

# Swedish Rail Sector Development

Banverket's sector report

# 08

# Contents

Director General's foreword	4	Development of passenger services in 2008	46
Our passengers and purchasers of transport services	6	Development of freight transport in 2008	56
Facts about the rail sector in 2008	14	Public transport accessible to and usable by everyone	64
Industry-wide cooperation in the development of the rail sector	20	Quality of service for passengers and transport purchasers	72
<b>Subjects</b>		Safe traffic	78
Skills supply in the rail sector	24	A healthy environment	84
Local trains, light rail and underground in Sweden in 2008	30	An equal opportunity rail transport system	92
High-speed links – a new transport system	36	<b>Miscellaneous</b>	
<b>Objectives report</b>		Important events in 2008	96
How well does the rail sector meet the objectives of transport policy?	42	Swedish transport services in figures	99

Banverket is responsible for ensuring that the entire rail sector – railways, light rail systems and the underground – is developed in accordance with those transport policy objectives laid down by the Swedish Parliament. Developments are presented each year in the form of a sector report.

## Banverket's responsibility for the sector

As with other modes of transport, rail should contribute towards fulfilling the transport policy objectives laid down by Parliament. Sector responsibility means that Banverket, as the representative of the state at a central level, is responsible for ensuring that the development of rail, underground and light rail services is in line with the transport policy objectives. The overarching transport policy objective is to guarantee provision of transport systems for citizens and businesses throughout Sweden which is socio-economically efficient and sustainable in the long term. Within the framework of this overarching objective six long-term sub-objectives are specified:

- **AN ACCESSIBLE TRANSPORT SYSTEM**
- **A HIGH QUALITY OF TRANSPORT**
- **SAFE TRAFFIC**
- **A SOUND ENVIRONMENT**
- **REGIONAL DEVELOPMENT**
- **A TRANSPORT SYSTEM OFFERING EQUAL OPPORTUNITIES**

Banverket's responsibility for the sector includes a responsibility to monitor developments and permits in the rail sector and to be a unifying, supportive and driving force in relation to the other parties involved. The rail sector has a large number of actors. Cooperation between the actors is a precondition for continued positive development in the rail sector.

## The sector report

The report begins with a review of the satisfaction of passengers and purchasers of commercial transport services with the rail transport system in 2008. This is followed by a chapter containing facts in brief about the rail sector and its actors. Thereafter come three themed sections. First, the skills requirements of the rail sector and those actions taken to ensure the supply of skills. A chapter is devoted specifically to rail-based systems – light rail, underground and local rail lines – and their contributions to meeting transport policy sub-objectives. The theme section ends with a chapter on the opportunities and preconditions for high speed rail lines in Sweden.

After the introductory factual and theme chapters comes a survey of developments within the rail sector by each transport policy sub-objective. The sub-objectives for an accessible transport system and regional development are closely related and are therefore treated together.

The report ends with a calendar of important events in 2008 and a chapter showing developments in Sweden's transportation in figures.

Some numerical data is presented with the previous year's figures in brackets.

# Director General's foreword



A handwritten signature in black ink that reads "M Akhtarzand". The signature is written in a cursive style.

**Mino Akhtarzand**  
Director General

**IN THIS SECTOR REPORT** Banverket gives an account of the work that actors in the rail sector have done together in order to meet the transport needs of the citizens and of industry. An important measure of this work is mileage achieved and the quality of transport.

We can be satisfied by the fact that rail has in the past year again beaten all records. Both long-distance and short-distance passenger traffic in 2008 reached its highest level ever, and freight traffic equalled the record levels of previous years. This must be seen in the light of the ongoing financial crisis and recession, which for many modes of transport has meant a severe reduction in volumes of passengers and freight.

Both long-distance and short-distance passenger traffic by rail has increased its market share of passenger transport. Freight transport by rail has retained its market share. A greater market share for rail traffic is of course gratifying, as it contributes to more efficient freight services, but it is also an important contribution to the reduction in the total environmental impact of the transport sector.

An important measure of how rail has met customer needs for quality in the rail services is punctuality. This has, gratifyingly, improved somewhat in 2008, which is good for the entire rail sector. If rail is to be a sustainable mode of transport, people must be able to rely on trains leaving and arriving on time, and industry must be able to put its trust in rail as a link in its processes. Customers place great reliance on the sector, when they choose to use rail as a mode of transport. The sector must jointly meet

this commitment by always providing the products customers demand and pay for.

In order to improve the quality of rail services Banverket has mobilised primarily within operations and maintenance where they do most good for rail traffic. In Stockholm/Mälardalen, the Västra Götaland and Öresund regions Banverket has, together with transport authorities and rail companies, initiated special projects to improve punctuality and quality in rail services. In these projects joint programmes are being developed, with actions which in both the short and long term facilitate a well functioning service. Those results obtained hitherto from this work are positive, indicating that these concentrations reduce delays.

Many of the measurements given in this sector report show that rail and public transport have a growing proportion of satisfied customers. This is no doubt a result of the purposeful work carried out by Banverket, the railway companies and other actors over many years in developing their operations. Efforts and actions for improvement, made, for example, in the mobilisations, has led to greater accessibility to the rail net and more satisfied customers. But it is quite clear that we have to increase our customer focus, further intensify our work with customers and further improve accessibility to rail. We at Banverket are continuing to work with the ambition of having 100 per cent satisfied customers.

This year Banverket has been commissioned by the government to examine the market and socio-economic preconditions for high-speed lines in Sweden. Our conclusions indicate that the Götaland Line and the Europabanan Line

are of very great strategic significance for the transport system throughout Sweden. There are also sufficiently strong arguments to state that high-speed lines are an important means for achieving a sustainable transport system.

High-speed lines are a good method of achieving both greater capacity on the railway and rendering effective the current transport system. New high-speed lines free up capacity on the existing net for regional trains and freight traffic. This means that high speed lines are an important strategic investment for the whole of Sweden. They result in major reductions in travel time, contribute greatly to reaching climate targets, and increase Sweden's competitiveness. It is my view that Sweden has now come to an important crossroads on an issue for the future, and it is, therefore, gratifying that the government has decided to continue to look into high speed lines.

The rail sector is undoubtedly a sector of the future; growth is high, traffic is increasing and major investments are being made in infrastructure. Ensuring the provision of skills is, therefore, a decisive issue in order for the sector to function efficiently both today and in the future. Estimates show that the rail sector needs to recruit approximately 1,500 new co-workers per annum in the future.

In order to cope with this a joint programme Skills Supply in the Rail Sector is ongoing. An ambitious project is being implemented in, primarily, two designated areas: making the sector more attractive for recruitment and promoting the supply of training within the rail sector. What is more, we need greater efficiency within the transport sector. Together the sector needs to mobilise its forces for greater efficiency, which can lead to greater benefits for each krona invested.

I am now looking forward to continued development of the sector in future years, with better and more efficient traffic, making for an increasing number of satisfied customers on the railway. If we succeed together in our efforts in the rail sector, we will receive the finest reward we can get: a healthy environment and more satisfied rail customers.

*Borlänge, March 2009.*



All the actors who make possible travel and transport have responsibility for creating the greatest possible value for passengers and freight transport buyers. Expectations of solutions for efficient transport for business are high, just as is the need for an accessible, reliable and attractive public transport system to make everyday life simpler.

In order for the rail sector to be able to offer a supply of transport possibilities to meet these needs, we have to acquire knowledge about our customers. What are the challenges for the rail sector, and what did our customers think about public transport and the railway in 2008?

*One competitive advantage of public transport is that the journey can be used for work or leisure, as the passenger plays no part in the traffic.*





Our passengers  
and purchasers of  
transport services



### PUBLIC TRANSPORT MAKES LIFE EASIER

Passengers' Forum (Resenårsforum) is an organisation for passengers on public transport, which pursues questions from a passenger perspective. In its day-to-day work Passenger's Forum gains insights into passengers' requirements and needs, and their perception of public transport. What follows is an overview of Resenårsforum's views concerning the potential for improvement of public transport by rail.

Passengers feel that the preconditions for public transport have altered considerably, particularly over the last 10 years. The greater supply of transport providers within both local, regional and national traffic, have provided new opportunities for travel, but also a development of different ticketing and price systems – something which often proves difficult for passengers.

Ticket purchase for long-distance journeys via SJ AB or other major operators is regarded as problematic. The risk of buying the wrong ticket and being thrown off the train, particularly if you are travelling regionally outside the region where you yourself reside, is felt to be unpleasant. This does not increase the attractiveness of public transport. What is needed is a ticketing system which is compatible and focuses on the customer. Uncertainty about what prices apply must not be so great that passengers become anxious. Passengers are happy to pay – as long as it is simple!

Resenårsforum considers it is important to ensure that passengers feel that the development of public transport is going in the right direction – towards more attractive and user-friendly public transport. The only people who can decide what is attractive are the passengers themselves of course. For this reason, passengers' needs and demands have to be focused upon at the time when public transport is being planned and designed. This is where Banverket has an important role to play. Banverket has to improve at providing directives, encouraging and guiding the actors in the sector towards solutions which mean that travel becomes more attractive.

Banverket has a special joint consultation group with passengers in the Göteborg area. The group has been in existence for a number of years, and the initiative is praiseworthy. Resenårsforum regards to the consultation group as the necessary link between the authorities, the operators and passengers. The operators need to organise this right across the country.

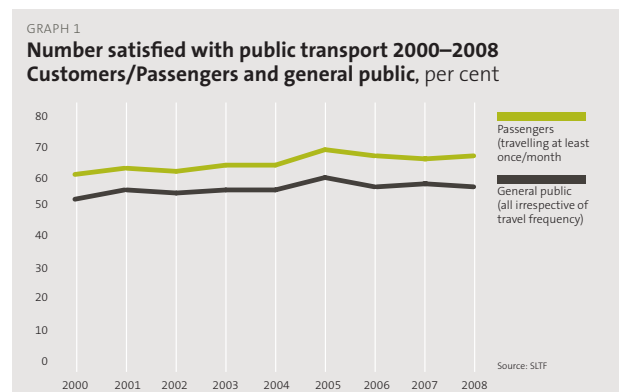
Certain actions have been carried out for a more attractive public transport service, and others are planned, amongst others as a result of commitments in the joint programme Looking Ahead (Koll framåt), whilst other actions are taking their time.

A question of this kind has to do with station staff. This is a central issue, as all train journeys begin and end at the station. Many journeys involve one or two changes on route. The shortage of staff who can answer questions influences passengers' feelings of confidence, but also how they perceive reliability, particularly in connection with journey disruptions. There are several parties who can co-finance station staff, but Banverket has to ensure that this happens. It is quite clear that a friendly reception leads to relatively high marks for bus services and airlines. Passengers' Forum considers that there is a minimum requirement for rail too, which for a long time has not been met.

The passengers' perspective is expressly asked for in more and more contexts. But it must not be a question simply of a single objective; it must be about real participation. Public transport passengers are the people who choose an attractive alternative, public transport, with the freedom from being tied to the car. Resenårsforum considers that the question of alternatives must also be about passengers being able to choose different levels of quality on their journey.

#### *Banverket's comments*

The rail system is not an end in itself. It is important never to forget that we exist for passengers and transport purchasers, to meet their needs and desires. The passengers' perspective is a precondition for rail being regarded as attractive. With this as a starting point, it is important that all actors who make public transport possible work in an efficient way together.



Insufficient attention has over the years been paid to the passengers' perspective by actors in the sector, including Banverket. In recent years a change has occurred, however, for example through the sector-wide work on Looking Ahead and the Doubling Project (Fördubblingsprojektet) as well as the sector authorities' work on organisational changes in order to become more customer-oriented. It should also be noted that several subprojects within the Doubling Project are working precisely to make it simpler for passengers to book and pay for their journey independently of operators and fare systems.

Banverket is anxious to obtain a reliable picture of passengers' views about how the rail transport system can be developed. It must, however, be noted that it is the rail companies and the responsible transport authorities who have the direct customer relationship with passengers. Banverket must support a positive development in these relations, without necessarily taking over responsibility for them. Banverket is positive towards the fact that there are organisations in existence which are able to represent and coordinate passengers' views about public transport. This improves the opportunities for dialogue. At the same time, it is important that individual passengers have the opportunity of giving their views directly to Banverket. The solution which exists in Göteborg (a joint consultation group with the passengers) will be evaluated and in time will possibly be introduced in other parts of the country.

But a louder voice on the part of the passengers' collective increases the pressure on rail companies and the transport authorities to develop their services. How individual actors choose to develop their services has a great deal to do with what alternatives or what competition exists. At the same time, it is important to stress the importance of the fact that the public transport system is connected so that a traveller can easily make the entire journey from home, by changing between different trains and different forms of transport, right up to their final destination. Banverket works continuously together with the sector to make the whole journey possible.

Passengers' Forum mentions the importance of station staff being available to assist passengers on the station. Banverket would state that the work it is doing together with Jernhusen in

order to introduce a guiding system will result in greater staffing and an increased human presence on stations.

### The Swedish view of public transport

The county and local traffic sector organisation Svensk Kollektivtrafik (Swedish Public Transport) constantly monitors the attitudes of Swedish people to public transport through the Public Transport Barometer (Kollektivtrafikbarometern). During 2008 approximately 42,000 people were interviewed, both passengers (people travelling on public transport at least once a month) and the general public.

According to the Public Transport Barometer 66 per cent of passengers were satisfied or very satisfied with public transport in 2008. This is an increase of 1 percentage point on 2007, but the same figure as for 2006. Only 7 per cent were directly dissatisfied with public transport.

The general public has a more negative view of public transport. Only 56 per cent felt satisfied with public transport in 2008. Here, too, the trend was rising. In 2000 the satisfaction of the general public was 52 per cent. *Graph 1.*

In May an extra question was added to the Public Transport Barometer about how satisfied people were with the authority responsible for public transport on their latest journey. Of those asked, 81 per cent were satisfied or very satisfied.

### Passengers' point scores

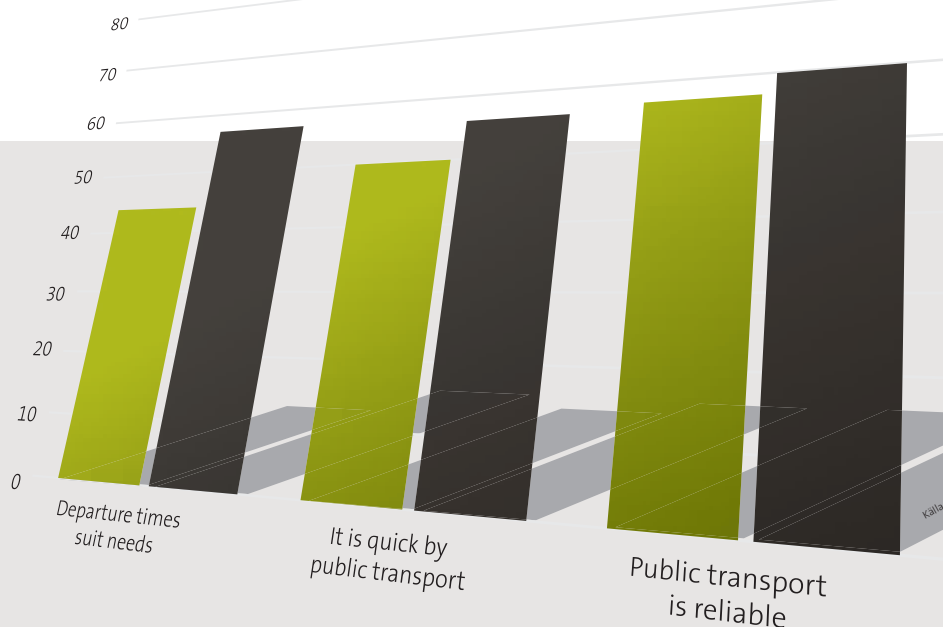
The Swedish Public Transport Association's surveys show that the actors in public transport have a challenge in increasing accessibility and quality. 56 per cent of passengers feel that travelling on public transport is quick. This implies no change from the survey in 2007. The view of departure times is also unchanged from 2007. As regards the reliability of public transport, 60 per cent consider that they can rely on arriving in time. In general passengers are somewhat more positively inclined to the accessibility and quality of public transport than is the general public. *Graph 2.*

Passengers and the general public are relatively satisfied with information about the supply of public transport services and departures. A clear majority consider that it is easy to buy tickets.

GRAPH 2

### Marks for accessibility and quality of public transport, number satisfied in per cent

General public  
Passengers



Information about delays and cancellations, on the other hand, get low scores. Only 25 (25) per cent of passengers are satisfied. The sensitivity of public transport companies also receives poor scores. Only 28 (29) per cent of passengers agree entirely or partially with the claim that public transport companies are sensitive to their views. *Graph 3.*

Service and reception and the upkeep of rolling stock receives fairly high scores when passengers and the general public have their say. The score for the behaviour of drivers and staff is particularly high. Among both passengers and the general public satisfaction is 70 per cent. *Graph 4.*

To a great extent passengers consider that it is simple and safe to travel on public transport. All of 74 (73) per cent of passengers believe that public transport is a safe way to travel. 72 (73) per cent agree entirely or in part with the statement that it is simple to travel on public transport. Many passengers also consider that public transport provides an added value in that one has no responsibility for traffic, and that one avoids stress by travelling on public transport rather than travelling by car. The value for money of public transport on the other hand receives poor scores. Only 47 (49) per cent of passengers and 40 (42) per cent of the general public think that travelling on public transport provides good value for money. *Graph 5.*

There are differences in satisfaction between passengers and the general public. This fact has a great deal to do with the general public's perception of the utility of public transport. This is decided to a great extent by departure times, the location of lines and simplicity. For many people it also has to do with ingrained habits. If an individual does not consider that public transport is a practical alternative to the car, this will also reveal itself in the satisfaction level.

#### Differences between modes of transport

The general customer satisfaction may vary between modes of transport. In the Stockholm Public Transport area several different modes of transport share the area. According to a survey conducted in the autumn of 2008, 76 per cent of travellers were satisfied with the underground. This is an increase of 11 percentage points since the autumn of 2006. The proportion of satisfied commuter train passengers was 61 per cent, which is the highest proportion so far. Commuter train passengers are however still Stockholm Public Transport's least satisfied passengers. The satisfaction with local lines, such as Tvärbanan and Roslagsbanan, has

been consistently high since measurements began. For the autumn of 2008, 82 per cent of passengers were satisfied, and only 6 percent dissatisfied. Satisfaction with bus services increases somewhat in each survey. In the latest survey the proportion of satisfied travellers and passengers was 73 per cent.

Swedish Quality Index conducts a survey of customer satisfaction in business and the public sector every year. The survey for 2008 on passenger travel shows that customer satisfaction in passenger journeys is at the lower level than for the majority of other sectors assessed. This is despite the fact that rail, domestic flights and long-distance coaches received higher scores in 2008 compared with 2007. The railway still has the lowest satisfaction compared with the other means of transport. Rail's scores are also lower than the average for the social economy in general.

The index of customer satisfaction is calculated on the basis of scores for, among other things, company image, service, product quality and value for money, and can have values between 0 and 100. The higher the value, the better the actual customers/users consider that the product is, and that suppliers fulfil consumers' needs and expectations.

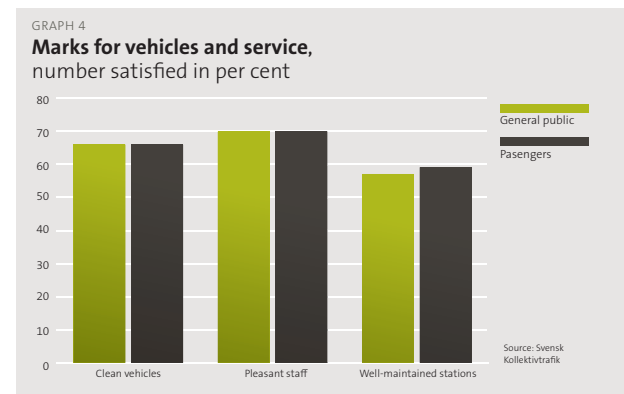
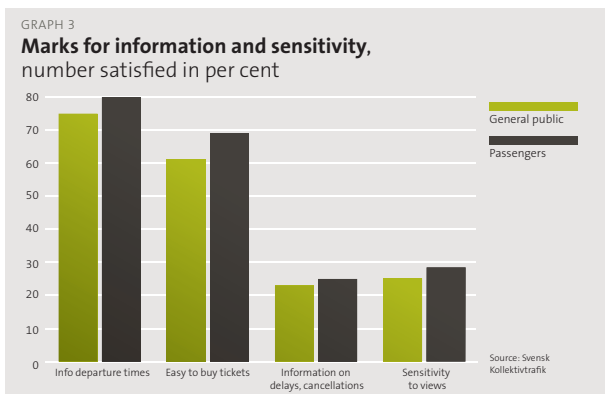
#### Differences between passenger groups

Stockholm Public Transport's surveys indicate differences in satisfaction between different age groups. Those who are most satisfied with Stockholm Public Transport these services are passengers over 60 years of age. Least satisfied are passengers in the age group 20–29. Women are somewhat more satisfied with the services than men. The difference between women and men is clear as regards the feelings of safety when one is travelling alone in the evenings and at night. However, the proportions who feel safe, primarily women, have increased considerably in recent years as regards the underground and commuter trains.

As regards long-distance passenger travel, Swedish Quality Index surveys show that women generally are somewhat more satisfied than men. The greatest differences are in the air sector. A Swedish Quality Index report also shows that satisfaction increases with age. Satisfaction with SJ AB's service is lowest in the age group 30–39.

#### Quality factors on stations

The station is the passenger's entrance to the rail transport system. The design and functions of the station have great significance for accessibility. It is, for this reason, important to



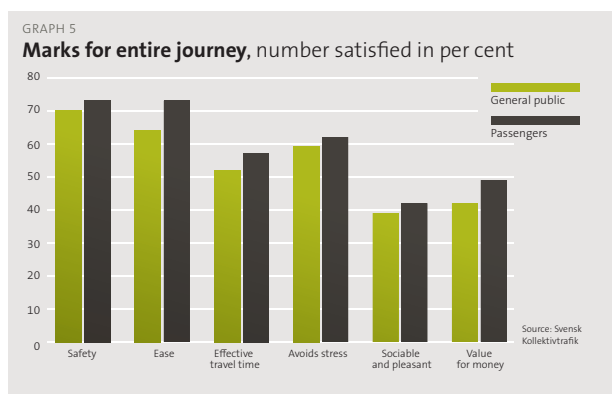


gather information about how existing and potential passengers use, perceive and value the station, both in its entirety and in its constituent parts.

During the autumn of 2008 the sector-wide project Attractive Stations conducted a passenger survey at eight stations. The result indicates that passengers generally speaking are quite satisfied with information for finding their way about the station, cleaning of the station building, the range of shops and security on the station. Among those factors which passengers are dissatisfied with one might mention access to seating on platforms, shelters/windbreaks on platforms, the range of cafés and restaurants, access to toilets and the opportunity of seeking help from station staff. On certain stations there was a demand for access to the Internet and the opportunity of buying goods from vending machines. The result also indicates that there are major differences between passengers needs on stations. As regards their overall impression of stations, the proportion of satisfied or very satisfied passengers came to 67 per cent.

#### Access for all

Everyone should be able to travel on public transport. According to Kollektivtrafikbarometern 30 per cent of passengers consider that their opportunities of travelling on public have improved during the year. For 2007 the corresponding figure was 29 per cent. 26 (30) per cent of passengers and 23 (26) per cent of the general public have noticed improvements for people with disabilities over the past year.



#### The environmental issue has relevance

Data from the theNature Protection Agency survey in the autumn of 2008 about the knowledge and attitudes of the general public to climate change shows that the proportion has increased of those who absolutely or possibly can envisage travelling on public transport for the sake of the environment. The proportion increased from 61 per cent in 2007 to 67 per cent in 2008. There are significant differences between different groups of passengers. The proportion of younger people who state that they may consider travelling more on public transport is 88 per cent. Students are also a group who respond very positively. If a comparison is made between genders, then women are more positive than men – 76 per cent and 59 per cent respectively.

#### EFFICIENT TRANSPORT FOR BUSINESS

Transport purchasers are a heterogeneous customer group who comprise everything from retail businesses to the steel industry. Different types of goods produce different needs and requirements of the structure of the transport service. As regards choosing means of transport, there are however some criteria that is important for all transport purchasers, irrespective of sector, type of goods and their degree of refinement.

A study carried out by the umbrella organisation the Transport Group shows that price, precision of delivery and reliability of delivery are those criteria that the transport company considered to be the most important when their customers purchase freight transport. The price issue weighs by far the heaviest as regards choice of form of transport. Other important criteria are service in contacts and transport time. Graph 6.

It is natural that transport purchasers are particularly price-sensitive. Transport costs are mainly handed down to the next party in the chain of production, which is why high transport costs can lead to competitive disadvantages. At the same time a high degree of competition prevails in the logistics market, both within and between forms of transport, which favours transport purchasers in their endeavours to reduce costs.

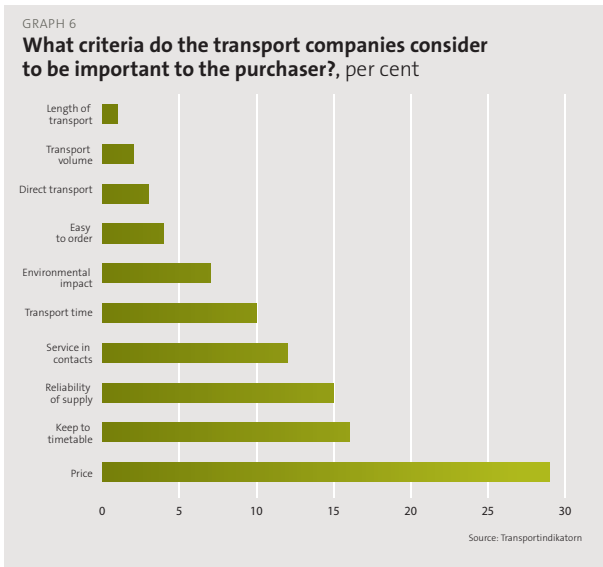
Freight transports are constantly growing both in Sweden and the rest of the world. An increased demand for transport makes demands on the transport system, both as regards infrastructure, capacity and coordination between forms of transport for logistical flows.

