....	.....
☐ outbound international freight		.....	.....
☐ transito freight		.....	.....
☐ other types of freight movement, pls. specify		.....	.....
		.....	.....
Road vehicles kilometrage			
☐ vans		.....	.....
☐ HGV's <10ton		.....	.....
☐ HGV's 10-20 ton		.....	.....
☐ HGV's >20 tons		.....	.....
☐ HGV's total		.....	.....

7. What is the status or rôle of the freight transport forecasts in policy making?

Freight transport forecasts provide a firm framework for the definition of infrastructural needs (roads, rail and waterways) and building programs.

- ☐ No
- ☐ Yes

explanation/example:

Freight transport forecasts provide a firm framework for the formulation of integrated freight transport policies and they provide a basis for the ex ante evaluation of policy options.

- ☐ No
- ☐ Yes

explanation/example:

Freight transport forecasts provide a firm framework for the formulation of integrated inter-modal transport policies.

- ☐ No
- ☐ Yes

explanation/example:

1 Freight transport forecasts not only play an important part in transport policy formulation but also are important input and guidance for affiliated policy areas such as economy and environment?

- ☐ No
- ☐ Yes

explanation/example:

COLOPHON

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