TABLE 1

#### Customer satisfaction with passenger travel according to Swedish Quality Index 2005-2008

	2005	2006	2007	2008
Subsector air	63,9	64,5	63,0	64,8
Subsector train	58,1	60,1	62,3	63,1
Subsector bus	71,1	67,6	67,7	72,8

Source: Swedish Quality Index



Cross-border traffic is growing rapidly. On average goods to a value of between SEK 3–4 billion cross Sweden's frontiers every day. Almost 4/10 transport purchasers in Scandinavia are planning to expand their business, which will affect the demand for logistics in the next 5 to 10 years. The expansion applies both to the Nordic countries and other countries. The need for flexible and time-efficient cross-border transport will, therefore, increase in the future.

It is the rail companies and other logistics companies who actually carry out the shipments for the transport purchasers. It is their supply which affects the opportunities of transport purchasers to choose efficient shipments. The supply is, in its turn, dependent on the quality of capacity of the infrastructure.

#### The rail companies' needs and requirements

Banverket routinely examines the rail companies' perceptions of the infrastructure and its administration. The rail companies are dependent on a functioning infrastructure in order to be able to meet their commitments to their customers. From the point of view of the rail companies, it is primarily maintenance, long-term planning of track work and efficient and quick trouble-shooting which have the top priority. In the shorter term the rail companies would like to see actions to increase capacity such as faster speeds and more passing places. From a longer perspective considerably greater track capacity is needed. The rail companies have even today a greater need for train paths than are currently available.

#### Environmental considerations are a matter of price and time

Data from TransportIndikatorn (The Transport Indicator) in autumn 2007 shows the transport companies feel that demand is increasing for ecological products and services. Despite the

increasing demand it seems, however, that customers are not prepared to pay more for environmental adaptation.

Posten Logistik has in the Nordisk Logistikbarometer 2008 studied the relevance of the environmental issue as regards transport buyers' purchases of transport. More than half of the companies questioned, 54 per cent would probably not replace existing transport by more environmentally efficient alternatives, if it would mean a delivery time extended by 24 hours. Nor would approximately the same proportion replace existing transport with more environmentally efficient solutions if it would mean a price rise of 10 per cent.

Attitudes in different countries in Scandinavia do, however, differ. The least scope for changing transport out of consideration for the environment exists in Denmark, whilst the acceptance of price rises and a longer delivery time seems to be greatest in Sweden.

At the same time, many transport purchasers are interested in the fact that the logistics supplier is ISO-certified. A corresponding figure for Scandinavia as a whole is 27 per cent. One transport purchaser in five in Scandinavia wants the carrier to have an environmentally efficient alternative.

#### The satisfaction of transport purchasers

Considerably fewer general surveys of customer satisfaction are being carried out for freight transport than for passenger transport. Green Cargo carries out regular surveys with the aim of providing data for improvements to services and provision. The latest was done in 2008. In the survey the company receives a somewhat worse overall points score than it did in 2006. Green Cargo's precision of delivery gets a relatively high score. The same applies to the score for the company's ability to help transport purchasers to meet their customers' requirements. Good service and customer reception receive overall relatively high scores. As regards good value, the score is somewhat better than in the 2006 survey, but the customers are not completely satisfied. Nor are transport purchasers particularly satisfied with Green Cargo's adaptability and feedback on problems and claims.


Vägverket Konsult (Road Administration Consulting Services) conducted a survey in 2008 into the satisfaction of transport purchasers within the forest timber industry, building, petroleum, and other transport purchasers within long-distance and short-distance traffic, focussing on road traffic. The carriers' precision of delivery and capacity for reliable delivery receive high scores in the survey throughout. Satisfaction with carriers' pricing and ability to ship cost-effectively are however low. The same applies to the opportunity of influencing prices. Satisfaction with carriers' ability to offer combinations of modes of transport is also low. But in this case many of the transport purchasers have no view. As regards support on the part of the authorities for purchasing safe and environmentally adapted services, the survey shows very low satisfaction.

» *Transport companies feel that demand is increasing for ecological products and services.* «





Facts about  
the rail sector  
in 2008



2008 was another record year for rail in Sweden. Greater demand for rail transport presupposes that today's rail transport systems are used in an efficient way and that the actors in the sector collaborate in order to satisfy the needs of passengers and transport purchasers. Greater demand also presupposes planning for the future. In this chapter a picture is provided of the rail sector and its actors in 2008.

*The rail network in Sweden comprises approximately 11,000 km of operated track, of which a good 7,800 km is electrified.*

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## RAIL TRANSPORT IN SWEDEN IN 2008

The positive developments in travel in 2007 continued in 2008. Passenger mileage by rail grew provisionally by a good 7 per cent or 0.7 billion passenger-kilometres, from 10.3 to a total 11.0 billion passenger-kilometres, which is an all-time record.

Long-distance mileage amounted provisionally in 2008 to 6.4 billion passenger-kilometres, which is an increase of 0.4 billion passenger-kilometres. The increase was greatest for journeys between Stockholm and Malmö and Stockholm and Göteborg.

Short-distance mileage by rail amounted provisionally to 4.6 billion passenger-kilometres, which is an increase of 0.4 billion passenger-kilometres. The increase is greatest in the Öresund region where integration between Denmark and Sweden has been taken further. Graph 7.

Freight mileage in 2008 and mounted provisionally to 23.3 billion tonne-kilometres, which is the same level as 2007. The comparison between the three first quarters of the year is 2007 in 2008 shows and increase in the order of 5 per cent whilst a corresponding comparison for the final quarter shows a reduction by approximately 15 per cent. The international recession which has resulted in a reduction of goods for use in both industry and trade, has therefore had a major effect on rail transport. Graph 8.

Total long-distance passenger mileage remains provisionally unchanged at the same time as the railway's share of mileage increased. Short-distance mileage decreased somewhat, but at the same time rail's share increased there too. Total long-distance freight mileage declined, at the same time as rail retained its market share.

## INFRASTRUCTURE

The rail network in Sweden comprises approximately 11,000 km of operated track, of which a good 7,800 km is electrified. The major part of the track is owned by the state and administered by Banverket. Other infrastructure administrators of operated track are Inlandsbanan AB which administers the state-owned Inlandsbanan (Inland Line) between Mora and Gällivare, Öresundsbrokonsortiet which owns and administers the link across the Öresund, A-Train AB which owns and administers the Arlandabanan line, and AB Storstockholms Lokaltrafik (Stockholm Public Transport) which owns and administers the local lines Roslagsbanan and Saltsjöbanan in Stockholm.

Apart from operated track, the rail net also comprises so-called capillary infrastructure in the form, for example, of sidings and branch lines. This infrastructure has major significance among other things for the feeding of freight from industries and harbours out into the major freight routes.

Lines for light rail traffic exist in Göteborg, Norrköping and Stockholm. In Stockholm there are also lines for underground traffic.

At New Year 2008/09 there were a total of 449 (482) permits for infrastructure administrators in Sweden. The overwhelming proportion applies to the capillary rail net. Of the permit holders, 78 (79) were both infrastructure administrators and rail companies.

## ACTORS ON THE TRACK

In 2008 a total of 26 (24) rail companies operated commercial traffic on Swedish track, which corresponds to an increase of approximately 70 per cent over the last 10 years. During the year three operators

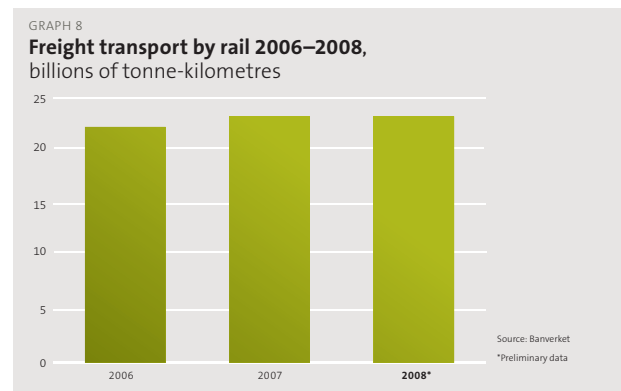
ran light rail traffic and one operator ran underground traffic. Inlandsbanan AB and Tågakeriet in Bergslagen AB operated both passenger and freight traffic on the railway. There are also a large number of rail companies active in for example ports and terminals. At New Year 2008/09 there were a total of 108 permits for rail companies.

Companies or organisations who wish to organise transport on the railway, but do not themselves operate these, can apply for authorisation from Transportstyrelsen (the Transport Agency). It is primarily the transport authorities and the major transport purchasers who can obtain authorisation. At New Year 2008/09 15 actors had authorisation.

By comparison with many other countries in Europe there is in Sweden a large proportion of rail companies which are completely or partially controlled by international companies. 14 of the 26 rail companies who this year ran passenger and/or freight traffic in Sweden were under some form of international control. Table 3.

## STATIONS AND TERMINALS

Terminal is a generic name for places where freight is loaded and unloaded between trains, and between trains and other forms of transport. Intermodal terminals, ports and other places for loading and unloading are included in the concept. At intermodal terminals primarily container goods are transferred between railway and road. At ports container freight and dry bulk are transferred between land transport and sea to. The features of other places for loading and unloading are that there are track and road connections and hardstanding to facilitate reloading between different forms of transport. During



### HOW MANY TERMINALS ARE THERE IN SWEDEN?

- There are about 600 private sidings in 225 locations. There are public sidings in approx. 100 locations.
- Intermodal terminals are found in 23 locations. Seven of these are at ports.
- There are approx. 50 ports.
- Eight postal terminals have rail connections.

2008 a new terminal has been opened in Stockaryd between Nässjö and Alvesta.

In 2008 there were 615 stations with passenger connections on the Swedish rail net. Access to the rail transport system is improved if the number of stations increases, as this provides more opportunities for making use of the train. In 2008 two new stations have appeared on the rail net: Falkenberg and Gröndalsviken, together with a new stop at Kimstad on the Southern mainline and three new stops for local trains on the East Coast line. Most stations are used by only one rail company, but approximately 160 stations are so-called multi-operator stations. In the Stockholm Public Transport area there are 100 underground stations, 51 commuter train stations and 98 local train stations. The light rail system in Norrköping has 42 stops. In Göteborg's light rail system there are 131 stops.

Most of the larger stations in Sweden are so-called travel centres where several different forms of transport, such as bus, train and other rail-based transport meet. The travel centre often forms a natural meeting point in the town, with shops and cafés. The largest travel centre in Sweden in 2008 was Stockholm, with approximately 200,000 passengers and visitors every day. The central stations in Malmö and Göteborg have approximately 40,000 passengers and visitors every day.

### ONGOING PROJECTS

Investments in new infrastructure are necessary in order to meet the needs for rail traffic today and tomorrow. Banverket's future plans for rail 2004–2015 comprises approximately SEK 108 billion for investments in infrastructure. In September 2008 the government put forward an infrastructure bill for the period 2010–2021, with budgetary resources for continued investments.

TABLE 2  
Administrators operating lines 2008:  
Rail, light rail and underground

Rail	Length of track operated kilometres
Banverket	9 830
Inlandsbanan AB	1 091
A-Train AB	18
Others (including the Öresund Bridge to the limit of territorial waters, Roslagsbanan and Saltsjöbanan)	90
<b>Total</b>	<b>11 028</b>
<b>Light rail</b>	
AB Storstockholms Lokaltrafik	30
City of Göteborg	82
Norrköping Municipality	15
<b>Summa</b>	<b>126</b>
<b>Underground</b>	
AB Storstockholms Lokaltrafik	109

Source: Banverket

TABLE 3  
Rail companies operating commercial traffic on Swedish track in 2008  
and companies operating light rail and underground traffic

Operator	Freight traffic on rail		Passenger traffic on rail		Light rail	Underground	International interests
	Swedish	Abroad	Swedish	Abroad			
A-Train AB			■				■
Arriva Tåg AB			■				■
AB Stockholms spårvägar					■		
Bantåg Nordic AB	■						
Cargo Net AB	■						■
Cargo Net AS		■					
Green Cargo AB	■						
Göteborgs spårvägar AB					■		
Hector Rail AB	■						■
Inlandsbanan AB	■		■				
Malmtrafik i Kiruna AB	■						
Merresor AB			■				■
MidCargo AB	■						
Nordic Haulage AB				■			
Ofofbanen AS		■					■
Peterson Rail AB		■					■
Railion Scandinavia A/S		■					■
Roslagståg AB			■				■
SJ AB			■				
SJ Norrlandståg AB			■				
Stena Recycling AB	■						
Stockholmståg KB			■				
Svenska Tågkompaniet AB			■	■			■
TGOJ Trafik AB	■						
TX Logistik AB							■
Tågfrakt AB	■						
Tågakeriet i Bergslagen AB	■	■	■				■
Veolia Transport Sverige AB			■				■

Source: Banverket

**THE CITY TUNNEL** is a communications solution comprising approximately 17 km of rail track, of which 6 km runs in two parallel tunnels beneath the city of Malmö. The aim is to increase capacity throughout the region and to improve access to rail traffic in Malmö. The City Tunnel connects the railway north of Malmö with the railway south towards Trelleborg, Ystad and Copenhagen. Malmö Central Station is being converted from a so-called reversing station to a through station, and two new stations are being built - Triangeln and Hyllie. The tunnel will go into service from December 2010.

**THE HALLANDSÅSEN PROJECT** is part of an extension of the West Coast line between Göteborg and Lund. A tunnel increases capacity for both passenger and freight traffic from 4 to 24 trains per hour. The project comprises 12.8 km of double track, of which 8.6 km runs in two parallel single track tunnels. The tunnels will go into service from 2015.

**THE BANAVÄG I VÄST** project comprises approximately 75 km of double rail track between Göteborg and Trollhättan. The project is being undertaken in collaboration with the National Road Administration who are building a dual-carriage-way road on this route. This expansion will double the capacity for passenger and freight traffic on the Norway-Vänern-banan line. It creates the preconditions for commuter train services and the opportunity of transferring freight traffic from the overloaded Western main line. In 2008 the new double track was connected to Trollhättan and Veland. The entire stretch will be finished in 2012.

**THE CITY LINE** is a double track railway with two new stations, City and Odenplan, in an approximately 6 km long tunnel between the commuter train station Stockholms Södra and Tomtebodan. By means of the City Line track capacity will double through Stockholm. In this way it will be possible to increase the frequency of services in the rush hour. There will

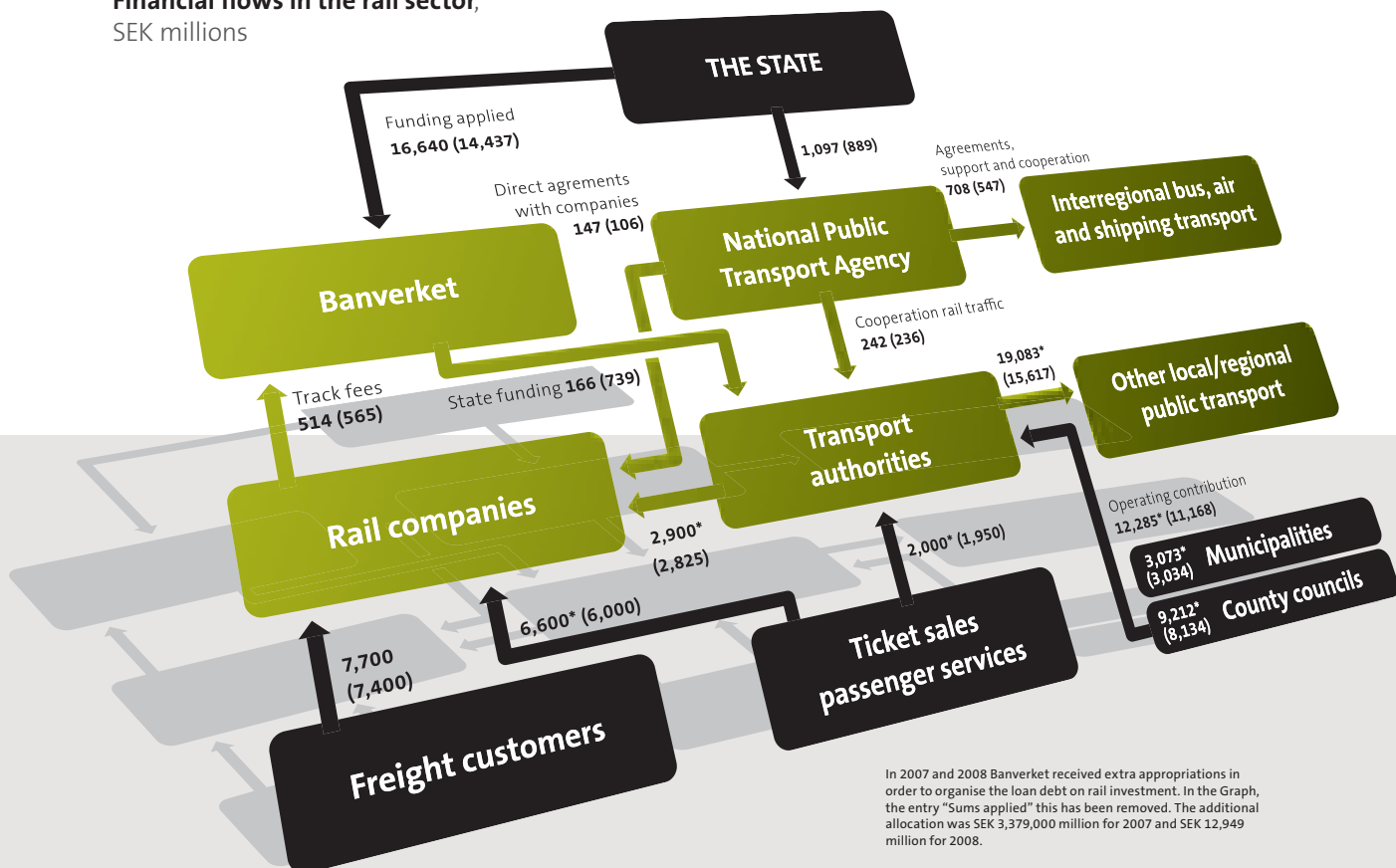
also be more space on the track for the increased traffic which will be the result of investments in the rail net around the Mälars Valley. The line will go into service in 2017.

**THE BOTHNIA LINE** consists of 190 km of railway between Nyland and Umeå, 140 bridges, 25 km of tunnel and seven travel centres. The aim is to make possible rapid and efficient freight transport and a rapid passenger service for the entire coast. The freight service between Husum and Örnsköldsvik is already running. The entire line will be opened in the autumn of 2010.

**THE KIRUNA PROJECT** has come about because mining in the area of the city has led to ground subsidence, which in the immediate future will affect the rail infrastructure. The project involves a completely new rail route through Kiruna and a new power converter station (operating from the summer of 2008). The project is being run in close cooperation

GRAPH 9

**Financial flows in the rail sector,**  
SEK millions



In 2007 and 2008 Banverket received extra appropriations in order to organise the loan debt on rail investment. In the Graph, the entry "Sums applied" this has been removed. The additional allocation was SEK 3,379,000 million for 2007 and SEK 12,949 million for 2008.

Data about the transport authorities disbursements and income from freight and passenger services is based on estimates and should be treated with caution. Data marked with a \* refers to 2007, with a comparative year 2006. Income from other local/regional public transport is not shown in the Graph.

» Investments in new infrastructure are necessary in order to meet the needs for rail traffic today and tomorrow. «

with Kiruna Municipality, LKAB and the National Road Administration. Estimated time of going into service for the railway is 2012.

**THE ÅDALSBANAN LINE** is a 180 km long railway between Sundsvall and Långsele via Timrå, Härnösand and Kramfors. Together with the East Coast line, the Ådalsbanan Line and Bothnia Line form a continuous coastal railway for rapid, reliable and environmentally friendly passenger and freight transport. The project consists partly of upgrading the current railway, partly building a new track. The project is estimated to be completed in 2011.

#### FINANCIAL FLOWS 2008

The National Public Transport Agency is tasked with working towards a co-ordinated long-distance public transport system for passengers by train, bus, boat and air. In this role the agency has procured transport policy-motivated interregional services which cannot be run on a commercial basis. In 2008 the agency procured services to the value of SEK 1,097 million, of which SEK 393 million was rail services.

In each county there are county transport authorities responsible for local and regional services. Normally it is the county councils or the municipalities in the county who are jointly responsible.

The transport authorities and procures public transport from, among others, rail companies running services on behalf of the transport authority.

The rail companies pay fees to Banverket for the use of the rail infrastructure. These include fees for, among others, passenger and freight traffic per train kilometre.

The market for freight services by rail in Sweden is completely open, and services are run before on an entirely commercial basis. In 2008 freight transport purchasers bought services on the railway to the value of approximately SEK 7.7 billion. *Graph 9.* ■



The cooperation of many different actors is required in order to develop the rail sector so that passengers and transport purchasers regard the railway as their obvious choice. It is a question of, among other things, joint planning of actions and financing of the infrastructure, and strategies for a more accessible and attractive service and a common view of actions leading to higher quality in the existing service.



# Industry-wide cooperation in the development of the rail sector

## COOPERATION IN THE LONG-TERM DEVELOPMENT OF PUBLIC TRANSPORT

The government task Looking Ahead – a national programme for the long-term development of public transport – was presented to the government at New Year 2007/08. One conclusion was that attractive public transport is a precondition for an increase in public travel, which in its turn leads inter alia to a healthier environment and better regional development. Another conclusion is that the public transport industry has to improve in focussing on the customer's needs. What is more, it was adduced that the public sector must help in providing good preconditions for public transport.

### The Doubling Project

In January 2008 a united public transport industry presented its ambitions for doubling the market share of public transport before the year 2020 in the project "Partnership for a Doubling of Public Transport to year 2020". The aim of the project is to create the preconditions for achieving the objective of doubling the market share and creating a business model in order to be able to move towards the common vision "Public transport is part of your own travel". In the project the following are taking part: Swedish Public Transport, the theBus and Coach Federation, the theAssociation of Taxi Owners, the Association of Swedish Train Operators and the Swedish Association of Local Authorities and Regions.

A doubling of public transport is estimated as contributing to the achievement of urgent objectives as regards the environment, employment, traffic safety and equal opportunities. Estimates show that the emissions of the carbon dioxide from passenger traffic would drop by approximately 23 per cent. This implies a socio-economic gain of a good SEK 4 billion. Employment may rise through more job opportunities and expanded labour market regions, which creates the preconditions for growth and regional development.

### Attractive Stations

The Attractive Stations project forms part of the Doubling Project and is a collaborative effort between Jernhusen, Banverket, thePublic Transport, Samtrafiken and the Swedish Association of Local Authorities and Regions. Its aim is, together through simpler actions and an expanded service, to make public

transport appear more attractive to passengers. This may be about improved information on ticket sales, new housekeeping routines and different actions to create security. The actions will be financed within the framework of ordinary budgets.

Today a station often has a complex ownership structure in which Banverket, municipalities, county traffic companies and station building administrators own and/or administers different parts of what the public regard as the station. The project will develop forms of cooperation between actors in the industry and concrete examples of how stations can develop. The idea is that the requirements of passengers will drive the process. In the longer term it is also a question of finding new forms of cooperation between state and municipal actors, in order eventually to boost an increasingly regionalised public transport.

Eight stations on the Southern mainline and the West Coast line are pilot stations. These are Mölndal, Falkenberg, Halmstad, Ängelholm, Landskrona, Lund, Hässleholm and Nässjö. In order to acquire data for what needs to be done passenger studies have been carried out at each station in 2008. At the end of 2009 a new passenger study will be undertaken in order, in this way, to be able to determine whether the improvements have lead to positive results. The main results from the study in 2008 are presented in Chapter 1: Our passengers and purchases of transport services.

#### SUBPROJECTS WITHIN THE DOUBLING PROJECT

- A common business model
- Environmental responsibility
- Research into public transport
- Tax rules favouring public transport
- Attractive stations
- Co-ordinated payment systems
- Form of agreement
- Promotion of adult education
- Public transport in municipal planning
- Small and medium-sized investment projects
- Travel planners and competition-neutral booking systems
- Resplus annual season ticket supplement

## THE COMMERCIAL TRANSPORT SECTOR'S COORDINATED PLANNING

The transport authorities are now working together in long-term infrastructure planning, with an approach covering all modes of transport. This is a new way of working, and represents a major step forward for more efficient planning between regional and national levels. It will be easier to produce forecasts, deficiency analyses, the basis for calculations, integrated effect assessments and socio-economic calculations. It will in this way also be easier to identify those actions which are most cost effective.

### The planning process has several stages

Long-term infrastructure planning will take place in two stages. First the aims will be planned and then the actions. The government establishes the objectives, economic framework and aims for the coming planning period, in this case 2010 to 2021. In the following action planning the counties and the transport authorities produce proposals for detailed plans for investments in infrastructure.

In January 2008 the government allocated the transport authorities the task of preparing the coming action planning. This commission included the development of a model for the formulation of regional systems analyses covering all modes of transport. A regional systems analysis is an analysis covering all modes of transport of the transport systems function and deficiencies on the basis of the objectives which it is to meet. What is more, models and methods for socio-economic assessments and co-financing have been produced, with a method for strategic environmental assessment.

With the regional systems analyses as a basis, the transport authorities have in 2008 conducted a national systems analysis with integrated objectives for the transport system and its development, and national analyses for freight and passenger services. This material was submitted to the government on September 30, 2008.

The next part of the action planning was initiated in December 2008, when the transport authorities were tasked with drawing up a joint proposal for a national overall transport plan for the development of the transport system for 2010 to 2021. In the national plan the transport authorities will provide proposals for actions for the preliminary planning framework of SEK 41 7 million and proposals for actions for that part referring to development of the transport system. At the same time the counties (county councils or municipal cooperative bodies) have

### THE GOVERNMENT'S PRELIMINARY OVERALL TRANSPORT FRAMEWORK FOR THE TRANSPORT SYSTEM 2010-2021

- SEK 136 billion for operation and maintenance of national roads, including carrying capacity, frost-proofing and reconstruction of roads, and state co-financing of private roads .
- SEK 64 billion for operation and maintenance of the national rail network.
- SEK 217 billion for the state framework for the development of the transport system, which will go to actions for national roads and to actions for the national rail net, interests and amortisation, etc.



been given corresponding tasks to draw up proposals for county plans covering all forms of transport for the regional transport infrastructure.

In 2009 proposals for actions will be drawn up within the subprojects of operations, sector, areas for action and areas for investment. The four stage principle and an overall transport approach will be applied. What is more, the integrated effects and benefits of actions will be described. The authorities will report to the government by September 1, 2009.

### NEW MODELS OF FINANCE

Demands on and benefits from infrastructure require investment in infrastructure. The same applies to the continuously increasing expectations of capacity. State funding is limited, and infrastructure projects have therefore to be listed in order of priority. Co-financing from different interested parties, such as municipalities, regions, counties and business, is one way of being able to bring forward infrastructure projects, achieve a greater volume of projects in long-term plans, and achieve an optimal formulation of investments.

Co-financing from local and regional authorities and business can be realised when these parties see a value in the investment beyond the general transport interests which the transport authorities have to look after and satisfy. At the same time there are some limitations in the opportunity for co-financing, for example because of the allocation of responsibilities between state, municipality and county council.

With these starting points, in January 2008 the government gave the transport authorities the task of – within the joint action planning – developing models and methods for clearer preconditions and better opportunities for regional, municipal and private co-financing of investment objects. A report was presented on this commission in September 2008. Some of its conclusions are that:



*Infrastructure planning with an overall view of forms of transport is a new way of working, and a step forward in more efficient planning.*

- the preconditions and opportunities should be tested as regards co-financing for all projects in the action plan
- statements of intent should be signed in order to clarify the interests and form the basis for a continued preparation
- the implementation of projects including co-financing should be based on agreements which clearly regulate the aim of the project, scope, timetable and finance.

The report from the transport authorities indicate that co-finance in infrastructure projects can be relevant in the following areas:

- projects (not named in the action plan) demanding great flexibility in order to correspond to acute transport and urban planning issues
- projects with major impact on regional and local development
- projects with special effect on opportunities for alternative land use
- projects with private, municipal or regional demands which exceed the responsibility of the transport authorities
- projects with special private, municipal and/or regional interests which make demands on advance delivery or where investment as such has to be coordinated with other investments.

As an example of agreements reached earlier on co-financing in the rail sector one might mention the City Tunnel in Malmö and the City Line in Stockholm. In Malmö the municipality and Region Skåne make a one-time contribution to state installations and finance their own share of station plant. In Stockholm the City of Stockholm and Stockholm County Council as well as the Mälardalen and Östergötland regions have participated in the co-financing.

A dialogue about co-financing has been carried on as regards the extension to capacity on the Dalabanan line, connections to the intermodal terminal at Rosersberg, travel centre and depot

reconstruction in Karlstad and travel centre and intermodal terminal with connections in Sundsvall.

### **MOBILISATION FOR GREATER PUNCTUALITY**

In 2008 the actors in the rail sector have continued to cooperate in mobilisations for greater functionality and quality of train services in the conurbations Stockholm/Mälardalen, Västra Götaland and the Öresund region. Results and perceptions of the work to date have been positive, showing that mobilisations reduce train delays. There is more follow-up about mobilisations in Chapter 11: Quality of service for passengers and purchasers of commercial transport services

For Mobilisation Stockholm/Mälardalen the target is to halve delays in train services from 2006 to 2011. In order to reach this target Stockholm Public Transport, SJ AB and Banverket have agreed on a total of 44 projects to be carried out by the end of 2011. In 2008 extra maintenance has been carried out on signals and points. What is more, investment is being made in overtaking points and longer platforms have been built.

In Mobilisation Öresund a decision was taken in June 2008 to reduce the total number of train delays by 25 per cent for 2010, based on the 2007 results. The mobilisation comprises a total of 39 different actions. The physical actions in 2008 have applied to operations and maintenance. Banverket, Green Cargo, SJ AB, Skånetrafiken and the Association of Swedish Train Operating Companies have taken part in the work.

For Mobilisation Väst the target is to halve the number of train delays in Western Sweden by 2010. Among actions taken in 2008 might be mentioned Banverket's projects for maintenance and track patrols to rapidly correct faults on the track. SJ AB and Västtrafik have started to shut train doors 30 seconds before departure. Banverket, SJ AB, Västtrafik, Veolia Transport, Hallandstrafiken, Green Cargo, the Association of Swedish Train Operating Companies and the Port of Göteborg are taking part in the work. ■

Growth in the transport sector is rapid. Traffic is increasing constantly and major infrastructure investments are being made. There is considerable competition for technical skills and in the next 10 years there will be a generation change. Ensuring skills supply is a decisive issue for the transport sector to be able to function today and tomorrow. In this chapter a picture is provided of the skills needs in the rail sector and what the sector is doing to ensure the provision of skills in the future.

*Through joint ventures the objective is for young people to associate the rail sector with exciting jobs and a large number of choices.*





Skills supply  
in the rail sector



## THE RAIL SECTOR HAS A GREAT NEED OF SKILLED CO-WORKERS

### Rail is an industry of the future

Rail is the form of transport which manages to combine growth with tackling the climate issue. This has in recent years been noticed by both passengers and purchasers of transport services. Both passenger and freight traffic is constantly increasing, and continued strong development is expected, even if there is a risk of a temporary falling off of freight traffic because of the weaker economy.

Investments in rail today are contributing to towards a long-term sustainable society in future. For this reason major efforts at continued investments in the rail system are being made. The forecast for 2020 shows clearly that large parts of the current railway infrastructure will not cope with demands in the future. The need for greater resources for operations and maintenance of the existing infrastructure are also clear. The more trains there are on the track, the more preventative and remedial maintenance is needed.

The shortfall in the skills of the rail sector implies a serious threat to the development of a long-term sustainable transport system. If the supply of staff is less than the need within plant, operations maintenance and services, this may lead to greater costs for the railway's direct customers and end consumers, lower quality, fewer rails for the money, delays in projects, delays in technology updates, poorer maintenance and supply of services.

### What are the skills needs?

Overall estimates of skills needs throughout the transport sector show that between 15,000 and 17,000 new co-workers need to be employed every year over the next five years. The current training system can contribute 7,000 co-workers. Within the rail sector there is a need for approximately 1,500 new co-workers per year. The need for skills is to be found within all of the markets in the rail sector. Demand continues despite the risk of temporarily slower growth in the Swedish economy.

In 2008 the cooperation organisation, the Transport Group, studied how the transport companies assess the supply of trained staff. Only 16 per cent consider that the supply of trained staff in new recruitment is good or very good. More than half, 51 per cent, consider that the supply of trained staff is poor or very poor.

There are several explanations why there is a shortage of staff. The interest in technology courses has for a time been weak, even if the trend is turning. This has meant that the number of training places is at a lower level than would correspond to the long-term need.

For train drivers the forecast is that there will not be a shortage in 2009, because of the depression. More actors on the track, because of the deregulation of services, and the training of too few train drivers for many years does, however, mean that there will be a shortage in the longer term. Bearing in mind the recession, it is, however, difficult to estimate the need for train drivers over a five-year period.

Generation change also poses a major challenge, as a large number of engineers will retire over the next few years. What is more, more staff is middle-aged in many of the markets of the rail sector than on the labour market on average. This applies particularly to train drivers and staff active in track, electricity and signal work.

Another reason for the shortage of skills in the rail sector is competition between branches of industry as regards attracting staff. All industrial companies compete for the same target groups. Linked to this is fact that familiarity with the rail sector and its actors is low. This hampers skills supply for the rail sector.

## ACTIONS TO SAFEGUARD SKILLS SUPPLY

### Programme for skills supply in the rail sector

In order to safeguard skills supply in the longer term it is necessary for the actors and partners in the rail sector to work together to provide information about the advantages of rail, to communicate an attractive image of the sector as an employer



*Rail is the form of transport which manages to combine the climate issue with growth, and is an industry of the future.*

and to create a relationship with potential new co-workers. It is a question of creating more training places within technology, logistics and construction.

During the autumn of 2007 and in 2008 the sector has invested in work on the joint sector programme Skills Supply in the Rail Sector. Statements of intent have been issued between representatives of the industry, such as Banverket, the rail companies, consultancy companies, rolling-stock maintenance companies, rail operators and suppliers of systems and components. Two priority areas have been indicated. It is a question of, on the one hand, making the industry more attractive, on the other, promoting the supply of training courses in the rail sector.

The sector programme is based on a common platform with the keywords information, communication, and relation, both for clarity in the programme and for the encounter with external contacts. Target groups for this communication work are young people (15 to 19 years of age), students (19 to 25 years) and the working population. *Graph 10.*

#### **The rail sector as an attractive employer**

Several studies recently carried out show that familiarity with

the rail sector is low among young people today. The sector is regarded as sluggish, boring and static. Through joint efforts and on the basis of a common platform for communication, the target is that young people in future will associate the rail sector with exciting jobs and a great choice. In order to achieve this, it is necessary that the actors in the industry are both seen and heard and can hold their own against the competition.

In 2008 a number of communication projects have been carried out. Representatives of the sector have visited upper secondary school fairs around the country. For universities and colleges the sector has taken part in careers fairs. Several actors in the sector have got together to organise Future City – a competition in which school and business meet to build the city of the future.

The rail industry's joint website järnvägsjobb.se was re-launched on August 29, 2008 and will act as a simple portal for those interested in working in the rail industry. All vacant posts at Banverket and with the other actors in the rail sector who are in the sector programme are brought together here. Training programmes leading to these jobs are also presented. In association with the launch of the website several communication projects were also carried out. Among these one might mention cinema

GRAPH 10

#### **Functioning channels of communication**

##### **Information**

Common message provides more information on sector  
*»That's why you should invest in rail«*

##### **Communication**

Message creates familiarity and interested  
*»The rail industry appeals to me«*

##### **Relation**

Objective is that more people apply to the industry  
*»I am applying for a job with rail«*

advertisements in university towns and advertisements in the student press.

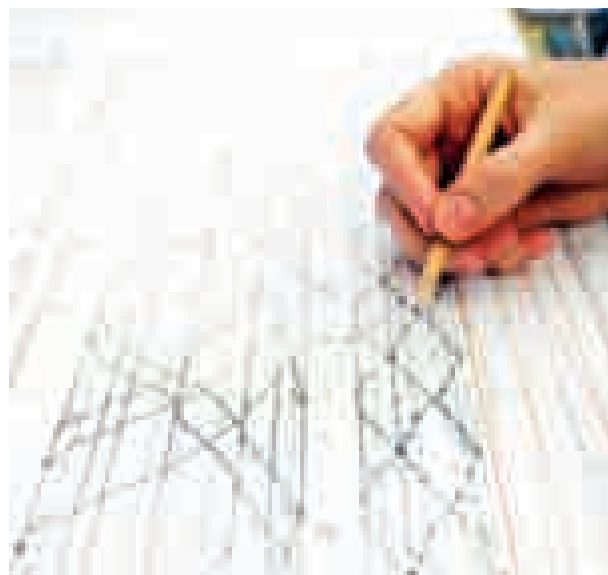
These projects will continue in 2009 and will be followed up by internal surveys and the surveys Karriärbarometern and Ungdomsbarometern.

### Functioning training system

A number of activities and projects form part of the sector programmes priority area for a functioning training system. These are specific projects to increase the share of training projects involving rail, at both the upper secondary school and advanced vocational training (KY). It is also a question of projects to increase visibility, coordination and quality in those training courses at college-level which already exist.

The first training courses at upper secondary school level entirely devoted to rail technology started in August 2008. The courses focus on electrical signal technology and are running at Södertälje Praktiska Gymnasium and at Universitetsholmens gymnasium in Malmö. The aim has been to develop accessible and cost-efficient courses which interest and attract more young people into the industry. By increasing the proportion of courses in the general education system, costs are reduced for private companies. The courses have a large element of practical work, which provides employers with the opportunity of encountering students at an early stage. This facilitates the recruitment process.

In August 2008 an advanced vocational training course started at Nackademin in Stockholm. The two-year course leads to a qualification as a construction engineer specialising in rail. In the same month 30 students began the new rail welding course at advanced vocational level in Vansbro. The course runs over 55 weeks. In the longer term further courses will start up



Training courses for work in the rail sector are to be found both in the upper secondary school, advanced vocational training (KY) and university/college.

in various locations on the basis of evaluations all the sector's recruitment needs.

Apart from projects to initiate courses at upper secondary and post-upper secondary level, work is going on to interest compulsory school students in the rail industry. For example,

a project is being conducted to develop training materials in rail technology, devoted specifically to years 6 to 8 in compulsory school. ■

#### TRAINING PROVIDERS FOR WORK IN THE RAIL SECTOR

##### UPPER SECONDARY SCHOOLS (COURSES IN TRACK, ELECTRICAL, SIGNAL)

- Universitetsholmens gymnasium, Malmö
- Södertälje Praktiska Gymnasium, Södertälje
- Mölledalsskolans gymnasium, Malmö\*
- Göteborgs Praktiska Gymnasium, Göteborg\*
- Brinells gymnasieskola, Nässjö\*
- Karlstads Praktiska Gymnasium, Karlstad\*
- St Eriks gymnasium, Stockholm\*
- Kista gymnasium, Kista\*
- Nackademin gymnasium, Sollentuna
- Hushagsgymnasiet, Borlänge
- Liljaskolan, Vännäs

\*Planned start of course in 2009.

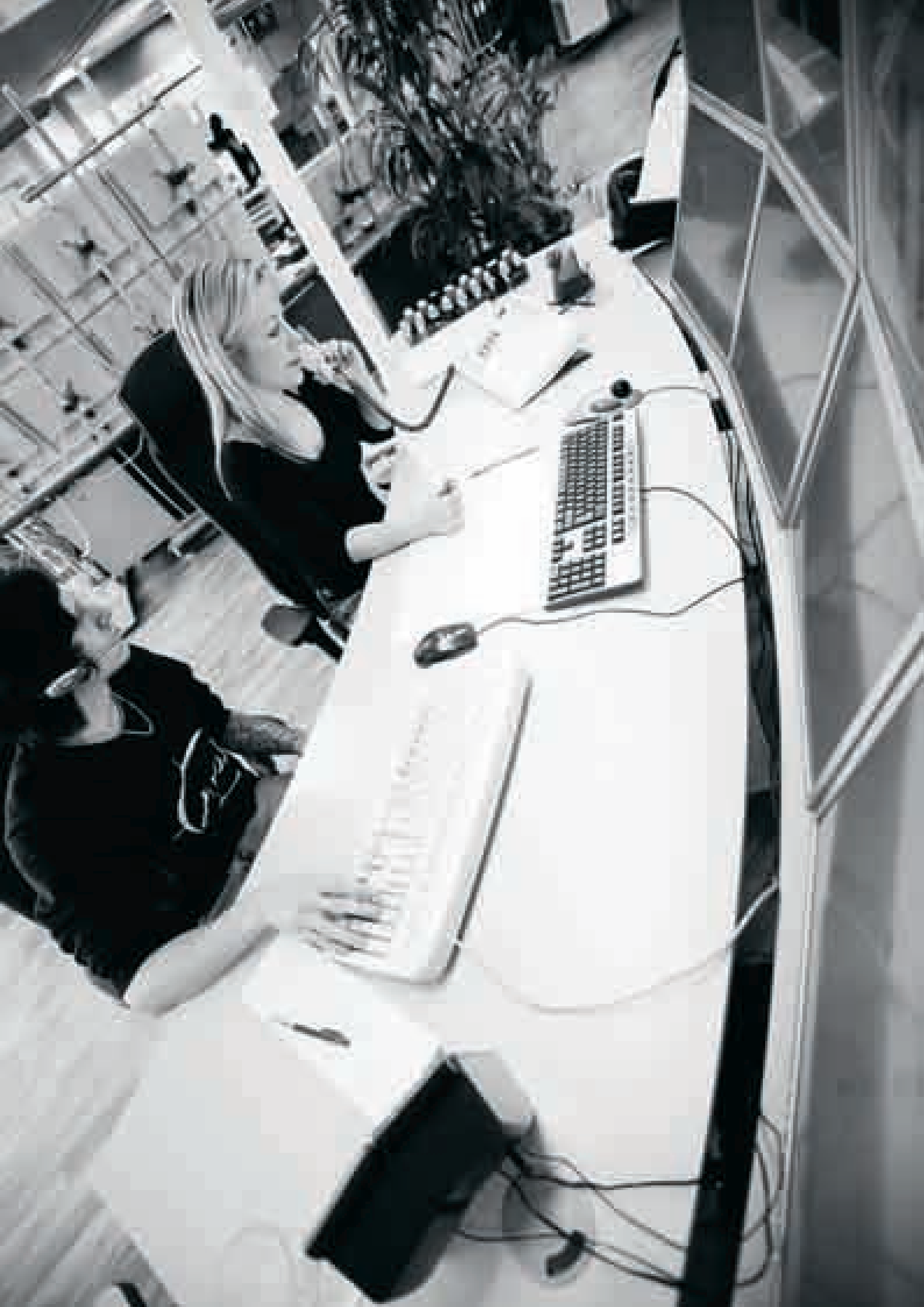
##### ADVANCED VOCATIONAL TRAINING (KY) /VOCATIONAL SCHOOL

- The Railway Training Centre (train drivers, track technology, overhead contact technology, signal technology), Ängelholm

- Nackademin, Stockholm
- Vansbro Lärcentrum, Vansbro
- Transport Competence Center (train driver courses), Hallsberg, Mjölby, Vännäs
- Stockholms Tekniska Institut (projector, electrical and signal), planned start of course autumn term 2010
- Campus Varberg (construction engineer), planned start of course autumn term 2009

##### UNIVERSITIES AND COLLEGES (WITH PROGRAMMES)

- Faculty of Engineering, Lund University/Järnvägsskolan (Railway engineer)
- Royal Institute of Technology (KTH) (Traffic and logistics etc.)
- The Institute of Technology at Linköping University (Communications and transport systems)
- Chalmers University of technology (Masters Programme in Supply Chain Management)
- Luleå University of Technology (General rail technology/CEN TEK)
- Uppsala University (Masters Programme in Human-computer interaction)



The largest proportion of all travel on rail-based services is made in local traffic systems. In the Stockholm area, in Göteborg and Norrköping the local service is in the form of local trains, light rail and underground is necessary for the residents to be able to get between home, work and leisure activities. In this chapter a picture is provided of the scope of the local systems and their development, as well as their contributions to meeting the sub-objectives of transport policy.



# Local trains, light rail and underground in Sweden in 2008

## TYPES OF LOCAL RAIL-BASED SERVICE IN SWEDEN

Underground is one rail-based local transport system within an enclosed or otherwise screened area. The underground is not a part of the national rail net. The carriages are normally connected together into trains with high-capacity, and can run at 70 to 90 km/h. A large part of the track is in tunnels below ground. In Sweden there is an underground only in the Stockholm area.

A local railway is a rail-based transport system partially within an enclosed or otherwise screened area. Local railway is not part of the national rail net, but is operated with rolling stock corresponding to most of the railway's standards. Examples of local railways are the Saltsjöbanan and Roslagsbanan lines in the Stockholm area.

Light rail systems are to a great extent part of the street environment and run at the speeds allowed there. The driver mostly drives "on-sight", that is to say without other help from signals than what is otherwise to be found in the street. The distance between stops is often short and the stops are designed like bus stops. In Sweden there are light rail systems in Norrköping, Göteborg and Stockholm.

Light rail and underground services in Sweden and have had very healthy growth in passenger numbers in recent years. In 2008 mileage amounted provisionally to 2.3 billion passenger-kilometres, which is the highest level ever and an increase of 0.2 billion passenger-kilometres compared with 2006.

Local rail-based systems contribute in several ways to creating sustainable cities. Light rail and similar systems take up

very little room in the urban area, which means that space can be used to facilitate pedestrian and cycle traffic and create more attractive urban environments.

What is more special infrastructure and priority vis-à-vis car traffic means higher average speeds than road traffic. Additionally electrical rolling stock is very energy-efficient and free from local emissions.

New forms of public transport, such as light rail, duo systems and new electrically operated bus systems, are being discussed in several Swedish cities, with the aim of achieving sustainable public transport in cities. Jönköping, Uppsala, Malmö and Lund are examples of towns where new traffic systems may be in place within the next 10 years.

## NORRKÖPING

The light rail system in Norrköping was opened in 1904. Until buses were introduced in the 1920 the tram was the only form of public transport in the town. The urban area today has a light rail network of 23 km of double track, divided into two lines. Currently light rail and bus systems have approximately 50 per cent each of the town's public transport. Since 2004 Veolia Transport Sverige AB has been the service provider for light rail in Norrköping.

In 1992 a political decision was taken about major investments in light rail. A programme for upgrading light rail was produced, among other things with investments in new rolling stock and a rebuild of crossings. Light rail in Norrköping is today a modern and safe traffic system. The vehicle fleet is continuously updated and work on safety is given top priority.

In October 2008 the political majority on Norrköping Municipality took the decision to begin building light-rail out to the city districts of Ljura and Hageby, as an extension of the light rail system towards the city district of Navestad Centrum to the south. Building work is planned to begin in the spring of 2009.

The reason for extending the light rail system is, on the one hand, social welfare, on the other the direct commercial benefits. An extension of the light rail system will mean that more savings can be made in the operation of buses than new light rail operations will cost. The forecast for the sound financial outcome, in combination with the fact that light rail is expected to attract more people from cars to public transport, has meant that the investment in light rail has often been called "Sweden's most profitable light rail project". If light-rail is extended according to plan, the light rail system is estimated to have a 70 per cent share of public transport in Norrköping.

## GÖTEBORG

Light rail in Göteborg is by far the largest light rail system in Sweden, and accounts for approximately 90 per cent of the mileage for light rail in Sweden. The network is approximately 82 km long and divided into 12 lines. Göteborgs Spårvägar operates the service. Planning and coordination with other public transport is carried out within Västrafik Göteborgsområdet AB.

Only in the 1990s was it politically practicable to make major investments in light rail in Göteborg. In the so-called Göteborg Agreement the region was allocated a reserve of investment funding by the state, to dispose over among other

things for restoration and extension of the network. Light rail plans were concretised in the so-called Kringen Plan. This involves the building of new light rail links, which together with existing track would form a ring around the centre.

In 2001 the first stage was opened according to the Kringen Plan, the so-called Chalmers Tunnel, linking Korsvägen with Chalmers Technical University and Sahlgrenska University hospital. The opening of light rail in Södra vägen followed, between Stampen and Korsvägen past Ullevi Stadium and Scandinavium. By means of these links a direct link was forged between central Göteborg and the north-east suburbs of Angered, Kortedala and Bergsjön.

The “Södra älvstranden” Project, which will complete Kringen, is at the planning stage. By means of this stage the light-rail net will be completed with the so-called “Badhus Link”, along the river Göta älv between Järntorget and Lilla torget squares.

In a recently presented objective for the service in the Göteborg region, the so-called K2020, public transport will have a much greater role in regional services than today. This is because of a continued anticipated growth, at the same time as it is impossible or undesirable to expand the road network further. In this objective market share will increase to 40 per cent, which means that the number of journeys by public transport in the city of Göteborg will double over a 12 year period.

## THE STOCKHOLM AREA

The underground is the backbone of Stockholm’s rail-based local traffic. It was opened in 1950 and is owned and administered by the transport authority AB Storstockholms lokaltrafik (Stockholm Public Transport). The underground today has 101 stations, of which 100 are in use. Of these, 53 lie above ground and 47 underground. The service is run by Veolia Transport Sverige AB until November 2009.

In the Stockholm area there are also two local suburban lines which have survived, even though they individually comprise different forms of light rail system: the Saltsjöbanan and Roslagsbanan lines. Light rail in Stockholm consists of four smaller systems: Lidingöbanan, Tvärbanan, Nockebybanan and Djurgårdslinjen.

The Lidingöbanan line was technically a railway until August 28, 2008, when it was reclassified as a light rail system. The line is 9.2 km long and runs between Ropsten and Gåshaga brygga. The service is operated by Veolia Transport AB.

The Saltsjöbanan line runs between Slussen and Saltsjöbaden in Nacka Municipality. The line, which has 18 stations and is 18.6 km long, carries local trains on two lines. The operator is Veolia Transport Sverige AB.

The Roslagsbanan line is a narrow gauge railway in the north-east suburbs of Stockholm, carrying local trains. The line starts from Östra station and divides into three lines towards Kårsta, Österskär and Näsbypark. The service provider is Roslagståg.

The Tvärbanan line is an approximately 11 km long light rail system which connects the Stockholm commuter train network and the underground network. Tvärbanan is entirely double track and runs partly as a street track and partly as a suburban line on its own track bed. At Liljeholmen the line shares track for a short stretch with the old main line past Liljeholmen – today used as a freight track. This is now the only location in Sweden where freight trains and light rail use the same track. The system is operated by Veolia Transport AB.

In August 2008 the Stockholm Public Transport board decided to extend Tvärbanan both northwards and eastwards. The projects “Tvärbanan Solna” and

“Tvärbanan Ost” are estimated to involve investments of approximately SEK 5.2 billion. Investment means that the length of Tvärbanan will more than triple. The project “Tvärbanan Ost” includes the rebuilding of the Saltsjöbanan line between Sickla and Solsidan/Saltsjöbaden for light rail use and its connection to Tvärbanan. Tvärbanan has in its current form become very popular. The extension of the line creates improved travel opportunities and at the same time relieves the pressures on the radial track systems – the underground and commuter trains. Construction is estimated to start in 2009, and the service will operate from the summer of 2013.

The Nockebybanan line is a 5.7 km long light rail system between Alvik and Nockeby. Nockebybanan runs as a suburban line on its own track bed apart from certain street crossings where it runs on street track. The service on the line is operated by Veolia Transport Sverige AB.

Stockholm Public Transport decided in 2007 that the light rail system in Stockholm’s inner city should be developed. The existing light rail, Djurgårdslinjen, will be extended from Norrmalmstorg Square to the Central Station and on to Hornsberg. Increases in passenger numbers, primarily in the summer to excursion venues on Djurgården, mean that existing capacity is insufficient. What is more, the City of Stockholm is planning the development of new housing both in Värtahamnen and on western

TABLE 4  
Local lines, light rail and underground in Sweden 2008

Line	Sections of track/lines	Length of track	Number of stops/stations
The underground	Green, red and Blue lines	109 km	100
Nockebybanan	Alvik-Nockeby	5,7 km	10
Lidingöbanan	Ropsten-Gåshaga brygga	9,2 km	14
Roslagsbanan	Östra station-Kårsta/ Österskär/Näsbypark	65 km	39
Saltsjöbanan	Saltsjöbaden-Slussen/ Igelboda-Solsidan	18,6 km	18
Tvärbanan	Alvik-Sickla udde	11 km	17
Light rail in Göteborg	Twelve lines	82 km	131
Light rail in Norrköping	Two lines	23 km	42

Source: Respective infrastructure administrator



*Local track-based systems often form the backbone of a city's public transport system.*

Kungsholmen. When the new stretches of track are ready, which is estimated to be at the earliest in the spring or summer of 2010, it will be the first time in more than 40 years that light rail has operated regular services in Stockholm's inner city. In the autumn of 2008 public consultation began on the new light rail in Stockholm's inner city.

For the light rail initiative Stockholm Public Transport will not merely buy in the service on the new rail line, but will invite tenders for the construction, operation and maintenance of the line and service for 15 years as a package solution. It is the second project in Sweden where light-rail traffic and public transport have been developed through a so-called OPS solution. In Sweden a solution of this kind has so far only been used for the Arlandabanan line..

### INTERNATIONAL COMPARISONS

Light rail and similar systems in the form of urban lines and/or local lines are very common in Europe. The same applies to the underground – Europe is the continent which has most underground systems. One reason for this is that lines at or below ground level have often been the only alternative for rail-based systems, as it has been difficult to build elevated lines in Europe's old city centres.

In principle all the European countries have light rail, local lines or similar systems. Light rail is particularly common in Central and Eastern Europe. In Germany there is light-rail in more than 50 cities. Poland, Switzerland, Hungary, Bulgaria

and Austria are other major light rail nations. The light rail system in Sofia is the largest in Europe, with 17 lines and a track length of 308 km. France is, however, the country where most is being invested in developing light-rail and other similar systems.

Apart from Sweden, in Scandinavia there is light-rail in Finland (Helsinki) and Norway (Oslo and Trondheim). In Denmark there is no light-rail in any real sense, even if several local lines have a similar system. The light rail system in Helsinki has 200,000 passengers every day, which makes it the first choice among public transport systems in the city. A new light rail system is under construction in Bergen, Norway.

Underground systems are to be found in 39 European cities. The largest system is to be found in London. Stockholm's underground is the sixth largest system in Europe by length. In Scandinavia there are also underground systems in Oslo, Helsinki and Copenhagen.

### THE IMPORTANCE OF SERVICES FOR THE FULFILMENT OF OBJECTIVES

Local rail-based services comprise a large part of travel by public transport in Sweden. For this reason it is important to analyse the significance of the service for meeting the intermediate objectives of transport policy. Below a general picture is presented of local rail-based services. What follows is a general picture of the contributions made by local rail-based services to meeting objectives. The data

in this chapter is relevant on the basis of the objectives applying to the rail sector in 2008. For 2009 a new structure and formulation of objectives may apply.

### An accessible transport system

Modern light rail units have low floors and easy access. This is to facilitate boarding and leaving by people with disabilities, older people and children. Track steering is precise, which means that a completely level access from platform to the carriage can be obtained. What is more, the distance between stops in the urban setting is short. The possibility of boarding and leaving underground carriages is in principle just as good. General access in the underground is, however, worse. This is because of the obstacles implied by the location of the underground, partly beneath ground level.

Experience shows that many older people and people with disabilities find light rail relatively easy to travel on, and that they can travel alone. A well-functioning light rail service can in this way lead to this group of passengers choosing public transport in preference to the Paratransit Service for older people.

Local rail-based services are very space-efficient, taking up a small area in the urban environment. The area required differs between different modes of transport, in part because of different margins for the human factor. The area required per passenger is approximately half for light rail (1.2 m<sup>2</sup>) what it is for bus (2.1 m<sup>2</sup>), whilst the area needed for

passenger cars is 22 m<sup>2</sup> per passenger. As regards light rail, the street can be shared with pedestrians and cyclists. In this way attractive urban environments can be combined with efficient public transport. The underground is space-efficient because it is largely hidden beneath the ground.

Local lines, as in closed systems with fewer stops/stations and rather heavier rolling-stock, have worse direct access. The major contribution of local lines to meeting the target of an accessible transport system lies primarily in the fact that access between urban areas is improved. On the local lines in the Stockholm area a large number of people can move between the suburbs and central Stockholm without using their cars.

### Regional development

It is primarily the local lines in the Stockholm area which contribute to the target of regional development. The political objective of regional expansion means constantly increasing numbers of journeys with all forms of transport. The local lines in the Stockholm area increase the opportunity of travelling to workplaces, education and commercial and public service without the need to use the car.

### High transport quality

Punctuality in local rail-based services is often very high, because of short travel distances, high frequency of service, and that many of the systems are closed and therefore insensitive to disruption from other traffic.

In 2008 punctuality for light rail in Göteborg has been improved by 3 percentage points to 84 per cent compared with 2007. The fact that light rail is prioritised in the traffic signalling system and the drivers no longer spend time selling single tickets makes it easier to keep to the timetable.

For the underground too punctuality has improved this year. Punctuality was 94.1 per cent in 2008, which is an increase of 1.4 percentage points from 2007, and 3.1 percentage points from 2006.

Local rail-based systems have a very high capacity compared with other means of transport. For example, the underground in Stockholm, with a frequency of 90 seconds, has a capacity of 48,000 passengers per hour and track. Light rail, underground and local lines have, what

is more, often higher average speeds than road traffic.

Satisfaction with local rail-based traffic is higher than is the case for long-distance train journeys and commuter trains. One reason for this may be the higher punctuality in the local systems. According to Stockholm Public Transport's survey in the autumn of 2008, 76 per cent of passengers were satisfied with the underground. This is an increase of 11 percentage points since the autumn of 2006. Satisfaction with local lines in the Stockholm area, such as Tvärbanan and Roslagsbanan, has been constantly high since surveys began. In the autumn of 2008, 82 per cent of passengers were satisfied, and only 6 per cent dissatisfied.

### Safe service

Light rail services have to share with other urban traffic, which can lead to accidents. The most common type of accidents is collisions between trams and road vehicles, but collisions also occur between trams. Because of low speeds, personal injury rarely occurs, but the costs of material damage can be significant. In the underground those who are killed or injured in most cases have been trespassing on the track, and in many cases it is a question of suicide or attempted suicide.

In 2008, 1 (2) deaths and 6 (39) serious injuries occurred on the light rail system. In the underground 5 (1) people – excluding suicides – were killed, and 4 (6) were seriously injured. There were 5 (7) suicides.

### Healthy environment

Electric vehicles are free from local emissions. Emissions on a global level depend on how electricity is produced. In Sweden electricity comes from renewable sources.

Local rail-based traffic systems are very energy-efficient, with a large number of passenger movements per kilowatt hour. The underground is the most energy

effective form of public transport. Light rail has similar energy efficiency. An ethanol bus uses 5.5 times as much energy as an underground carriage when calculated per seat.

All public transport gives rise to noise. The underground is the means of public transport which gives rise to least noise in relation to the urban environment around it. Local lines cause noise levels which are comparative with other rail traffic. The noise from light rail can be regarded as disturbing,

### An equal opportunities transport system

An analysis of current travel patterns and values on the part of women and men shows that a developed public transport service favours women more than men, amongst other things because women have worse access to cars. A well-functioning public transport system is, therefore, an indirect way of promoting equal opportunities travel.

A decisive factor in whether women choose public transport is, however, that the perceived safety and security is high. Relatively high perceived safety is to be found in local rail systems. The perceived safety and security on the underground is very low, but has risen in recent years. The location of light rail on the surface and in illuminated urban environments generally speaking influences women's perceived safety in a positive direction.

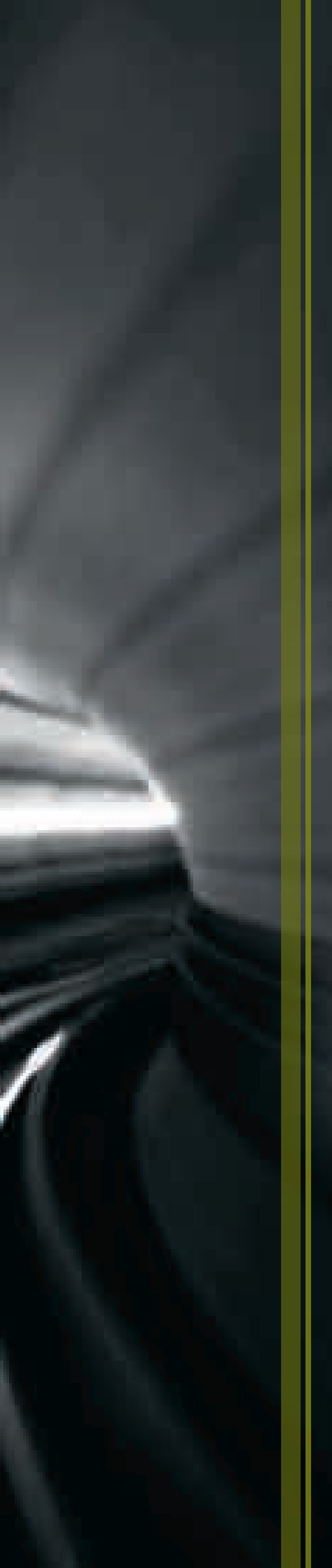
For the underground the transport authority Stockholm Public Transport makes continuous effort to increase safety and security. From the so-called Safety and Security Centre all resources existing in public transport are administered in close cooperation with the police, the Peaceful Street project and other voluntary night-walker groups. The task is to provide individuals who find themselves in a threatening or violent situation within the Stockholm Public Transport service with security resources in the form of stewards, policemen and traffic control officers. ■

» *The underground in Stockholm, with a frequency of 90 seconds, has a capacity of 48,000 passengers per hour and track.* «





High-speed links —  
a new transport system



Sweden has arrived at a crossroads. If the rail sector is to be able to provide more people and companies with the opportunity of choosing sustainable transport, greater rail capacity is needed. Surveys show that separate high-speed rail tracks are a good method for, at the same time greatly increasing capacity and streamlining the use of the existing system.

*High-speed lines have a major effect on accessibility for the citizens, at the same time as capacity is freed up for freight traffic.*

### WHAT DISTINGUISHES A HIGH-SPEED RAIL LINK?

A high-speed railway is a railway adapted for very rapid passenger trains and rapid freight trains with light freight at speeds above 250 km/h, in practice often 300 km/h or more, with large curve radiuses and without level crossings with roads. The conventional railway, on the other hand, is adapted for a combined passenger and freight traffic with a speed of at most 250 km/h. Gradients should be small with regard to freight trains, and level crossings with roads can be found.

High-speed trains have the same technical properties as other trains. This means that high-speed trains can also run on existing conventional track.

### INTERNATIONAL HIGH-SPEED LINES

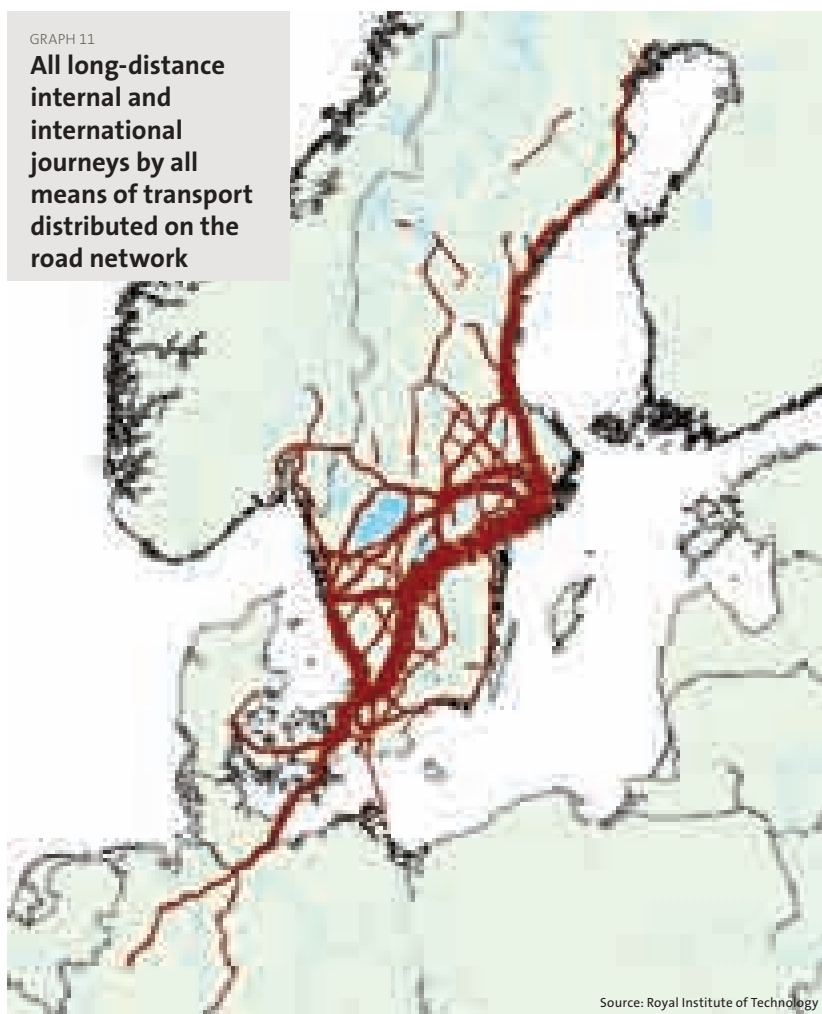
The first high-speed line was built in Japan in 1964. Today the Japanese high-speed net covers almost all of the country. High population density, high frequency of service and excellent quality has contributed to very high traffic volumes. The number of passengers on the Japanese high-speed net is today greater than on all of the European high-speed nets together.

In Europe services on high-speed lines began when the French TGV started to run between Paris and Lyon. Expansion in France has continued successively and in 2007 the net was 1,900 km in length. In 2007 the TGV service accounted for all of 57 per cent of the total passenger traffic by rail in France. It is interesting that the rate of increase in the service is in proportion to the reduction in travel time. A couple of years after the start up of the TGV service, air traffic between Paris and Lyon was cut by a half.

Today the most rapid developments are taking place in Spain. The Spanish government has in an infrastructure programme established the objective that by 2020 Spain will have 10,000 km of high-speed rail line and that 90 per cent of the population will live within 50 km of a station on that network. In February 2008 the line between Madrid and Barcelona opened. The 630 km now take 2 hours and 40 minutes, which is approximately 4 hours shorter than on a conventional line.

In total there are today more than 5,500 km of high-speed lines in Europe. A further 3,500 km are in the course of

GRAPH 11  
All long-distance internal and international journeys by all means of transport distributed on the road network



construction, and 8,500 km are planned before 2025.

### WHAT IS NEEDED TO BUILD HIGH-SPEED LINES IN SWEDEN?

High-speed lines mean major investments and therefore need a considerable traffic base in order to become profitable from a commercial or socio-economic viewpoint. High-speed lines can be built on the basis of different market needs. Short travel time is usually fundamental. Greater capacity has become increasingly important as rail traffic has increased, and separation of rapid and slow traffic is a very important measure for achieving this. Regional and national development is usually also an objective, where the greater access implied by high-speed rail is also a precondition. A healthier environment can be achieved, if more people choose the train instead of car and air travel.

In Sweden passenger rail traffic with higher speeds has so far been relevant on lines with a major customer base.

The Western main line (Stockholm–Göteborg) and the Southern mainline (Stockholm–Malmö) were the first to have X 2000-traffic. The East coast northwards from Stockholm and the West Coast line also have a relatively good base.

In January 2008 Banverket was tasked by the government with investigating the preconditions for high speed lines in Sweden. The following came to light in Banverket's investigation.

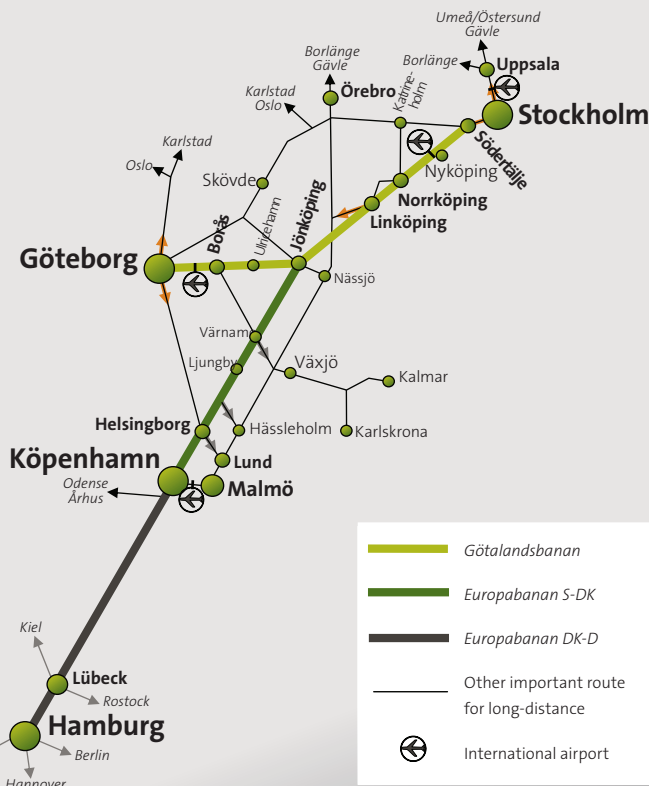
In order to find a starting point for the analysis of the potential of high-speed rail in Sweden there must be

- a large end terminus market with airline competition
- large middle markets
- a high demand for freight traffic

In order to analyse the preconditions, the major long-distance travel flows have first to be analysed. All long-distance journeys by car, bus, train and air have been apportioned out onto the road network. The reason the road network has been

GRAPH 12

**The proposed route of the Götalandsbanan line and one of the proposals for the route of the Europabanan line\***



Source: Royal Institute of Technology

Art: Oskar Fröidh

\* The Graph shows a proposal for the route of the Europabanan line. It should be noted that the route shown is not obvious and that no decision has been taken on this matter.

used is that it is of a finer mesh than the rail network, and the journeys then take the most natural routes with the shortest distances and times. You also then gain a view of, on the one hand, where the major travel corridors are, and on the other what a high-speed network might look like if it were to provide for these flows. *Graph 11.*

When it comes to freight international services have a much greater significance, which affects the indigenous flows. Unlike passenger traffic, air-traffic has almost no significance for freight flows, while sea traffic, on the other hand, has very great significance. A major rail freight route goes from northern Sweden down towards Bergslagen and then on further south where Hallsberg forms a node in the rail network. From Hallsberg another freight route goes down to Göteborg, where the port has great significance as a start and endpoint. A third major freight route goes down to Skåne, where international services have great significance.

Freight can reach the continent either via the Öresund Bridge through Denmark or by ferries direct to Germany and Poland.

If we put together passenger and freight services, then the Western main line and Southern mainline appear to be those that are most overloaded even today. With the increase that already exists in rail traffic, and those needs that can be anticipated, these lines will continue to be in great demand both for freight and passenger traffic. The lines therefore appear as major transport corridors. The other major transport corridors are the East Coast line northwards from Stockholm and the West Coast line south from Oslo and Göteborg to the Öresund region. The combined volumes of freight and passenger traffic are however not as large there.

To sum up, analyses and estimates point to the fact that there is a market for high-speed trains in Sweden in two corridors: on the one hand from the Stockholm region to Norrköping and

Linköping and on to Jönköping and Göteborg, on the other from Stockholm region along the same stretch to Jönköping and after that to Öresund and further on to Hamburg.

The Götalandsbanan line refers to a corridor from the Stockholm region to Norrköping and Linköping and further on towards Jönköping, Borås and Göteborg. The stretch between Södertälje (Järna) –Nyköping–Norrköping–Linköping is called Ostlänken (the Eastern link). The Götalandsbanan line is also suggested as going via the airports at Skavsta and Landvetter. The Europabanan line is a route contemplated through southern Sweden, Denmark and on across the Fehmarn Bält to Germany. There are several alternatives as regards how the line would cross Sweden, and no decision has been taken on this matter. Together these lines are often called Europakorridoren (the European corridor). *Graph 12.*

On 18 December the government appointed a special investigator tasked with continuing to investigate the preconditions for the development of high-speed lines in Sweden. The commission will result in a report in September 2009.

**EFFECTS ON PASSENGER SERVICES**

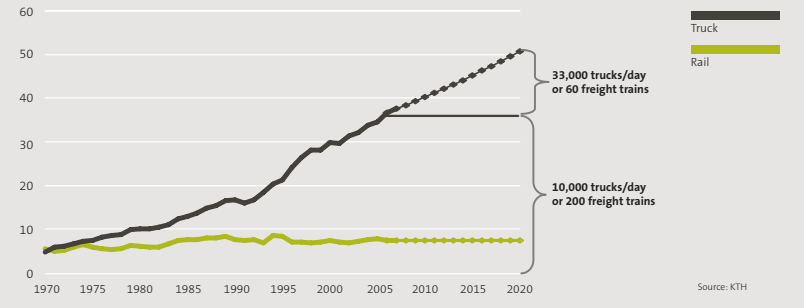
With an expansion of high-speed lines travel times will become very short both on the high-speed network and on lines connecting with that network. As an example we might mention:

- Stockholm–Linköping, approximately 1 hour
- Stockholm–Göteborg, approximately 2 hours
- Stockholm–Copenhagen, less than 3 hours
- Stockholm–Hamburg, approximately 4 hours and 30 minutes.

An expansion of the Götalandsbanan and Europabanan lines therefore has the greatest effect on the passenger traffic market. Rail travel is expected to increase substantially, and rail is estimated to take over many passengers from internal flights. Car traffic is expected to decline. The short travel times mean new travel opportunities, which generate new journeys. Rail also cooperates with air by offering better feeder journeys to those airports which have direct connections to the high-speed network, such as Arlanda, Skavsta, Landvetter and Kastrup.

GRAPH 13

**Development of international freight transport by rail and truck 1970–2006 and development with/without capacity and deregulation, freight in millions of tonnes excl. ore, oil**



In the long term the location of housing and workplaces will be affected. The growth will be quickest in regions around the high-speed lines. Car ownership will not increase as quickly along the Europabanan and Götalandsbanan lines when they are operating. Another effect is that there will be fewer risks of delays. High-speed lines worldwide have very high punctuality. The current X 2000 train on the main lines has a punctuality of around 75 per cent, which means that 75 per cent of the trains are delayed less than 5 minutes, whilst the corresponding level for high-speed trains usually reaches 99 per cent. The reason for this is that the high-speed lines are a separate traffic system with their own traffic. They are also technically well-equipped and modern compared with the conventional network.

**EFFECTS ON FREIGHT SERVICES**

If the Götalandsbanan and Europabanan lines are developed, capacity will be freed up on the Western and Southern main lines, which will bring about an expansion in rail freight traffic. It should be stated that there is no direct link between a development of high-speed lines and greater freight traffic. On the other hand, the reverse is true, that is to say that if high-speed lines are not developed, there is not sufficient capacity to deal with greater freight traffic on the main lines.

Rail’s market share of long-distance mileage is today 25 per cent. If no specific actions are taken, this share will in the best case scenario remain constant, as truck transport will continue to increase, particularly as regards foreign traffic. Graph 13. Development of the railway’s freight services requires support from investment in infrastructure and terminals within Sweden and also a regulation of international rail traffic to be carried out in practice.

If sufficient capacity exists, and if the regulation is a success in international traffic, there is a very great potential for freight services on rail. Forecasts carried out by the Royal Institute of Technology show that market share could increase to 35 per cent and that long-distance truck traffic at the same time might decline. Some shipments could also be transferred from sea to rail.

Today most freight trains run at night. This is partly a result of customer demand, partly because it is difficult to acquire train paths during the day. In order to be able to exploit resources better there is an ambition both within industry in general and the transport sector to run services round-the-clock. There is, therefore, even today demand for more train paths for trains during the day. Analysis has shown that it is possible to run considerably more freight trains on the main lines during the

daytime if high-speed tracks are built. This capacity will be needed if the potential for rail freight services is to be realised.

**ECONOMY**

The cost of constructing a high-speed network is high – it is like building new main lines. The benefit can, however, be great, and the lines will be in use for a long period ahead. Calculations made so far show that the Götalandsbanan and Europabanan lines will cost SEK 100–150 billion to build. Then there will be approximately 700 km of completely new rail track at the same time as the old track becomes more usable. To be able to achieve maximum reductions in travel time further investment is required however, among others on the Västlänken, the link to Denmark and in Denmark and Germany.

The alternative, gradually developing the existing network, is also a possibility, but it would presumably be more expensive in the long term. Firstly, the total length to be built would be longer, approximately 900 km, and it would not be possible to build for such a high speed, as one would be tied to the old routes. What is more many problems would arise during the construction period next to the existing track. If one is going to build two new tracks, it is more efficient to build them in a new location.

When it is a question of such major and system-altering changes as high-speed tracks, making forecasts about the future demand for travel is, of course, associated with relatively large uncertainties. International experience of high-speed lines may, however, be a good indicator in assessing the plausibility of those forecasts that have been made. How demand may develop in the long term is, however, dependent on a number of factors, such as for example: demography, economic development, energy prices and technological developments in competing forms of transport. Those forecasts which are normally used as a basis for socio-economic estimates are based on

» High-speed trains can contribute to a long-term sustainable transport system which can deal with a large number of the transport movements in the future in an energy-efficient way. «

the idea that these factors largely develop relatively undramatically and in line with a development which has happened over recent decades. Sensitivity analyses which shed light on possible deviations in the development of these factors can and should always be carried out.

In those socio-economic cost estimates which have so far been made, construction costs dominate the cost side, whilst the consumer surplus and producer surplus dominate the benefit side. Within the consumer surplus are included savings of time, and the producer surplus includes primarily rail company profits from operating services with high-speed trains. The effects on freight services and environmental effects normally have a relatively minor importance in socio-economic cost estimates.

The fact that the producer surplus is so great is the result of high revenues, as

the train, because of short travel times and substantial markets, will have both many passengers and high loading, at the same time as short travel times imply efficient operation where trains and staff manage many runs each day. This applies to current track fees, but also indicates that there is an opportunity of taking out a fee from services which in part can be used to finance an expansion of the lines.

#### ENVIRONMENT

Transport services constitute part of the climate problem. This applies particularly to road and air traffic but also to sea to, as these forms of transport to a great extent dependent on fossil fuels. Rail is the most energy-efficient means of transport because of low rolling friction, low gradients and energy regeneration brakes. Trains are particularly efficient for large transport volumes. One advantage

is that electrically powered railways can be run from a choice of energy sources, from wind power to nuclear power. Trains can, despite this, become ever more energy-efficient through technological developments, better aerodynamic design, different traffic patterns and higher capacity utilisation.

Researchers are in agreement that as regards the climate issue we have to reduce total energy consumption, streamline energy use through energy-efficient means of transport and change our behaviour so as to use less energy-intensive means of transport. The train, and particularly high-speed trains, can contribute to this by creating a long-term sustainable transport system which can deal with a large number of the transport movements in the future in an energy-efficient way. ■



# How well does the rail sector meet the objectives of transport policy?

Rail should, like other forms of transport, help fulfil those transport policy objectives established by Parliament. The overarching objective for transport policy is to ensure a socio-economically efficient and, in the long-term, sustainable provision of transport for citizens and businesses throughout the country. Six sub-objectives indicate the direction and long-term objective. Linked to the sub-objectives are intermediate targets. What follow then is an assessment of how well developments this year have contributed to meeting the objectives.

The assessment of target fulfilment for each sub-objective is made on the basis of an overall assessment of development towards intermediate targets linked to sub-objectives or the like, and is based on the result for the feedback measurements which Banverket has established as relevant to each objective .

Reporting in this chapter is relevant on the basis of the objectives that applied to the rail sector in 2008. In March 2009 the government put forward a bill involving new passport policy objectives. For the 2009 sector report a new structure of objectives will, therefore, apply, and possibly new formulations of objectives.

- Development during the year is considered to have contributed to meeting the objective
- Development during the year is considered to a certain extent, but not sufficiently, to have contributed to meeting the objective
- Developments during the year is not, or only slightly contributed to achieving the objective

# 1

**AN ACCESSIBLE TRANSPORT SYSTEM,** where the rail transport system is designed such that the fundamental transport needs of citizens and business can be provided for.

## Intermediate stage

- Accessibility of citizens and business within regions and between regions and the outside world should gradually be improved.
- Accessibility between metropolitan areas and between urban areas should gradually be improved.
- The proportion of public transport by rail should increase in relation to total passenger mileage.
- The proportion of passengers with disabilities and other groups with particular needs to travel on the rail transport system should increase. By 2010 public transport by rail should be accessible to people with disabilities.
- The proportion of children and young people who can make use of the rail transport system should increase.
- The proportion of the number of journeys made by cycle traffic should increase, particularly in urban areas.

## Motivation

How rail services and rail travel develop provides a picture of the ability of the rail sector to provide for the transport needs of business and the citizens. In 2008 the positive development in mileage by rail has continued.

Freight mileage in 2008 amounted provisionally to 23.3 billion tonne-kilometres, which is the same level as for 2007.

In 2008 passenger mileage by rail increased provisionally by a good 7 per cent or 0.7 billion passenger-kilometres to a total of 11.0 billion passenger-kilometres. Both short-distance and long-distance mileage increased. Short-distance travel by rail increased

provisionally from 4.2 to 4.6 billion passenger-kilometres. Long-distance travel by rail increased provisionally from 6.0 to 6.4 billion passenger-kilometres.

Provisional data for 2008 shows that rail this year has taken a greater market share, both in short-distance and long-distance passenger traffic.

A positive development of mileage on rail is seen as reflecting a development towards greater accessibility. For passenger traffic this assumption is also supported by measurements of public transport passengers' views of accessibility in public transport in general: 30 per cent of passengers consider that their opportunities of travelling on public transport were improved in 2008.

One of the intermediate targets of travel policy is that public transport by 2010 should be accessible to people with disabilities. Of those stations defined in the priority public transport net in 2008 two have been completed. At the pace that actions are being carried out Banverket does not believe that the target will be achieved. In the government's appropriation directions to Banverket for 2009 the government gives directives that Banverket should have remedied 40 stations by the end of 2010. Banverket assesses that there are good opportunities for reaching the target. In the assessment of target fulfilment for the financial year 2008 this is not taken into account.

A guide system has not been introduced in 2008, but preparations are ongoing for such a system to be in place by December 2009. Among passengers in the public transport system as a whole 26 per cent state that they have noticed improvements for people with disabilities during the last year. The corresponding figure for 2007 was 30 per cent.

As regards children and young people, the total number of journeys on all forms of transport has declined somewhat in recent years. Journeys with rail-based transport, including light rail and underground, have however been increased. Specific actions for the accessibility of children and young people have, how-

ever, been taken only to very small extent during the year.

The opportunities of making combined journeys by cycle and train are continually being improved. In the metropolitan areas of Stockholm, Göteborg and Skåne the opportunities for combined journeys by cycle and train are relatively good. In the majority of pilot studies linked to stations the question of cycle parks has been dealt with. Development during the year is assessed to a certain extent as having contributed to improving the preconditions for a greater proportion of journeys by bicycle in urban areas.

Banverket assesses overall that development in 2008 has contributed to meeting the target of an accessible transport system.

# 2

**REGIONAL DEVELOPMENT,** where the rail transport system's design and function contribute to meeting the objective for regional development policy and counter-acting the disadvantages of long transport distances.

## Intermediate target

- The transport system should contribute to regional growth becoming sustainable for women and men, with the aim of achieving well-functioning labour market regions.

## Motivation

The transport policy objectives are not mutually exclusive. Particularly close to each other are the sub-objectives of regional development and the sub-objectives of an accessible transport system and to a certain extent, high transport quality. A development towards increased accessibility and high transport quality also promote regional development. Improved travel opportunities provide, among other things, access to work places, education and commercial and public service.

The rail transport system's contribution to regional development is assessed therefore on the basis of development towards an accessible transport system and high transport quality.

Banverket assesses that development in 2008 has contributed to meeting the objectives for regional development.

» In 2008 the positive development in mileage by rail has continued. «



### 3

**HIGH TRANSPORT QUALITY**, where the design and function of the rail transport system allows high transport quality for citizens and business.

#### Intermediate target

- The quality of the rail transport system will be improved and train punctuality will increase, particularly in the metropolitan areas of Stockholm, Göteborg and Malmö.
- The quality in the Swedish transport system should be improved, measured in terms of reliability, safety and security, flexibility, comfort, navigability and access to information. Sweden should work towards being able to compare these quality terms with those of other EU countries.
- Passengers' rights should be reinforced.

#### Motivation

Quality in the rail transport system is to a great extent dependent on train punctuality. During the year punctuality improved across the rail system as a whole. Passenger service punctuality

improved marginally, from 91.6 to 91.7 per cent. Great improvements were noticed in punctuality in the metropolitan areas of Stockholm, Göteborg and Malmö. Particularly high punctuality scores were achieved for Stockholm Public Transport services at rush hour. The rail sector mobilisation for punctuality was a contributory factor to the improvement. Punctuality for freight traffic deteriorated, however, in 2007, from 76.9 to 76.5 per cent. Punctuality in light rail and underground was improved during the year.

Passenger satisfaction with public transport improved somewhat in 2008: 66 per cent of passengers was satisfied. The corresponding figure for 2007 was 65 per cent. In Stockholm Public Transport satisfaction increased generally. Passengers' overall satisfaction with Banverket's traffic information was unchanged compared with 2007. Several projects aimed at improving passenger access to information are included in the efforts to double the share of public transport before 2020.

Transport policy has a designated objective of reinforcing passengers' rights. In 2008 Banverket and Jernhusen started a project to introduce a guide system on stations. Otherwise work within the

rail sector is ongoing to adapt travel conditions so that these will accord with the EU directive on rail passengers' rights and duties which comes into force in December 2009.

Banverket's overall assessment is that development in 2008 to a sufficient extent has contributed to meeting the objective.

### 4

**A SAFE TRAFFIC**, where no one is killed or seriously injured within the system of rail-based traffic. The design and function of rail-based traffic will be adapted to the demands that flow from this.

#### Intermediate target

- The number of dead and injured in the rail transport system will be reduced. In particular actions aimed at the safety of children and young people will be prioritised.

#### Motivation

Safety for passengers is still very high. No passenger died in 2008.

The number of dead and seriously injured overall in the rail-based traffic system including dead and injured in crossing accidents, declined this year. Taken as a five-year average however, development has to a large extent remained unchanged in recent years. The same applies to the number of people trespassing on the track that was knocked down. No rail accidents occurred leading to the discharge of dangerous substances in 2008.

A number of information projects targeted particularly at children and young people have been undertaken during the year with the aim of influencing behaviour and attitudes in order to reduce the risk of accidents.

Banverket assesses overall that development in 2008 partially contributed to meeting the objective of safe traffic.

## 5

**A SOUND ENVIRONMENT**, where rail transport design and operation contribute to environmental quality targets are achieved.

### Intermediate target/environmental quality objectives

- Swedish emissions of greenhouse gases will on average in the period 2008-2012 be at least 4 per cent lower than the emissions in 1990.
- The number of people exposed to noise pollution caused by rail traffic exceeding those benchmarks supported by parliament for housing will have decreased by 5 per cent by 2010 compared with 1998. The aim should be the most effective reduction in noise, for those people most exposed to noise to be given priority.
- The amount of polluted land which has negative effects on public health or biodiversity will be reduced. Actions taken in the period 2005-2010 were taken in such a large number of the priority polluted areas that the environmental problem in its entirety will largely be solved by 2050.
- By 2010 the loss of biodiversity in Sweden will be halted.

### Motivation

Emissions from the rail sector have decreased substantially in recent decades. In 2008 emissions from rail-based diesel services amounted to 65,400 tonnes, which is a reduction of approximately 36 per cent from 1990 (102,900 tonnes). Electrical energy represents approximately 90 per cent of total energy needs in the rail sector. Electrical energy since 2003 has come from renewable energy sources. What is more, systematic work on energy efficiency has been initiated. The rail sector has in this way met its share of the national environmental quality objective for climate impact.

The environmental quality objective and, moreover, the intermediate target in travel policy that noise pollution above the benchmarks as regards maximum noise levels will have declined by 5 per cent between 1998 and 2010 has already been met by the rail sector. The objective of equivalent sound levels will, however, presumably not be met because of traffic development today. Within the framework of the aim of prioritising those most subject to noise, Banverket has in the period 1998–2008 sound-proofed approximately 22,300 apartments. What is more, actions are being taken to reduce noise from the dominant source, at the contact surface between wheels and rails.

Banverket is working long-term to reduce the number of polluted areas presenting a risk of injury or inconvenience to people's health or the environment. An inventory, virtually completed, shows that Banverket is responsible for approximately 1,000 areas of this kind. Through the action levels stated in the plan for the future there are opportunities of achieving the environmental objective.

Banverket has initiated several projects with the objective that loss of biodiversity in Sweden should be halted by 2010. For example, in 2008 mapping began of living environments and the existence of threatened species in station areas.

Banverket assesses overall development in 2008 as having contributed to meeting the objectives of a healthy environment.

## 6

### EQUAL OPPORTUNITIES TRANSPORT SYSTEM

*which is designed so as to correspond to the transport needs of both women and men. Women and men will be provided with the same opportunities for influencing the establishment of the rail transport system, its design and administration and their values should be accorded the same weight*

### Motivation

During the year work on integrating an equal opportunities perspective to the transport sector has been ongoing. A large number of Banverket's employees have taken a course in gender and equality. In the action plan for Swedish infrastructure 2010–2021 the parties have taken steps to make the planning process more gender equal. The parties in the action planning are working to:

- achieve an equal gender distribution on working parties
- apply facts concerning differences in needs and values
- analyse regional traffic systems on the basis of gender perspective.

Women's representation on boards and management groups in the rail sector is being improved successively. On the whole men are, however, still over-represented.

In those cases where it has been relevant other transport policy sub-objectives have been followed up from an equality perspective. Making visible the differences between women and men is one way of gaining experience which can be used to create an equal opportunity rail transport system corresponding to the transport needs of women and men.

Banverket assesses that overall development during the year to a certain extent, but not sufficiently, has contributed to meeting the objective of an equal opportunity as rail transport system. ■

» Emissions from the rail sector have decreased substantially in recent decades. «



How travel by train has developed provides a picture of the ability of the rail sector to meet the travel needs of the citizens. Both short-distance and long-distance travel by rail reached record levels this year. The increases also contributed to rail taking market share from other forms of transport.

# Development of services in 2008

## TOTAL MILEAGE IN SWEDEN

Total mileage in 2008 provisionally reached 137.2 billion passenger-kilometres, which is the highest level ever and an increase by 0.1 billion passenger-kilometres compared to 2007. The increase by comparison with 2006 is 3.0 billion passenger-kilometres. Car and motorcycle were responsible in 2008 for 75 per cent of the mileage, whilst public transport was responsible for 21 per cent, and pedestrians, cycles and mopeds for 4 per cent, which is the same distribution as for 2006 and 2007.

Developments in 2008 should be seen in the perspective of a successive change from an extreme international boom to a recession. The effects of this development on passenger traffic were, however, considerably less than it was on freight traffic. The development should also be seen in the perspective that real disposable income provisionally grew by 2 per cent, which can mainly be explained by an increase in total salary levels. The increase in passenger traffic is also explained to a certain extent by a reduction in taxation, for example as a result of the second stage in the reduction in tax on earned income and changes in capital taxation. Despite the increase in disposable income, private consumption remained unchanged compared with 2007.

The fact that developments in private consumption did not keep pace with the increase in disposable income is explained by greater savings, which can be put in relation to a reduction in household assets, and among other things as a result of an unfavourable development on the stock exchange. The increased saving are also explained by the decline in the value of houses and owner-occupier

apartments and a concern about the future economy as a result of an increase in the number of redundancies.

Travel consumption decreased by 8 per cent, despite the fact that other consumption remained unchanged. This is explained primarily by the fact that car consumption declined by 23 per cent, where the greatest part of the reduction is explained by a reduction in the purchase of new cars, which meant that car ownership dropped slightly for the first time in 12 years. Public transport consumption declined by only 2 per cent, however. One should, moreover, note that travel consumption measured in Swedish kronor is not the same thing as travel measured in mileage.

## LONG-DISTANCE TRAVEL – RAIL MILEAGE IS INCREASING FASTEST

Long-distance (interregional) mileage in 2008 amounted to 39.8 billion passenger-kilometres, which is the highest level ever and an increase by 0.1 billion passenger-kilometres compared with 2007. The increase compared with 2006 is 1.2 billion passenger-kilometres. The proportion of car journeys amounted to 70 per cent, which is a reduction by one percentage point compared with 2007.

Long-distance rail mileage in 2008 amounted provisionally to 6.4 billion passenger-kilometres, which is the highest level ever and an increase by 0.4 billion passenger-kilometres on 2007. Rail's market share of long-distance mileage was, therefore, increased from 14 to 15 per cent. Compared with 2005 the increase is 1.2 billion passenger-kilometres. There has, therefore, been a very large increase in interregional train traffic over

the last 3 years. Of rail's long-distance mileage, the private operators accounted for 5 per cent in 2008 and for a good 9 per cent in 2007. The change is explained partially by the fact that SJ AB took over night-train services to Norrland.

Air travel mileage in 2008 amounted provisionally to 3.2 billion passenger-kilometres, which is a reduction by 0.1 billion passenger-kilometres compared with the years 2006 and 2007. By comparison with the record year of 2001 this is a reduction by 0.5 billion passenger-kilometres. Over the past 22 years air mileage has fluctuated between 2.8 and 3.7 billion passenger-kilometres, with an average value of 3.2 billion passenger-kilometres, that is to say the same level as for 2008.

The primary reason for the fall in 2008 is the tougher competition with rail and the fact that, in order to maintain a higher cabin factor, it has been necessary to reduce the supply somewhat. The poorer supply can also be put in relation to the fact that air in 2008 was hit by a dramatic rise in fuel prices, which have declined during the latter part of the year.

Both rail and air were affected by household economies. Air was disfavoured by a reduction in household assets and increased saving, but was favoured by the positive development in disposable income. Apart from household economy, both rail and air were affected by the greater internal competition and by the real price of petrol which in 2008 increased by 4 per cent compared to 2007. During the summer months the real price was, however, more than 10 per cent higher than 2007. The petrol price fell, however, by more than a quarter from the summer to the end of the year.

*In recent years there has been a clear shift from travel by air to travel by train.*



The harder competition has been significant through the development and maintenance of low cost air travel and the new lower prices for rail travel. Low-cost air travel has meant a greater provision and lower prices at certain large airports, but a reduction in provision and higher price at some smaller airports. This has on certain routes generated a very low cabin factor, which indicates an excess supply and in that way an unprofitable operation. This has meant that airlines in certain contexts have, through reducing provision, tried to raise the cabin factor.

Low rail fares have meant ever greater capacity utilisation, particularly on the X 2000. Capacity utilisation has increased from approximately 50 per cent in 2000 to 73 per cent in 2008 as a result of flexible pricing. Because of the higher capacity utilisation, SJ AB has decided to buy 20 fast trains of the Regina type from Bombardier and to upgrade 160 passenger carriages. Graph 14.

Travel by express train on the three major lines Stockholm–Göteborg, Stockholm–Malmö and Stockholm–Sundsvall have increased by approximately 45 per cent between 2001 and 2008, whilst internal flights from airports along these routes have decreased by approximately 20 per cent. In rail travel flows other than the endpoint markets are included and in the air travel transfer passengers are also included, but this nevertheless gives a clear picture of the shift which has occurred in travel from air to rail. The greatest changes have occurred since 2005

The shift in passengers from low-price air services to night-train services from

and to Norrland which began in 2006 and continued in 2007 and 2008. Unlike southern and central Sweden, air services to and from Northern Norrland grew by 8 per cent between 2007 and 2008. The long distances for these journeys means that changes in the number of passengers have a major effect on total mileage for each form of transport.

SJ AB raised prices across the board by approximately 5 per cent in May 2007, apart from services in Mälardalen. In December 2008 prices were raised there too. A new pricing system was introduced in April 2008. This system provides the opportunity with a basic ticket at the lowest price, of supplementing this with a choice of seat reservation, and an opportunity of changing the reservation, an opportunity of a refund, Internet or a three-course meal. Overall the real price rises on SJ AB services in 2008 were relatively marginal.

The previously lowest price for an advance ticket of SEK 95 introduced in 2007 was supplemented in that year by a system with ticket auctions, where the reserve price was only SEK 1. In 2008 this resulted in 13,000 people travelling for one krona and a further 80,000 people travelling on tickets they had bought at auctions. During the summer SJ AB also offered half-price on tickets in first class. In total the changes meant more journeys by rail and a stronger competitive situation vis-à-vis car and bus.

#### **Supply changes in 2008**

Those supply changes affecting services in 2008 include the fact that SJ AB introduced more direct trains with shorter

travel times between Stockholm and Göteborg as early as 2007. The quickest train, departing at 06.00 from Göteborg and arriving in Stockholm at only 08.45 became so popular that it had to be run using a double set of carriages with 11 carriages. This train also became full, and it is impossible to run three connected sets of carriages because the platforms are not long enough.

SJ AB succeeded in finding a further train to start at 05.55 from Göteborg arriving at 08.40 in Stockholm. This means that there is a capacity of 16 carriages or 830 seats from Göteborg to Stockholm. This capacity corresponds to 6 aircraft.

X 2000 through trains operating Stockholm–Göteborg–Halmstad–Malmö had previously run in the summer, but were also run at weekends in 2008. From the autumn intercity trains were also run directly via Katrineholm to Göteborg in approximately 4 hours at weekends, to supplement the slower trains running Stockholm–Västerås–Göteborg, which take almost 5 hours.

Since the northern mainline for several years had been undergoing reconstruction to be able to take heavier goods trains and fast trains, SJ AB put on X 2000 trains via Bollnäs with a shortest travel time of 4 hours and 50 minutes, that is to say almost an hour quicker than the intercity trains. Previously certain X 2000 trains had run to Sundsvall and on to Östersund, with a travel time of 5 hours and 30 minutes. In the autumn SJ AB put on an additional fast train, so that there were two return trips, by which means the service was increased. When SJ AB had problems with the



X 2000 trains, these trends were replaced by intercity trains in December 2008.

The problems with the X2000 trains in the autumn of 2008 proved to result from too great a variation in the power supply, which meant that fuses blew to protect the train's electrical equipment. The variations in power supply resulted in turn from the high loading on the rail net and the fact that several trains with energy regenerating brakes were being used.

As night-train and chartered train services were deregulated in January 2007, Veolia Transport Sverige AB has operated night-trains to Jämtland in competition with SJ AB. SJ AB has also increased its night-train traffic to Jämtland during the winter sports holiday. SJ AB took over the night-train traffic to Norrland from Veolia in June 2008. The service is bought in by the National Public Transport Agency and is operating with their locomotives and carriages. SJ AB withdrew the daytime

train is between Umeå and Luleå and rescheduled the night-trains so that they took other routes in central Sweden, which resulted in shorter travel times. SJ AB also applies its flexible fares to the Norrland service. During the summer Veolia also operated to northern Norrland, thus competing with SJ AB and the National Public Transport Agency.

International services have also been deregulated for several years, but with the proviso that it is not permitted to pick up and drop off passengers in each country, so-called cabotage. On April 11, 2008 the first competing line between Stockholm and Oslo was established. This was the so-called Union Express which ran 8 return trips between Stockholm and Oslo every day with a travel time of 5 hours, which is quicker than SJ AB's intercity trains, which take 6 hours. The service had to be discontinued, however, on October 7, 2008 as the operator, Ofofbanen AS, lost

their licence to operate the service because of financial shortcomings.

On the Kustpilen line between Linköping and Västervik/Kalmar Veolia took over the service from SJ AB from the middle of June. The service between Linköping and Västervik was expanded with more departures so that there were 8 return trips every weekday, and the number were increased between Linköping and Kalmar. A further change to Kustpilen which however occurred in 2007 was that the service on the route Karlskrona–Kristianstad was restored after the track had been electrified.

During the autumn of 2008 several departures of Upptåget from Tierp to Gävle were extended, which at the other end connects with Uppsala, Arlanda and Upplands Väsby.

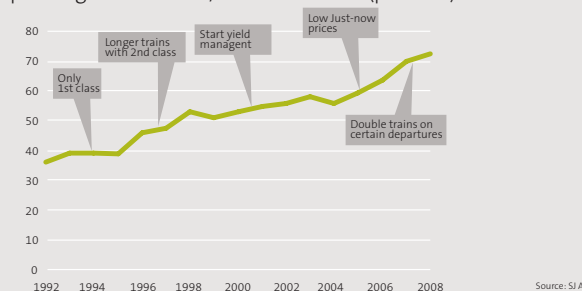
Together with other European rail companies a new inter-rail card was introduced which meant that sales in 2007 increased by 115 per cent compared with 2006, and that sales increased by a further 50 per cent by comparison between the years 2007 and 2008. Unlike the inter-rail card which was popular in the 1970s, the new card also applied to adults and for a period that could be chosen freely. As an alternative to the inter-rail card, opportunities for charter trips by rail were also introduced in 2008.

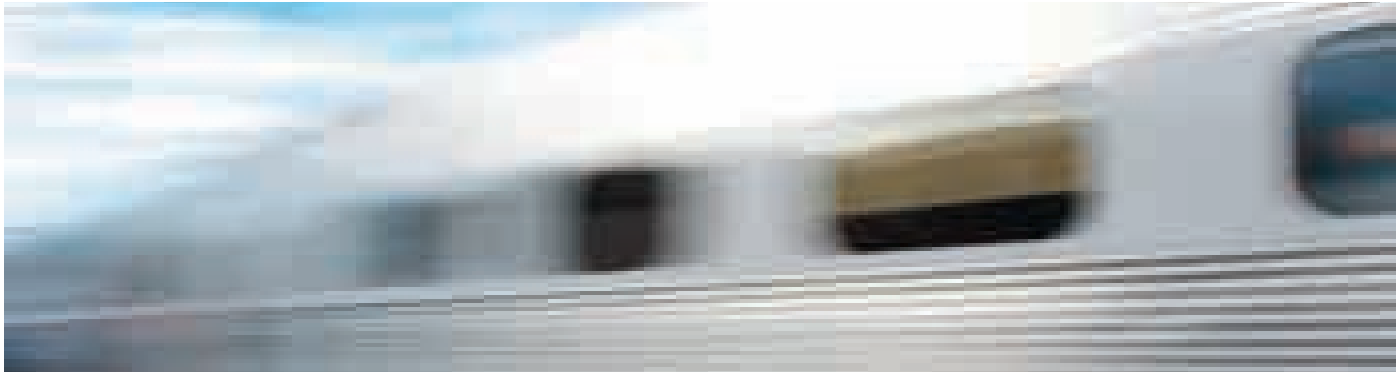
#### Long-distance mileage by bus and car

The long-distance mileage for bus traffic remained provisionally unchanged over the years 2006, 2007 and 2008. The service supplied was improved somewhat in certain respects at the same time as prices rose – among other things the number of international destinations was expanded at the same time as the bus fleet

» Overall the real price rises on SJ AB services in 2008 were relatively marginal. «

GRAPH 14  
X 2000 Occupancy 1991–2008, passenger-kilometers/Seat-kilometres (per cent)





was in part renewed. The bus service was favoured by the higher real price of petrol, primarily during the summer months. Long-distance buses are also favoured by the economic downturn, but disfavoured by the continued changes in supply and price for air and rail travel. The service was also inhibited by the two-week long bus strike which among other things had consequences for the service in Norrland.

Long-distance mileage for cars in 2008 amounted provisionally to 278 million passenger-kilometres, which is a reduction by 0.8 million passenger-kilometres compared with 2007, but an increase by 0.6 billion passenger-kilometres compared with 2006. The reduction is explained by, among other things, the fact that the real price of petrol rose by 4 per cent, at the same time as disposable income rose by only 2 per cent, which is why the price of petrol was regarded as higher in 2008 than in 2007. The price was regarded as even higher during the summer period, when mileage is at its maximum, as the price then was considerably higher than at the beginning of the year.

### SHORT-DISTANCE TRAVEL

Short-distance (regional and local) mileage in 2008 amounted provisionally to 97.4 billion passenger-kilometres, which are at the same level as in 2007, and the highest level ever, as well as an increase of 1.8 billion passenger-kilometres compared to 2006. The proportion of car and motorcycle journeys in 2008 amounted to 77 per cent. The proportion of public transport journeys amounted to 17 per cent. Pedestrian, cycle and moped traffic was responsible for the rest, that is to say 6 per cent, which is the same proportion as for 2006 and 2007.

The short-distance mileage for bus traffic increased in 2008 provisionally by 0.1 billion passenger-kilometres to 9.7

billion passenger-kilometres. The increase is explained by the fact that regional bus traffic has been expanded with express buses, but also by the greater bus traffic in conjunction with the introduction of a permanent congestion charge in Stockholm in August 2007, whereby a large number of bus lines acquired greater frequency of service. Short-distance bus travel in Stockholm was also favoured by the relatively comprehensive service with replacement buses in connection with renovations of parts of the underground, commuter train and local train network during the summer. It should also be noted in this regard that the majority of those buses added during the congestion charge trial in January to June 2006 were not taken out of service when the trial ended, and that a large part of the service has remained since the congestion charge has been made permanent.

The increase in short-distance bus services also results from the development in the Göteborg region and primarily in the Öresund region, where both the local and regional bus services expanded. This is explained by, amongst other things, a previously planned restructuring of public transport generally, whereby buses comprised an important part. The service would presumably have increased even more if it had not been for the two-week long bus strike which had major consequences for services in the Stockholm region.

The short-distance mileage for rail in 2008 amounted provisionally to 4.6 billion passenger-kilometres, which is the highest level ever and an increase by 0.4 billion passenger-kilometres compared to 2007, and by 1.2 billion passenger-kilometres compared with 2004. There has therefore, as in the case of inter-region regional services, been a major increase in regional rail traffic.

The increase in 2008 derives in large part from a very favourable development for the Öresund trains, which is explained by the integration of the Öresund region in recent years, in combination with an improved supply. From January the frequency of services increased so that a train departs every 10 minutes between Copenhagen and Svågertorp. Actions within the framework of Mobilisation Öresund, such as a lengthening of platforms, have also influenced developments. There has also been a significant increase in Western Sweden, where more and longer trains have been introduced and punctuality improved through Mobilisation Väst.

Several county companies have ordered new trains in 2008. Östgötatrafiken, Jönköpings läns trafik, Västtrafik and Norrtåg ordered Coradia trains type X61 from Alstom. These are the same type ordered by Skånetrafiken in 2007. Together with the new commuter trains in Stockholm, 150 units of type X60/X61 have been ordered for services in Sweden. Västtrafik has ordered Regina trains from Bombardier. Altogether a total of 100 units of this kind have been ordered.

Of the train companies' short-distance mileage, private operators were responsible for 26 per cent in 2008. The corresponding figure for 2007 was 16 per cent. The increase in the share of private operators can almost exclusively be explained by the fact that SJ AB lost the Stångådalsbanan line service to Veolia and the Pågatåg service to Arriva.

### LIGHT RAIL AND UNDERGROUND

The mileage for underground and light rail services in 2008 amounted provisionally to 2.3 billion passenger-kilometres, which is the highest level ever and an increase by 0.1 billion passenger-kilometres compared to 2007. Compared

to 2006, that is an increase of 0.2 billion passenger-kilometres. The increases can be seen both in light rail services and in underground services. As regards the underground, the increase is explained in part by the introduction of the permanent congestion charge. Underground services were also favoured by the introduction of night traffic at the weekends, but was disfavoured by the fact that parts of the net were replaced by bus services during the summer period. Light rail services in Stockholm were favoured somewhat by the two-week long bus strike. In this connection, it should also be mentioned that some of the bus traffic was replaced by ferry traffic.

The increase in light rail travel results above all from the developments in Göteborg, where, for example, several new units were brought into use during the year. In Norrköping two new light rail units were brought into use.

### THE COMPETITIVENESS OF RAIL – DEVELOPMENTS IN A LONG-TERM PERSPECTIVE

The developments of passenger services in the longer term perspective are apparent from Graph 15. During the period 1950 to 1970 private motoring expanded rapidly, whilst the supply of rail services declined excessively. During the first energy crisis in 1974, when for a short period there was petrol rationing, train services expanded rapidly. The next increase came with the second energy crisis in 1979, when low ticket prices were introduced on the trains. During the 1980s train travel declined somewhat, as a result of, for example, the expansion of air travel.

The 1990s began with a major reduction in travel in 1991 to 1992 as a result of VAT on travel. Subsequently there

was a continuous increase as a result of the development of new lines and new trains. The new lines came into operation successively and the supply was improved substantially, which meant that total travel in 1999 was greater than ever before. Services continued to increase until 2004, when total travel fell somewhat as a result of a reduced supply and greater competition from air. In 2005 travel began to increase once again and over the years 2006 to 2008 travel grew rapidly.

Graph 16 shows developments in travel by different types of train from 1990. The greatest increases have occurred for transport authorities' local and regional services and for SJ AB's express trains. These have partly replaced InterCity trains, which have sometimes been renamed regional trains, at the same time as new regional trains have appeared in, for example, the Mälars Valley. Services ordered by the National Public Transport Agency have remained at a relatively constant level, whilst services on county lines have increased

### What governs the choice of means of transport?

Interviews with train passengers show that the six most important factors in the attractiveness of train journeys are: short journey times, high frequency of service, direct connections without having to change, high standard of comfort, good service and low ticket prices. What is more, the train service has to be accessible. The distance to the nearest railway station should not be too great. The standard factors in combination with price often determine choice in the individual case, but they, of course, presuppose that the train is accessible for the intended journey. What follows below

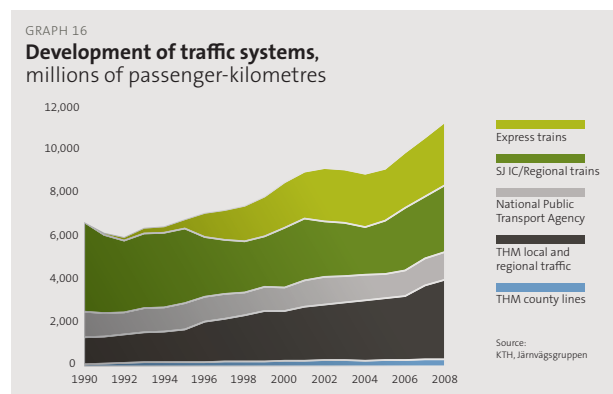
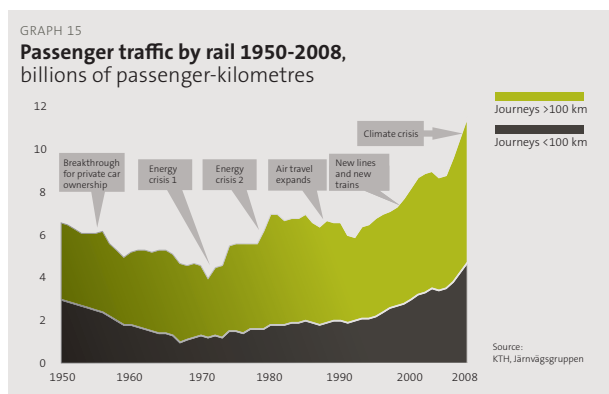
is a review of the most important factors in how they have developed over the period 1990–2008.

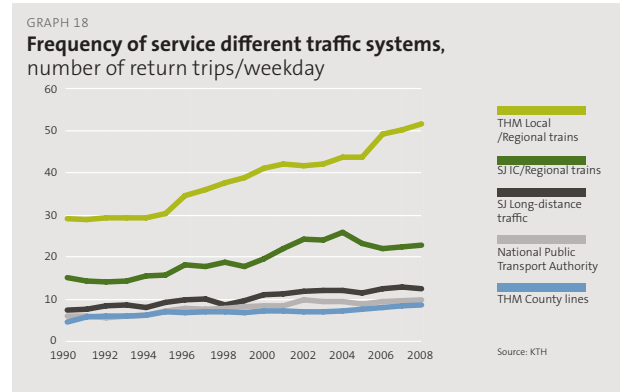
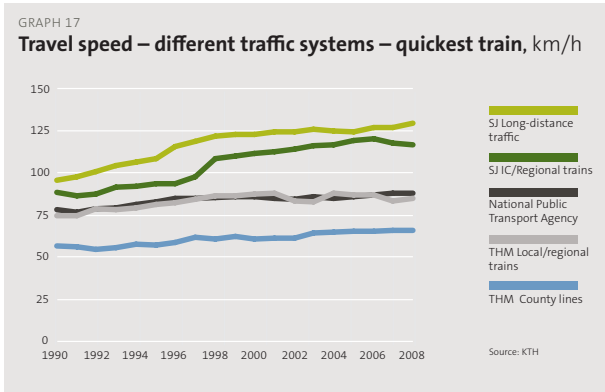
### Travel time

Travel time is the most fundamental factor both in generating new journeys and in the choice of means of transport. The means of transport which has the shortest travel time will also be the market leader, which means both lots of passengers and high income. When the railway was established in the 19th century, it was incomparably faster compared to horse and carriage or travel by sea. During the 20th century car and air travel arrived, which were quicker for many journeys, whereby the train was on the verge of being outcompeted. In recent decades the development has turned, and, through investments in additional lines and the development of new trains, rail has again become the most rapid means of transport in many contexts.

In essence it is the need to travel and the individual's time budget which governs travel. This means that there are threshold values where it is easier to travel often. For journeys to work, one hour's travel time is usually the standard for it to be possible with onward connections to have time to go back and forth to work. For business trips 3–4 hours' travel time is suitable, if one is to return within the day.

So-called travel time elasticity is usually around 1.0, which means that if travel time is reduced by 10 per cent then travel increases by 10 per cent. At the threshold values of approximately 1 and 3 hours' travel time the elasticity may be much higher, as the train begins to compete with air at 3 hours' travel time, and weekly commuting can become daily commuting at one hour's travel time.





Graph 17 shows travel speeds in kilometres per hour for different types of train from 1990 to 2008. The great increase that has occurred as a result of investment in infrastructure and fast trains, particularly for long-distance and regional trains, is clear from this.

#### Frequency of service

Frequency of service is important because it determines whether one can find a suitable departure which fits in with one's own timetable. A high frequency of service is more important in regional traffic than in long-distance traffic. In long-distance traffic it may be more important to find a suitable departure time, but that is facilitated by high-frequency. Competition is also significant – the car is the most flexible, as one can leave when one wishes, which at least over shorter distances requires high frequency of service if the train is to be an alternative. Air travel also has a frequency of service of one departure per hour in major contexts.

It is also important that the timetable is easy to remember, and then a periodic timetable is preferable. A periodic timetable is one where a train departs each hour the same number of minutes after the hour. This is particularly common in local and regional services, when you have 15 minute, 20 minutes or 30 minute services. SJ AB's X 2000 trains, which depart every hour or every other hour, have to a great

extent a periodic timetable, which is also necessary to maintain connections with regional trains at important junctions.

Frequency of services is assessed by the passenger as part of the travel time. Somewhat simplified, one can say that half the frequency equals the waiting time. This means that if one train departs every hour the average waiting time is 30 minutes. A periodic timetable is assessed as 10 to 20 per cent better than an irregular timetable. The higher value applies to regional traffic.

Graph 18 shows frequency of service for different train types from 1990 to 2008. The Graph also shows the major increase in frequency which has occurred primarily for local trains and regional trains.

#### Comfort and service

A high level of comfort and good service means that the journey is more enjoyable. One of the advantages of rail is that it is possible to work and rest on the train. The fundamental comfort factors are that you are seated comfortably, that the train runs quietly and steadily, and you can choose to be on your own or socialise with other people if you like. In addition to this, some form of refreshment service is desirable and necessary on journeys longer than approximately 2 hours.

All comfort and service has a value, but the value varies according to individual passengers and reasons for travel. A cup of coffee has a customer value of 5 per cent; a light meal approximately 10

per cent and a restaurant car approximately 15 per cent on a longer journey, all of which is measured in the readiness to pay in the ticket price. This may be turned into more passengers or higher income. On the other hand, some form of refreshment service may be a requirement or a means of competing on somewhat longer journeys.

Particular equipment such as an electric socket, internet connection, radio, TV, video or cinema on trains also has a customer value, but this varies a great deal depending on the passenger and how far they are travelling. Certain things such as an electric socket appear to be becoming standard, while other things come and go with technological development. Something like this is access to a mobile telephone on the train, which was a novelty when the X 2000 was introduced at the beginning of the 1990s, but which has now been replaced by mobile phone-free carriages.

A train with great comfort and service, such as the X 2000, is valued at approximately 25 per cent higher than a worse train without service. This means that, if you introduce an X 2000 instead of an old train without any particular service, you can raise the price by 25 per cent and earn more income. As the X 2000 is faster and acts as a brand, the effect may be even greater. Graph 19 shows examples of how customer value can be enhanced on a train.

» One of the advantages of rail is that it is possible to work and rest on the train. «

### Quality

By quality here is meant that you keep your promises. The most important quality factor for rail is punctuality. A lack of punctuality can cause passengers to abandon the train. Punctuality consists of several aspects: the probability that the train will arrive on time; average delay, and variations in punctuality. The requirements on punctuality are greater in regional and in long-distance traffic. If you travel by train to work every day, you do not have such large margins as if you travel now and then.

There is also a situation when punctuality becomes so poor that the passenger has to take an earlier train in order to risk not arriving late. There will also then be a "hidden waiting time", which means that the travel time sacrificed is much longer than normal. There is a clear connection between punctuality and the number of passengers, but there is a certain shift. The number of passengers falls only some time after punctuality has become bad.

A delay is perceived as if it were 3 to 4 times longer than normal travel time on the train. If 75 per cent of the trains are on time and the average delay for those trains that are late is 20 minutes, then this is perceived as at least one hour's extra travel time by those people affected. Even if the average delay spread over all the travellers is only five minutes, this is a big problem if there are major variations in delays, that is to say that one does not know what to expect.

### Price

For many private passengers lower ticket prices are the prime factor for their choosing the train. Other groups of passengers, for example those travelling on business, prioritise short travel times and high-frequency as well as a high level of comfort and service above lower ticket prices. People who are commuting by train to work come somewhere in the middle, for example, because they can often claim their journey to work against tax, which is why the net cost is often lower than the ticket price. Price is also an important competitive device both between means of transport and in competition between the same means of transport. Deregulation usually implies that new operators come in and force down prices, as this is a relatively simple action. Price can also be seen relative to other means of transport – when the petrol price goes up, more people choose the train.

So-called price elasticity usually lies in the long-term at around 1.0, which means that if the real price is raised by 10 per cent, the number all passengers will fall by 10 per cent. As a result, in the long-term nothing is gained from such a price rise. Which is why one usually tries to differentiate prices so that, for example one raises more for business passengers who are less price-sensitive, and less for private passengers.

SJ AB's pricing system which has now been applied for several years is an

example of flexible pricing, in which both prices and the number of seats to be sold vary for each departure up to the time of departure. The price of an X 2000 journey can vary from SEK 95 to SEK 1,500 depending on whether you book early on second class and do not want to be able to rebook, or if you book a fully flexible ticket late in first class. This means that you exploit the willingness of passengers to pay the maximum both upwards and downwards on the price scale.

Graph 20 shows the developments of the real price in SEK/10 km by different types of train between 1990 and 2008. The normal price for travelling by regional or intercity train has fallen somewhat, whilst the especially low prices on the X 2000 have fallen substantially. The ever-increasing price differentiation on X 2000 trains shows clearly. The price of a monthly season ticket with county services has increased the most, but was very low at the outset.

### Accessibility

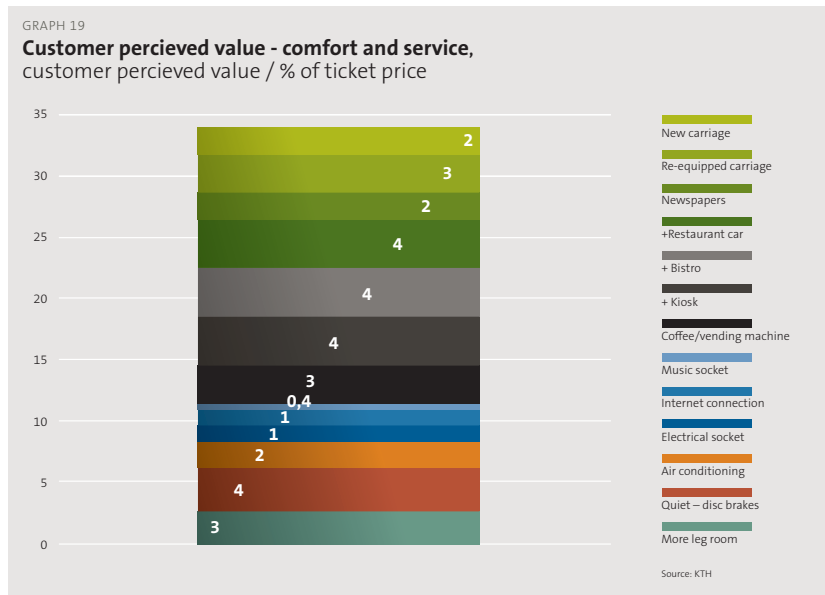
The train is accessible via stations, but it is also a question of finding suitable connections in the context in which people wish to travel. If one disregards walking and cycling over short stretches, the car is the means of transport which takes up most space and reaches almost everywhere at almost any time. Bus comes next, but is almost always slower than car. Air is the most rapid means of transport, but only reaches an endpoint market between two cities, and what is more has to have feeder transport at each end.

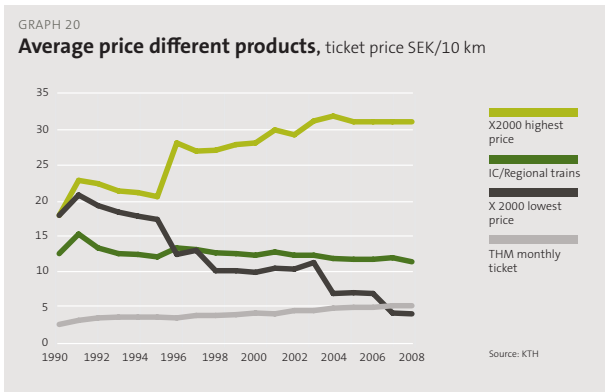
In practice train the comes after the car as the most accessible means of transport, at least on the interregional market, which also reflects the fact that it has the largest mileage and the largest market share after the car. In practice the supply varies from merely local or regional connections in small villages to interregional trains in larger towns.

There are upwards of 1,000 stations and halts, and approximately 75 per cent of Sweden's population live in urban areas with a passenger train service.

### Environment

Miljöfrågan har sannolikt fått verklig The environment issue has presumably gained real significance from 2006 onwards, as it is from that year it is difficult to explain the entire increase in rail traffic solely from supply and economic factors.





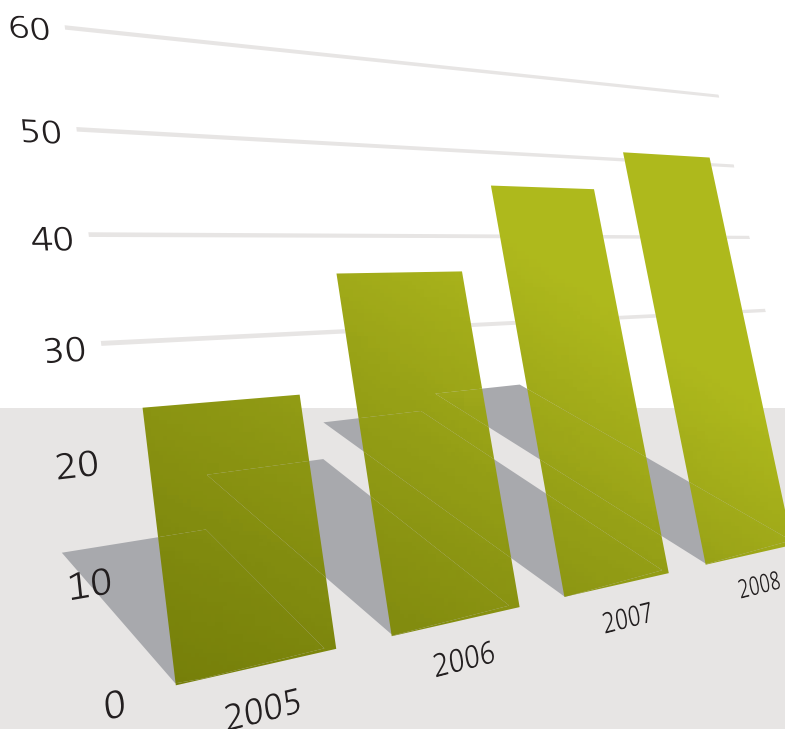
According to the SJ AB's onboard studies, the environment has grown in significance as a factor in the choice of means of transport. In 2005 24 per cent of passengers stated that the environment was significant. The proportion increased to 36 per cent by 2006 to 46 per cent by 2007 and 51 per cent by 2008. In this way it became the most important factor in the choice of means of transport during 2008. Several factors could be adduced, and environment was not the only argument for the choice of rail, but it is the major change which is interesting.

The Arlanda Express carried out a study among its passengers in 2008, primarily business passengers, about their travel and their views on the company's environmental policy. Almost half of

those questioned considered that the environment had grown in significance. This may be compared with 2007, when only a third thought this. In the study in 2008, 34 per cent also stated that they take the train often on business, and as regards private travel, 32 per cent stated that they have reduced their travel by car. Companies have also to a greater extent changed their travel policy in favour of the train.

Experience shows that it is difficult to change people's travel habits – people have got used to travelling in a certain way, and they do not take a fresh decision before each journey. As regards the car, the decision has often already been taken in that one has bought a car. Then it is a matter of something special happening

in order to reconsider one's choice, for example the fact that the price of petrol rises substantially, that new congestion charges are introduced, that a completely new rail line is opened or that the climate problem becomes so tangible that it affects a lot of people. More or less sudden changes of this kind can cause people to reconsider their travel habits and investigate alternatives. If the train then proves to be a competitive alternative, with short travel times, high-frequency, a high level of comfort and attractive prices, then the choice is a natural one. For this reason the increase is also greatest when the supply is best, as on the major X 2000 lines, even if we can see a general increase in all public transport. *Graph 21.* ■



GRAPH 21

Passengers giving the environment as primary reason for choosing rail, per cent





# Development of freight services in 2008

Efficient transport services are a precondition for business competitiveness. This chapter describes how freight services in Sweden developed in 2008. The chapter also provides a picture of real potential for freight services in the future.

## TOTAL MILEAGE IN SWEDEN

Total mileage in 2008 provisionally reached 100.5 billion tonne-kilometres, a reduction by 1.5 billion tonne-kilometres compared with 2007, but an increase by 1.8 billion tonne-kilometres compared with 2006. The reduction is related only to the last quarter of the year. If the increase for the first three quarters as had been maintained for the whole year, the level for 2008 would have been the highest ever.

The reduction should be regarded from the perspective of the rapid transition from an extreme international boom in the first nine months of the year to a recession in the last three months of the year. The transition was, however, not as sudden as it may seem, either in an international perspective or for Sweden. So even at the beginning of 2008 it was noticeable on Sweden's part that the rate of increase in production in both business and the public sector fell, at the same time as productivity was falling. It could also be seen that at the beginning of the year that the numbers of export orders coming in was dropping, which in its turn led to an immediate reduction in the increase in exports. As Sweden is an export-dependent country, and as exports generate a large transport mileage, the change had a major effect on the development of the transport sector.

As in the case of exports the rate of increase in imports was also reduced even at the beginning of 2008, which can be explained by a reduction in the rate of increase for input goods for the export industry, but primarily by a fall in the rate of increase of consumption. As an example one might mention that households' purchases of new cars dropped dramatically. It was also noticeable that reductions in industrial investments for the whole of 2008. An example of this is that investments in housing dropped by a good 5 per cent.

All of the above changes in Sweden can be traced back to international developments. This applies both to development in the first three quarters and to the last quarter. The factor triggering the transition from boom to depression was a financial crisis generated in the USA, deriving from a decline in the housing market, but also a fall in the raw materials market, which among other things lowered the price of crude oil. It should in this regard also be noted that even the so-called growth economies were hit by the recession, which among other factors for Sweden's part brought about a situation where the reduction of exports to the USA could not, as in earlier years, be compensated for by its exports of highly processed goods to China.

The last quarter of 2008 brought great changes to the transport sector. Thus the changes in the structure of production and consumption meant that the level of mileage fell, at the same time as there were changes in the structure as regards the distribution of forms of transport, the level of refining of freight and the flow structure. One factor which affected developments was that the value of the Swedish krona fell, which meant that it was cheaper to export, but more expensive to import.

Long-distance mileage, that is to say, rail and sea transports of more than 100 km, in 2008 provisionally reached 92.3 billion tonne-kilometres, which is a reduction by 1.3 billion tonne-kilometres compared with 2007, but an increase of 1.5 billion tonne-kilometres by comparison with 2006. As with total mileage, the level for 2008 would have been the highest ever if the increase in the first three quarters had been maintained throughout the year.



*Total long-distance freight transport mileage has declined this year, but rail has retained its market share.*

Short-distance mileage, that is to say truck transport of less than or equal to 100 km, in 2008 provisionally amounted to 8.2 billion tonne-kilometres, which is a reduction of 0.2 billion tonne-kilometres compared with 2007, but an increase of more 0.3 billion tonne-kilometres in 2006.

The decline is explained primarily by a fall-off in shipments for the forestry sector. The reduction would presumably have been even greater if the shipment of timber felled by the storm had not meant that a number of loading yards for onward transport by long-distance truck and rail had been retained. The level for sand and gravel shipments for the building industry, which makes up the major part of short-distance shipments, remained unchanged. This can be put in relation to the fact that a reduction in investment in the housing sector was balanced by an increase in road and track investment. Increasing road and track investment meant a greater number of sand, gravel and mineral shipments by rail.

Despite the fall in short-distance mileage for truck transport, an increase in short-distance truck shipments for the trade sector may be noted. This is explained by the increasing containerisation and streamlining of stores management, which has resulted in less stockpiling and the reduced size in shipments. This generated an increased number of distribution shipments of highly processed goods, but as shipments of "finished products" from stores to wholesalers and retailers..

## THE DEVELOPMENT OF FREIGHT BY RAIL IN 2008

Rail mileage in 2008 provisionally amounted to 23.3 billion tonne-kilometres, which is the same level as 2007 but an increase by 1.0 billion tonne-kilometres compared with 2006. The levels for rail freight in 2007 2008 are the highest ever, and can among other things can be put in relation to the fact that rail, as a positive consequence of the storm Gudrun developed new logistics solutions. These solutions in certain cases meant cooperation between companies and a number of rail companies. Certain of these transport production orders were retained and expanded after the shipment of storm-felled timber ceased. These flows have primarily been of timber, but shipments of other freight have also been carried.

For the shipments in most cases the same loading yards have been used as for the storm-felled timber, but new loading yards have also appeared. In connection with this, new flows have also been generated from companies other than those in the forest industry. Certain of these shipments have been so-called spot flows of a more temporary nature. Flows of this kind tend however in the longer term to be made permanent through traditional freight contracts.

Despite the fact that mileage was equally high in 2007 and 2008, relatively major differences at sector level may be noted. Shipments for the trade sector increased, which is primarily to be ascribed to highly processed goods and then to a great extent intermodal flows. In this context it should be noted that rail in 2008 also transported freight for trade in everyday commodities. A great part of the increase is explained by the growth of shuttle traffic to and from the Port of Göteborg. The development can be explained presumably by the fact that rail during the year to a greater extent than previously was responsible for distribution, main warehousing, terminals for reloading etc – to supplement shipments. For the pulp/paper sector an increase can also be noted, which is remarkable considering the number of paper mills had declined because of tough international competition. The increases can however be put in relation to pulp where the development in 2008 has been relatively favourable, but also to the fact that rail has raised its market share in connection with changes in forest industry shipments.

For ore transports, but primarily for the iron and steel sector, reductions may be noted, which can mainly be put down to the final quarter. The decline is explained by lower investments in connection with the shift from boom to recession which usually causes a decline in the consumption of steel. The decline can be put in relation to developments both in Sweden and internationally.

The market share of long-distance shipments by rail amounted to 25 per cent, which is the same level as for 2006 and 2007, but an increase of one percentage point compared with the years 1996 to 2005. If one discounts ore transports, which dropped by 0.6 billion tonne-kilometres to 4.6 billion tonne-kilometres, it may be noted that shipments within Sweden in comparison with 2007 dropped by 0.1 billion tonne-kilometres to 13.5 billion tonne-kilometres.

International shipments increased by 0.3 million tonne-kilometres by comparison with the years 2006 and 2007 and amounted to 5.3 billion tonne-kilometres. Exports increased by 0.3 million tonne-kilometres, transit by 0.1 million tonne-kilometres, whilst imports declined by 0.1 billion tonne-kilometres. Compared with 2004, exports declined however by 0.1 billion tonne-kilometres. Rail's share of export flows amounted, despite the increase, to only 8 per cent, which can be compared with the level in 1994 when it amounted to 15 per cent. In 14 years rail has therefore lost 7 percentage points, that is to say half a percentage point on average every year.

This circumstance may, however, change in that Green Cargo and Deutsche Bahn's freight company Railion have formed a joint production company for Scandinavia, Railion Scandinavia, with a base in Denmark. It already has 16 multi-system locomotives and immediately ordered 23 more multi-system locomotives so as to be able to run trains without changing locomotive directly from Hallsberg to Maschen in Hamburg. Multi-system locomotives began to be used in 2008. The private rail company, Hector Rail, which had already acquired several multisystem locomotives, began to run direct trains between Norrköping and the Ruhr in 2008.

The combination of an increase in exports and a reduction in imports had the negative aspect that the balance of exports and imports deteriorated, which is why the number of empty rail carriages travelling in a northerly direction increased. In reality the balance is even worse than appears from the relationship between the imported and exported amounts of freight, as flows also occur with empty wagons in a southerly direction. This problem

will, however, hopefully diminish in the future when the RIV agreement is replaced by the GCU agreement. This agreement will mean that wagons emptied of goods in Sweden for economic reasons will be filled with goods for return transports to the country of origin. This can also be expected to lead to greater cooperation between the rail companies.

The amount of freight transported by combined services in 2008 amounted provisionally to 78 million tonnes which was a fall of 0.2 billion tonnes compared with 2007. It was primarily the international combined services which were responsible for the fall. The figure is, however uncertain, as some flows initially reported as wagonload flows in reality proved to be combined flows. The level is presumably therefore somewhat higher than reported here. Seen from a five-year perspective combined shipments have increased by 38 per cent, and the development might be expected to continue, as the climate and environment issue has generated greater combined traffic.

In 2008 Green Cargo AB signed a transport agreement with SSAB regarding steel trains from Luleå–Borlänge and Borlänge–Oxelösund. The agreement runs for 10 years and comprises 4 million tonnes per annum. In connection with this agreement Green Cargo AB ordered 16 new TRAXX locomotives from Bombardier. CargoNet has also ordered 10 TRAXX locomotives, several of which were delivered in 2008.

#### MINOR OPERATORS CONTINUE TO WIN MARKET SHARE

It should be noted that in 2008 the deregulation of the main lines has meant that, apart from MTAB's ore shipments of 4.4 billion tonne-kilometres, 4.1 billion tonne-kilometres have also been moved by rail companies other than the Green Cargo AB group. This is an increase of 0.3 million tonne-kilometres compared with 2007 and an increase of 3.7 billion tonne-kilometres compared with 2004. As a result of this major increase, rail companies other than Green Cargo AB and MTAB were responsible for 18 per cent of rail mileage. This level can be compared with



2004, when rail companies were only responsible for 2 per cent of rail mileage.

In the years 2005 to 2008 there has, therefore, been a breakthrough for private rail companies. The new rail companies are represented in international flows, but primarily in flows within Sweden and in most sectors, as regards both low processed and highly processed goods. Despite the increase for the new rail companies, Green Cargo AB was in 2008 responsible for 63 per cent of rail mileage and is therefore a major actor in the transport market, which is also obvious from the fact that they were responsible for 15 per cent of long-distance transport mileage in Sweden.

### MILEAGE FOR DIFFERENT MODES OF TRANSPORT

Long-distance truck mileage in 2008 amounted provisionally to 34.9 billion tonne-kilometres, which but for 0.1 tonne-kilometres is the same level as for 2006 and 2007. As is the case with rail, differences may, however, be noted at sector level. Shipments for all sectors involving the forest, that is to say forestry, pulp/paper and wood products, increased by 0.2 million tonne-kilometres per sector in comparison with 2007. This, despite the economic downturn for wood products which meant over-filled stocks of wood products and reduced international demand, as well as those problems described above for the paper industry.

In the case of truck transport an increase in imports may also be noted, which improved the balance between imports and exports. The improved balance for truck presumably also contributed to a deterioration in the balance for rail, as the number of return flows from the continent fell.

The favourable development of imports is primarily a consequence of greater home consumption of highly processed goods, but the development is also explained by an increased import of input goods, which presumably favours truck. The relatively poor development of export flows would have been worse if shipments of highly processed goods had not increased. Lower exports for the traditional Swedish basic industries as a result

of developments in the final quarter of 2000 have had relatively marginal effect on truck, as these shipments normally favour rail and sea transport.

Imports would presumably have been even greater if Russia had not introduced export duties on pulp at the same time as they partially stopped exports for shipments by truck to terminals in Finland and from there by rail via Haparanda to Sweden. This last primarily affected rail however.

The restrictions on exports were carried out in order to acquire capital for raising the degree of refinement and thereby the income for Russia's export of sawn lumber. In that international prices for wood products declined dramatically, the increase in exports of wood products and the expected change in transport structure in Sweden were not forthcoming.

Truck has to a greater extent than rail been affected by changes in methods of selection in felling forests after the storm Gudrun in that forest is felled in relatively inaccessible places which were left untouched. This changes the scope and structure of shipments. The structure is also changed in that an increasing share of forest raw materials is shipped to energy companies instead of going on for reprocessing.

Sea mileage in 2008 provisionally amounted to 34.1 billion tonne-kilometres, which is a reduction by 0.2 billion tonne-kilometres compared with 2007, with an increase of 0.5 billion tonne-kilometres compared to 2006. The division into home and international movements by sea shows that international movements between 2007 and 2008 fell by 0.9 billion tonne-kilometres to 26.6 billion tonne-kilometres. Swedish movements fell in the corresponding period by 0.3 billion tonne-kilometres, which is primarily the result of the fall in the movement of scrap. The fall in international movements can then primarily be explained by sectors in which the forest is involved, which, unlike truck, has therefore declined. Differences in the development between sea and truck can of course be put in relation to the fact that sea, unlike truck, is influenced by the intercontinental market. In this context it might be pointed out that rail and sea have begun a cooperation to improve international flows via Swedish ports.

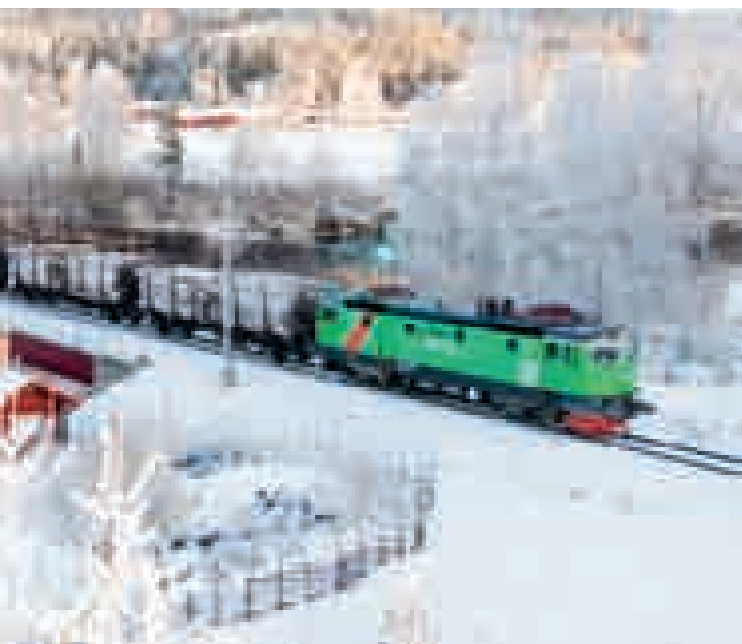
### POTENTIAL FOR RAIL FREIGHT TRANSPORT

#### What governs shipments?

The potential of rail for the extent of future freight transport has to be put in relation to the development of the entire freight market. For this reason it is possible to regard rail transport services as a discrete market. The freight market and, therefore, the potential for rail is affected like all other markets by both demand and supply factors. The demand factors are determined by the needs of business, which to a great extent is governed by the world outside, whilst the supply factors are primarily determined by transport policy decisions and the actors in the market.

Those demand factors influencing the freight market are:

- social development (balance of resources, supply of labour, occupational structure, productivity, population structure, energy balance and environmental and climatic conditions)
- business structure (internationalisation, increases in large-scale production, closure/merger of production units, specialisation, reprocessing)
- market structure (expansion and localisation)
- stock structure (stock size, central stores and demands on delivery dates).



Those supply factors influencing the freight market are:

- infrastructure (navigable waterways, ports, terminals, roads, railways, marshalling yards, the capillary net)
- operations (price structure, transport time, taxation and fees, transport technology, traffic systems, forms of organisation, deregulation and harmonisation).

The supply affects demand by defining the rules of the game for operating shipments and in this way the preconditions for demand, which in its turn through a choice of means of transport, route etc creates new preconditions for supply. There is therefore an interplay between supply and demand..

#### **Why has rail lost market share?**

In order to gain some understanding of the potential for rail freight, the historical development of the transport sector should be studied. It is clear then that rail has lost market share as a result of the rapid development of truck transport, at the same time as there have been problems in the rail sector. The expansion of truck transport is a result of the expansion of the road network in combination with the fact that heavier and longer vehicles have been permitted.

At the beginning of the 1990s the gross weight of trucks in Sweden increased from 51 to 60 tonnes, which means that the payload could increase from 31 to 40 tonnes, or by almost 30 per cent. Currently Sweden has, together with Finland, Europe's longest and heaviest trucks: 25+25 m and 60 tonnes. This may be compared with trucks on the continent where 18 m and 40 tonnes gross weight are common. The long and heavy trucks have meant lower transport costs for industry at the same time as rail has lost market share.

The rail industry has been wrestling with profitability problems and a lack of investment. Services have until recent years almost exclusively been run by state monopoly companies. An attempt has been made to rationalise by discontinuing services, primarily to small towns and customers. This has meant that the market has become increasingly restricted. An expansion of combined traffic has not been able to compensate for this, as trans-shipment still costs too much. It is, therefore, most often cheaper to drive a truck the entire distance.

This development resulted in a large proportion of the freight which was previously transported by rail in the years 1985 to 1999 being transferred to truck. It is, therefore, clear that a large portion of the freight which is currently moved by truck can be moved by rail. At the same time, it can be assumed that for rail almost all future freight will consist of freight previously transported by truck, which is a limitation resulting from the fact that major regular flows of freight are often needed in order for rail to appear as an alternative to truck transport.

#### **How big is the potential if rail recaptures lost freight?**

The potential for rail freight within the framework of the fact that rail will only carry "traditional rail freight" is relatively large. One might, therefore, note that if rail's share of mileage in 2006 were to reach the level of 1998 for those sectors where rail had declined, and at the same time retains the level rail has for the other sectors, then rail's mileage will increase by 20 per cent. If, on the basis of the 16 locations which have most truck freight the 10 locations which have a rail proportion lower than 20 per cent were to be singled out, and assuming that they achieved the level of 20 per cent, then the rail mileage would increase by 10 per cent. If instead of 10 locations the corresponding calculation for 25 locations were to be carried out, then rail mileage would increase by 15 per cent

#### **In what way does capacity govern rail potential?**

As regards the significance of capacity for rail freight, technological developments in rail should be noted, which have meant that the supply has been improved through higher speeds and weight per axle, as well as through the introduction of combined traffic, freight expresses and direct trains. In this context one might also mention actions for anticipated expansion of capacity in the future through:

- extending passing tracks on single track stretches
- passing stations on double track stretches
- expansion to double track
- expanding the load limit
- a further raising of axle loading
- longer trains





*More new rail companies can produce greater competition and the introduction of new products.*

A development of this kind raises the quality of supply and reduces transport costs. This applies primarily to customers with heavy traffic and with major and frequent flows. In other flows, where competition by truck is hard, these changes have less significance. At the same time one might mention the fact that truck services in a corresponding way have expanded through the expansion of the road network, in combination with longer and heavier vehicles being permitted and the fact that carriers have been able to offer a regular, high standard of service. This has created the preconditions for new markets and production systems for business, which has sometimes become dependent on the truck.

#### **What significance do new rail companies have for the potential of rail?**

The increase in the number of small rail companies might mean that supply increases and that the competition with the established companies will improve the quality of transport service. The administrative structure will, in all probability, continue to change and, though presumably not to the same extent as hitherto, even if it may be assumed that less bureaucracy is expected to be involved in the establishment and operation of new rail companies. This means that newly generated freight will also be shipped by the small rail companies and those like Green Cargo AB. Even if structural changes are expected to be minor, presumably the increased number of rail companies will improve the competitive situation vis-à-vis truck and sea.

An important precondition for the establishment of new railway companies, and then particularly from an international perspective, is that it is possible in practice to achieve a deregulated rail market in large parts of Europe. This would presumably mean a greater diversity of rail companies relatively quickly after its introduction, and thereby increased competition, with better service and lower prices. Experience shows that when the new companies are established, this also puts pressure on the old national companies which also become more efficient. The establishment of new rail companies will also lead to the

introduction of new products such as developed regular services with competing international and national lines and domestic small-scale combined services.

#### **What significance does containerisation have for the potential of rail?**

One factor which can both improve and weaken the potential for freight shipments by rail is an increase in containerisation. It can in the short term promote rail through a greater shuttle traffic, but in the long-term undermine the basis for wagon traffic. There are, however, many orders where there are logistical advantages in containers and the consequent increase in combined shipments. If wagonload traffic generally were to be discontinued, then the transport costs for business would increase substantially and the market share of rail would decline. As a combined train contains considerably less payload than a train consisting of wagons, it would require considerably more combined trains to ship the same volume, which is why capacity problems would arise.

A light combined system is a new traffic concept which may be able to meet the greater containerisation and in this way improve the potential for rail freight. It would also be an alternative to the truck. Light combined systems can be built with trains travelling in loops along different lines where loading and unloading occurs en route. At certain points it would be possible to change wagons between different loops so as, in this way, to cover a greater market with above all short-distance links, but even with longer distance links. Apart from flows between these centres, it would also be possible to generate feeder flows to the traditional combined service and possibly even to wagonload traffic.

#### **What significance does just-in-time have for the potential of rail?**

A further factor which may either improve or detract from the potential of freight transport by rail is that the just-in-time concept will be further expanded. An increase in reprocessing with an increasing number of specialised production plants will

lead to almost all of Europe providing the basis for the flows. A development of this kind should favour truck traffic, but the centralisation of stores which forms part of the just-in-time concept can also favour rail and sea. Parallel with the centralisation of stores there is also a relocation of stores from larger to smaller centres, which may however have a negative impact on rail.

It should in the context be noted that the just-in-time concept in recent years has not been ascribed as great a significance as previously. Considerable significance at an earlier date is explained by the fact that interest levels for some years were high, which meant that storage costs were high and companies for this reason wanted to get their logistics to operate without stores. In recent years interest levels have fallen, which is why small intermediate stores are becoming more common in order to compensate for delays in deliveries.

#### **What do changes in terminal structure imply for the potential of rail?**

If a small number of intermodal terminals were to be prioritised and subsidised according to the proposals of the intermodal terminal enquiry, this would lead to redistribution between wagonload traffic and combined traffic. Then the risk is of

weakening the potential for rail freight traffic. What is more, fewer terminals might create redistribution between terminals, which can lead to longer feeder transport distances. In practice this may mean that trucks will drive to a priority terminal and load there instead of going to a terminal nearby which is not prioritised. Fewer terminals also create longer distances between terminals.

#### **What factors might change the potential of rail for international transports?**

Changes in the conditions for international transports may improve the potential for rail freight. An important factor is then that it is possible in practice to achieve a deregulated rail market through most of Europe. It will also mean a greater diversity of rail companies, and in this way greater competition with better service and lower prices. Experience shows that, where new companies are established, this also puts pressure on the old national companies, which also become more streamlined.

Other factors of major importance for improving the potential of international rail transport are an improved collaboration between the rail companies and the introduction of international freight corridors. This would reduce waiting times at frontier



» *The duo locomotive is a locomotive that can be run on electricity both from aerial lines and from its own diesel motor.* «

crossings and provide better quality. A change of this kind would lead to a reduction in transport times to Southern Europe, in many cases of several days.

A further factor which would improve the potential of international rail transports is the introduction of harmonised track fees in Europe. In Germany, which is involved in most flows irrespective of starting point and endpoint, track fees are very high.

#### **What is implied by an increase in the number of industry sidings for the potential of rail?**

A return to a previous flow structure by increasing the number of industry sidings would improve the potential for rail freight in that the number of centres connected would increase. Apart from the fact that it would be possible to add a relatively large number of centres which were previously connected, it would also be possible to add a number of centres where it is possible with modest investments to have access to the railway. Those centres which might be added are those where there is at present no railway are where truck flows to/from the centre are very high.

One way of maintaining and increasing the number of industry sidings is to apply the so-called road traffic model to industry sidings, which Banverket has suggested. This means that contributions to investments and maintenance of industry sidings are allocated according to the same principle as for private roads. As for the roads, no special fees will be charged for traffic on the industry sidings, but these would be included in the general track fee.

#### **What effect would truck fees have on the potential for rail?**

One factor which, dependent upon its design in combination with other actions, may improve the potential of rail freight is the introduction of truck fees. The fees have the purpose of getting trucks to pay for those costs which they incur for society, but the fees can also be regarded as a method of financing roads and other infrastructure.

An assessment of 3 different levels for truck fees shows that a fee of 10 per cent reduces truck traffic by 4 per cent to 5 per cent and increases rail traffic by as much, at the same time as some freight is transferred to sea. If a fee of 20 per cent is charged and combined with an investment in the development of rail terminals and traffic systems, the effect becomes significant however.

#### **What opportunities for development are there in order to improve rail potential?**

If one wishes to see the potential for rail freight far into the future, it would be worth noting the opportunity of using duo locomotives, better freight wagons, IT technology for the intelligent goods wagon and management of shipments, terminal technology for combined transports, automatic couplers etc. Today diesel locomotives are often used for feeder transports and shunting by day and electric locomotives for long-distance

movements by night. The duo locomotive is a locomotive that can be run on electricity both from aerial lines and from its own diesel motor. All in all, fewer locomotives are needed if duo locomotives are used. With duo locomotives, an electrically operated freight train can enter an unelectrified track and collect waggons. In a corresponding way, a combined transport train with a duo locomotive can drive into an intermodal terminal. Because parts of the existing network do not need to be electrified, a duo locomotive could also provide savings on investments and maintenance.

The wagons can be made efficient by increasing the amount of freight per wagon. This can be done among other things by reducing the wagon's deadweight, by raising the permitted axle weight and the weight per metre and by changing the loading profile, which means that the volume loaded may increase. IT technology for the intelligent goods wagon provides, for example, an electro-pneumatic brake and automatic sensing of temperature and impacts, at the same time as it makes possible control of transports and the streamlining of turn-around of wagons, which would mean a higher utilisation of wagons and track.

New terminal technology for combined transports, for example through automatic horizontal transfer of unit loads, would increase the efficiency of terminals. Both trains and trucks would be able to reach the terminal independently of each other at all times of the day or night, which means that the traffic system could more easily be optimised.

The introduction of automatic couplers on all goods wagons and locomotives would facilitate shunting and marshalling and would also make possible longer trains. A modern automatic coupler could be remote-controlled and could also be equipped with couplers for air brakes and electronics, whereby the train could be shunted with a remote control by the locomotive driver or from a signalbox. In the long-term the introduction of the common European signalling system ERTMS may facilitate cross-border services.

#### **Why is rail no longer losing market share?**

By way of conclusion, it should be noted that to a certain extent destabilisation of rail's market share has already taken place, which it is possible to attribute to the fact that freight traffic by rail is at a turning point in which several factors act together. One might then mention the fact that:

- deregulation has meant that new flexible rail companies have been established
- the rail companies have become more efficient and are beginning to become profitable
- wagonload traffic has been made efficient through higher axle weights and volume
- the environment and climate issue has created a greater demand for rail services
- truck fees on the continent have favoured rail services. ■

Public transport should be accessible to everyone. The needs demands and attitudes of different social groups have to be taken into account when public transport is developed and designed. Physical accessibility is focused on, but accessibility also has to do with other factors, such as confidence and attitudes, usability as well as competition with the car. In this chapter a picture is provided of the move towards greater accessibility for all passenger groups in 2008.

*Fitness for purpose, accessibility and reliability are the keywords in the work of creating a public transport system which all passenger groups can employ.*





Public transport  
accessible to and  
usable by everyone



### ACCESSIBILITY BY CHILDREN AND YOUNG PEOPLE

Almost 2 million people in Sweden are children and young people, that is to say below the age of 18. This passenger group represents a third of all journeys on public transport. A high proportion of public transport journeys among children and young people result primarily from the fact they cannot use their own car.

Many children at compulsory school attend a school other than the one allocated to them by the municipality. Many have, what is more, two homes. The need for accessible public transport, among others when it is a question of frequency and the routes taken by public transport, is therefore particularly great in this passenger group.

In recent years the total number of journeys by all forms of transport (including pedestrian and cycle) has declined somewhat. Journeys by rail-based transport have, however, increased. Most journeys by rail-based transport are made by underground. Girls travel more often than boys by rail, light rail and underground.

At the same time as it is important to meet the mobility needs of children and young people it is necessary to take into account their lack of traffic maturity in planning and designing public transport and public transport plant.

#### Discounts and family tickets

All rail companies and county transport companies have discounts in different forms for children and young people. Children under 7 often travel free in the company of an adult. For children in their teens lower prices are often offered for tickets bought with cash and monthly season tickets. Family tickets, which mean that an adult can accompany one or several children who travel free, make it possible for families with children to use public transport to visit relatives and friends or to undertake leisure time activities at much reduced prices.

In SJ AB's service an adult can accompany one or two children under the age of 16 for the cost of a small booking fee. In Europe the general age limit for children in rail traffic is 4–11, but this varies from country to country. In Denmark 2 children fewer than

12 travels free together with an adult. In Germany children fewer than 15 travels free together with one parent or a grandparent.

#### Actions for greater access for children

Working towards a greater proportion of children and young people who can make use of the rail transport system is a question both of the physical adaptation of station areas and rolling stock and data collection on the needs and views of children and young people. The work of school information officers in informing of the risks involved in rail is also included.

Certain actions, such as the demolition of old railway property and the scrapping of level crossings near schools in order to reduce the physical barrier effects of railways, provide improvements more directly for children and young people than for other groups. A great deal of what is being done to improve access for people with disabilities also has positive effects for the access of children and young people to public transport system.

Among other physical actions taken in 2008 increasing the access for children one might mention the following: In Falkenberg bus connections directly to trains in the station area have been organised. On the Bohusbanan line new safety barriers and platform barriers have been introduced. Eight stations on the Nynäsbanan line have been given new lighting, new heated waiting areas and new station entrances. What is more, the fencing around stations has been improved. This work has been carried out in close collaboration between Banverket, Stockholm Public Transport, Haninge Municipality and Nynäshamn Municipality.

Among rebuilding actions which have taken place over a longer period one might mention Uppsala's new travel centre and the City Line in Stockholm. In Uppsala the current platform bridge is being replaced by a new passage beneath the railway connecting to platforms by stairs, lifts and escalators. On the City Line in the stations will be provided with barriers to prevent them from becoming play areas.

In order to create an accessible public transport system for children and young people, their knowledge, perceptions and needs have to be taken into account. It is also an objective in the national strategy for the implementation of the Convention on

the Rights of Children that children and young people should have the right to influence transport and social planning. In the present situation there is a great deal which can be improved as regards the work of the rail sector in listening to the views of children and young people.

In 2008 a business impact analysis was conducted, in which the views of children and young people were sought and analysed, in a rail enquiry for the Norrbotten line. In the so-called Kiruna project, Kiruna Municipality, LKAB, the National Road Administration and Vattenfall are conducting collaboration with the upper secondary school in Kiruna. The views of the upper secondary school pupils have been sought and are being taken into account in, among other things, planning the route of the new railway.

Actions to increase children's opportunities of making use of the rail transport system have also been taken by the National Road Administration and by municipalities. In order to access the entrances to the railway, that is to say stations and travel centres, children and young people use roads, footpaths and cycle paths. For this reason the actions taken by the National Road Administration and the municipalities to increase access and traffic safety for children and young people are important. It is, for example, a question of footpaths and cycle tracks and lowering speed limits at road crossings near to stations.

This year Banverket's school information officer has continued to inform school students about safety issues, but also about the advantages of rail. In 2008 12,400 children took part in Banverket's school information programme.

### Gender equality perspectives

Girls travel more often than boys by rail, light rail and underground. Girls also travel more by car and by school transport than boys. This knowledge can be used to analyse the travel habits of children and young people and their needs from a gender equality perspective. So far no such analysis has been carried out.



*A well functioning public transport system is necessary to be able to meet the mobility needs of young adults.*

### YOUNG ADULTS ON PUBLIC TRANSPORT

Young adults (18–26) comprise approximately 10 per cent of the population. Of these approximately 30 per cent live in the Stockholm, Göteborg or Malmö regions. More than 50 per cent in the group of young adults are students and 30 per cent live alone.

Young adults are very mobile. There are very few of them who do not travel at all on an average day. Young adults use public transport to a greater extent than all other passenger groups, and for example make long journeys by train. As regards journeys with their own cars, young adults have a very low proportion of the total number of journeys however. One reason is that many of them cannot afford to run a car. Another is that a large part of the passenger group live in metropolitan areas or larger student towns, where public transport is well developed and there is very little need to own a car. In the metropolitan areas as few as 15 per cent of 18 to 19-year-olds possess a driving licence.

### Utility and price sensitivity

For young adults adaptations of stations and rolling stock for greater physical accessibility to the transport system is not of decisive importance to their prospects of travelling on public transport. It is more important that they can make use of public transport for most of the journeys they make in their everyday lives.

In order for the mobility of young people not to be impaired, it is important that all kinds of public transport and all distances provide value for money. The young people's and student's discounts on season tickets offered by rail companies and transport authorities are one method of meeting their economic preconditions.

A greater regional expansion simplifies the mobility of young people. Many universities and colleges are spread across two or more centres. It has to be easy to travel between the centres. It must also be easy to get from a student's place of study to family and friends at home.

Actions for better commuting opportunities favour the passenger group young adults. Mobilisations in Malmö/Öresund, the Göteborg area and the Mälardalen area, and development in regional traffic with simplified journeys across county boundaries contribute to a greater fitness for purpose for young adults.

When young adults establish themselves on the labour market, increase their income and acquire a new family situation, there is greater scope and a greater need to own their own car. It is clear that travel on public transport drops markedly around 30 years of age. A challenge for the public transport sector is to try to retain this group in public transport. The more relevant young adults perceive public transport to be, the greater are the possibilities that they will continue to use public transport to a great extent even when they get older.

### THE WORKING POPULATION – A CHALLENGE FOR PUBLIC TRANSPORT

The passenger group working population comprises people employed in the age range 26 to 65, which is almost 4 million people. The working population is the passenger group which makes most journeys on all kinds of transport. It is also a group which makes great demands of rapid, punctual and value for money journeys.

Car use is very high among the working population. Of journeys to work, approximately half are made by a single person in a car. Leisure journeys are also primarily made by car. Men travel on their own by car to a much greater extent than women, whilst women more often use public transport to get to work.

The relevance of the car, that is to say that people agree with the assertion that they can use the car for most journeys, is very high. In a Kollektivtrafikbarometern survey conducted by Swedish Public Transport 81 per cent of the general public and 71 per cent of passengers are of this view.

### **Fundamental quality requirements and the competitive advantages of public transport**

From the viewpoint of people in work, public transport can have great competitive advantages vis-à-vis the car. It might be a question of not having to find a parking place, avoiding stress in driving one's own car or using the travel time for work or relaxation.

These competitive advantages acquire significance only when the fundamental quality requirement of reliability has been met. The requirements from those in work of arriving on time and in a short travel times, as well as the need to be able to rely on public transport, has to be met for the competitive advantages to be relevant.

### **A lack of quality costs time and money**

Increasing specialism in business with a centralisation of workplaces means more long-distance journeys to and from work, but also on business journeys. New business starts are generally more common in metropolitan areas and educational centres where there is a well-educated workforce. These factors make great demands on well-developed communication solutions.

Public transport that does not work costs time and money, both for the individual person at work and their employer. A survey from 2007 on X 2000 trains and regional trains on the route Stockholm–Norrköping showed that an estimated cost per hour's delay and person was approximately SEK 1,000. For business passengers the value is even higher.

## **PASSENGERS WITH DISABILITIES**

In Sweden approximately 1.3 million people between the ages of 16 and 84 have some form of permanent disability. It is primarily



a question of motor disability, hearing impairment, visual impairment, cognitive disability and asthma.

The car is of great significance to people with disabilities. 90 per cent of the distance covered is by car, either as driver or passenger. A great proportion of car travel is under the auspices of the Paratransit Service. Paratransit travel supplements public transport, but as paratransit transport has to be booked in advance, the opportunities for spontaneous travel diminish. One third of the paratransit travellers today state that they would rather travel on public transport than with the Paratransit Service if it were possible.

Those who find it most difficult to travel on public transport are primarily people with motor disabilities, people with cognitive disabilities, visually impaired people and those with several disabilities. Different disabilities create different demands on public transport. People with motor disabilities find it difficult, for example, to get to, on and off trains. Visually impaired people have a problem moving about the stations and between station buildings on platforms. Those groups who have the fewest problems with their journey as a whole are those with hearing impairment and asthmatics.

According to Kollektivtrafikbarometern 30 per cent of passengers consider that their opportunities of travelling on public transport have improved this year. For 2007 the corresponding figure was 29 per cent. 26 per cent (30) of passengers and 23 per cent (26) of the general public have noticed improvements for people with disabilities this last year

### **Functional disorder or disability?**

In 2007 the National Board of Health and Welfare 2007 made terminological changes. The changes mean that functional disorder and disability are no longer synonymous. What is more, the term handicap should no longer be used. A disability is a property associated with the individual, whilst a functional disorder is the result of factors in the environment. For example, a person with sight impairment can perceive a station platform as functionally disordered.

### **Action package for the priority network**

In 2008 Banverket began to remedy those stations defined in the priority public transport network as adapted to people with disabilities. The network, which comprises 150 stations, was defined together with the actors in the transport sector in 2007. The actions are being implemented in different stages, whereof the first runs out in 2011.

At stations indicated, co-ordinated and all-embracing so-called action packages are being implemented. This means that Banverket to varying extents is remedying lifts, stairs, ramps, handrails and tactile information signs (adapted for the visually impaired) on platforms and guidance routes to and from these.

In 2008 the action package was implemented at the stations in Hallsberg and Nässjö. Planning and design work has this year have been carried out at the stations in Skövde, Falköping, Herrljunga, Alvesta, Hässleholm and Katrineholm, for further work in 2009.

### **Constant improvements for improved accessibility**

Apart from the action package in the priority network constant improvements are being carried out in the rail system to improve access for people with disabilities.



*The adaptation of station areas for people with disabilities also has positive effects on accessibility for other passengers.*

People with disabilities are in great need of information before and during the journey, in order to be able to plan their journeys. Improvements in information systems are continuously ongoing. This is a question of dynamic information boards and screens, and speaker systems, clocks and fixed signs. In 2008 information systems have been updated at stations along the Nynäsbanan and Bohusbanan lines and the stations at Falkenberg, Grästorps, Örtofta, Åstorp, Torneträsk and Bastuträsk. New loudspeaker systems have been installed on the stations at Tierp, Gävle, Hudiksvall, Sundsvall, Ånge, Östersund, Falun, Ludvika and Sunne. Tactile signs and station plans have been installed at Hallsberg and Falkenberg stations.

Improvements aimed at increasing physical access are often, for example, a question of extending and improving lifts and ramps, guidance surfaces on and to platforms, windbreaks, benches and lighting. Actions of this kind have been carried out at a dozen or so stations this year. Platform heights have been adapted at several stations in Skåne, on the Bohusbanan and Nynäsbanan lines and in Sundsvall.

From July 1, 2008 a new EU directive applies with associated technical specifications (TSD) for people with disabilities. In this, for example, there are regulations on how platforms should be designed. Banverket's own advice and guidelines are, together with the EU rules, the basis for actions carried out at stations.

#### **Guides on stations**

An EU regulation about the rights and duties of rail passengers comes into force in December 2009. The regulation contains rules for, for example, protection and assistance of individuals

with disabilities. Requirements are also made for a guide service to be introduced at stations.

Guiding in the form of help in moving between meeting points on stations and carriages is often a precondition for people with disabilities to be able to travel by train. The regulations, together with experience from a project on guiding in the action programme Looking Ahead, provide the basis for developments of guide service on stations. The work, which is being carried out by Banverket and Jernhusen, started in 2008 and will continue in 2009. The aim is for the guide service to be available irrespective of which rail company the passenger chooses to travel with.

#### **Opportunities of achieving the objective by 2010**

In the government bill Modern Transport (2005/06:160) the current intermediate stage was formulated that public transport by 2010 should be accessible to people with disabilities. During the year two stations have been remedied completely, and a further number of stations have been partly remedied. Even with the delimitation implied by the priority network, and with the increased funding which Banverket has at its disposal the objective cannot be achieved before 2010.

Of those stations defined in the priority public transport network in 2008 two have been upgraded. At the rate actions are being carried out Banverket assesses that the objective will never be met. In Banverket's appropriation directions for 2009 the government has given a directive that before the end of 2010 Banverket will have taken action at 40 stations. Banverket assesses the chances of meeting the revised objective as good.

### Equal opportunities perspectives

Twice as many women as men have Paratransit Service permits. The more accessible public transport is, the less the need should be for the paratransit service. Otherwise equal opportunity cannot be measured by the methods and preconditions that we have today, as disabilities are not registered for journeys

### OLDER PEOPLE ON PUBLIC TRANSPORT

Approximately 1.5 million of the population are 65 years of age or older. The older population group will grow to 1.9 million by 2015 and to 2.3 million by 2030. Many people between 65 and 80 years of age have a driving licence and access to a car. About 500,000 are included in the group “elderly”, that is to say people over 80 years of age.

The car is the dominant means of transport both as regards the number of journeys and person-kilometres. In the older population group it is common that people will drive themselves. Among people over 85 years of age most are reduced to lifts from friends or some form of public transport, primarily the Paratransit Service.

Partly because of the relatively good access to cars, and partly because of the number of journeys tending to decline with increasing age, older people make very few journeys on rail-based services. The number of journeys by train has, however, risen somewhat in recent years. Women travel by rail-based transport more than men.

Older people make great demands on public transport being simple and secure to use. Older people who travel on public transport express the needs for more accessible information before their journey, a good pedestrian route to and from the station and good access to the station. It must not be complicated to travel on public transport. The more actual physical obstacles that exist, the lower will be the attractiveness of public transport.

### Actions for increasing accessibility for older people

After retirement age financial power usually declines. At the same time many older people today are very active and have a great need of mobility. Reasonably priced public transport is, therefore, an objective in order to attract older passengers. The rail companies and the transport authorities generally speaking have good discounts for older passengers. On Stockholm Public Transport services passengers of 65 and over may buy tickets at a reduced price. On SJ AB's services pensioners may buy last-minute tickets at a lower price. In the Göteborg area people aged 65 and over have free travel on public transport under certain conditions.

Physical actions carried out to improve accessibility for people with disabilities also simplify travel for older people. Better information through fixed information boards, traffic information on screens and new loudspeaker systems provide a better overview. New lifts and escalators facilitate movement between the station building and platforms. More attractive

environments on stations, on platforms, including more benches and heated wind breaks, increase security and comfort.

### ACTIONS TO INCREASE TRAVEL WITH A BICYCLE

An increase in combined travel by train and bicycle leads to a number of positive effects, such as an improvement in access in the city, greater sustainability on the transport system, new opportunities from tourism and greater competitiveness on the part of rail. In a good 10 per cent of all train journeys the bicycle forms part of the journey. Approximately 40 per cent of the population of Sweden live within 2 km of railway station. The greater part of the population of the country lives within 5 km of station. The potential for more people choosing to cycle instead of taking the car to the station should therefore be considerable.

The interest of passengers in combined journeys seems to be great. In the spring of 2008 Banverket conducted a survey into bicycles on trains among passengers on Tåg i Bergslagen. All of 92 per cent of those asked considered that it should be possible to take a bicycle on the train.

The opportunity for transporting bicycles on trains has improved successively since Banverket's first poll in 2005 – among other things because of Banverket's work in getting more operators to allow bicycles on trains – but there are still areas of the country where it is not possible. Sometimes it is possible to take a bicycle only on certain trains, sometimes merely in the summer months.

Many transport authorities allow passengers to take their bicycle on the train, if there is space and sometimes at a charge. In the metropolitan areas of Stockholm, Göteborg and Skåne the possibility of combined journeys with bicycle and train are relatively good.

During the year Banverket has also started a research project called “Bicycles on Trains”. In this project among other things the rules applying in different countries are compared. Holland, Denmark and Germany are leading countries where a great deal has been done to integrate the bicycle with other forms of transport, so that it is possible to combine public transport with the bicycle.

In the majority of the pilot studies conducted by Banverket linked to stations and points of interchange the question is addressed of who is to be responsible for financing, construction and operation of cycle parks. This work is being carried out in close collaboration with station administrators, municipalities and the National Road Administration. When the new travel centre is built in the cycling town of Uppsala the preconditions will be created for cycle parks.

In December 2009 EU regulations about the rights and duties of train passengers will come into force. There it is stated that the rail companies should make it possible for passengers to take a bicycle on the train if the bicycle is easy to manage, if it does not affect the service negatively, and if the carriages allow this. Where suitable a charge can be made. This regulation can be expected to influence the development towards increased opportunities for combining travel by bicycle and train. ■

» An increase in combined travel by train and bicycle leads to an improvement in access in the city, greater sustainability on the transport system. «




15:50 Regional

Spår  
11

Eskilstuna Arboga

Södertälje Syd Strängnäs  
Trevlig resa önskar SJ



A high level of reliability and reliable information is decisive for the passengers and for transport purchasers. Delays arising in the rail transport system affect a large number of people and constitute a problem for society at large. This chapter outlines the rail sector's work towards a higher quality of service in 2008.

# Quality of service for passengers and transport purchasers



### MOBILISATIONS FOR GREATER PUNCTUALITY

In order to improve punctuality in the metropolitan areas extra work is being done in the form of mobilisations in Stockholm–Mälardalen, the Göteborg and Öresund areas. Banverket, the rail companies and the transport authorities are working together to achieve greater punctuality for passengers and freight shipments. The focus is on actions which provide rapid benefits. Those actions so far taken have shown good results.

#### Mobilisation Stockholm–Mälardalen

In the autumn of 2007 Banverket, SJ AB and Stockholm Public Transport put forward a list of 44 actions which should be taken before the end of 2011. These projects affect the infrastructure, rolling stock, operator routines, traffic management, traffic information, and traffic planning. The objective is that the number of hours of delay to passengers should be halved from December 2006 to December 2011, from approximately 4.5 million hours per annum to 2.3 million hours.

For the rail infrastructure this mobilisation comprises greater preventative

maintenance, enhanced fault clearance in high priority areas and minor investment actions. During 2008 extra maintenance actions have been carried out on signals and points. Investments have been made in more passing stations and longer platforms in order to increase capacity. The investment in signals and longer platforms and points proved successful in 2008, with a reduction in the number of faults over a large part of the year.

SJ AB has this year invested further in preventative maintenance, so trains have not suffered damage during operation. The delivery of new commuter trains to Stockholm Public Transport this year means that services have become more reliable. Stockholm Public Transport staff have also been equipped with handheld computers with traffic information in real time so that staff can disseminate relevant information more rapidly.

The number of hours of delay declined from the first half-year of 2007 to the first half-year of 2008. In the latter part of 2008 a number of major delays occurred which had a negative effect on the outcome. Overall punctuality increased, however, for Stockholm Public Transport services in 2008 by 5.8 per cent.

Arrival punctuality for passenger trains to Stockholm was improved in 2008 by 0.3 per cent, from 92.3 per cent in 2007 to 92.6 per cent in 2008. *Graph 22, 23.*

#### Mobilisation Väst

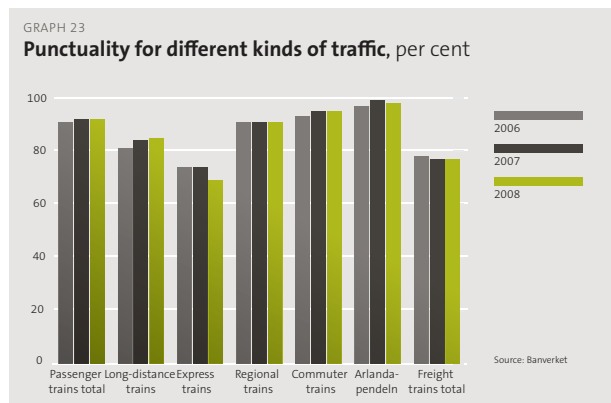
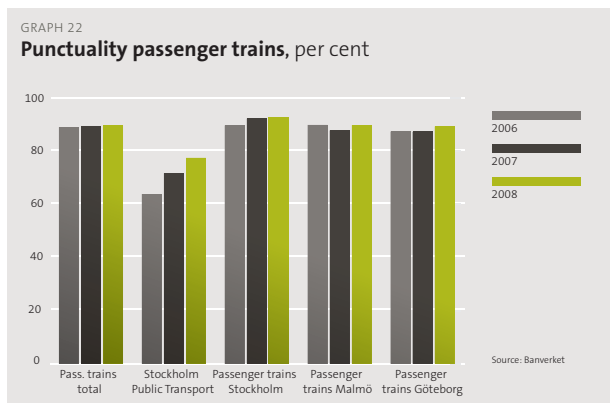
In the Göteborg area, Banverket, SJ AB, Veolia Transport, Västtrafik, Hallands- trafikken, Green Cargo, the Association of Swedish Train Operating Companies and the Port of Göteborg are collaborating to improve punctuality. The objective is to halve the number of delays over 3 years, from 2008 to 2010.

In 2008 a number of major and minor actions have been carried out. Among others, Banverket has invested in maintenance on the most heavily used lines and in track patrols who rapidly correct faults on the track. Banverket has, what is more, implemented actions on signals and points and increased the number of traffic information officers so as to improve the service to passengers. SJ AB has begun to close the doors 30 seconds before departure and has also put on courses in departure routines for staff.

The effect of the actions in 2008 was most clear in the commuter and regional trains run by Västtrafik. Arrival punctuality for passenger trains coming into Göteborg Central Station improved during the year by two percentage points, from 87.3 per cent in 2007 to 89.3 per cent in 2008. For long-distance passenger trains such as the X 2004 freight trains the projects have not yet produced the same results. *Graph 23.*

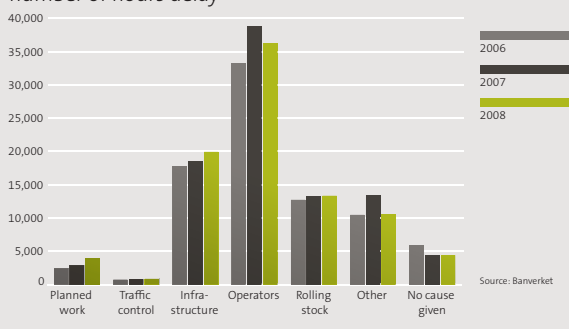
#### Mobilisation Öresund

In Mobilisation Öresund in June 2008 a decision was taken that the total number of train delays would be cut by 25 per cent by 2010, based on the 2007 outcome. Banverket, Green Cargo, SJ AB,



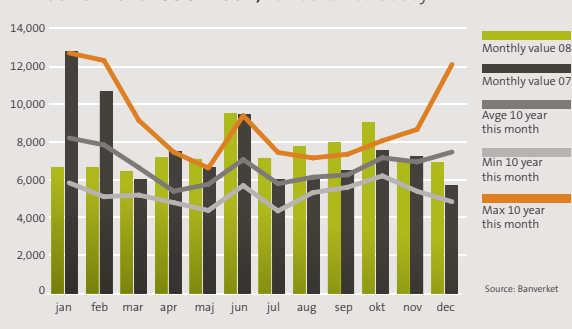
GRAPH 24

**Train delays by cause 2006–2008, number of hours delay**



GRAPH 25

**Train delays per month 2007 and 2008 and average, min. and max. 1998–2007, number of hours delay**



Skånetrafiken and the Association of Swedish Train Operating Companies are taking part in the work.

For this mobilisation the joint work in 2008 has focused on outlining the problem and, on the basis of this, producing proposals for actions which can quickly improve quality in train services. Banverket's physical actions in 2008 have been of an operating and maintenance type, such as reducing callout times for fault clearance/track patrols and changing engines and gearboxes in strategically selected sets of points. This together with the actions of the rail companies has meant that the total number of hours delay in 2008 fell by 15 per cent within the area of the Mobilisation Öresund. Arrival punctuality for passenger trains to Malmö was improved from 87.8 per cent in 2007 to 89.8 per cent in 2008. *Graph 22.*

### ARRIVAL PUNCTUALITY AND DELAYS IN 2008

Punctuality improved this year. The proportion of trains to arrive at their final destination with a delay of less than five minutes was 89.7 per cent, which is 0.2 per cent higher than in 2007. For passenger services punctuality was 91.7 per cent, which is 0.1 per cent higher than in 2007. For freight punctuality was 76.5 per cent, which is a drop of 0.4 per cent compared with 2007. *Graph 23.*

The punctuality of the light rail system in Göteborg was improved by 3 percentage points to 84 per cent compared with 2007. Signal priorities and the abolition of cash transactions improved are two reasons for the improved punctuality. On the underground punctuality improved in 2008. Punctuality was 94.1 per cent,

which is an increase of 1.4 per cent compared with 2007, and 3.1 per cent compared with 2006.

Total delays in rail traffic amounted in 2008 to 89,493 hours, which is 2.9 per cent lower than in 2007. Delays in freight traffic declined by 4,648 hours, whilst delays in passenger traffic increased by 1935 hours.

Reductions in delays for 2008 compared with 2007 are primarily the result of unusually low levels of delay in January and February. Between January and April delays were 27 per cent lower than for the corresponding period in 2007. In June and October the level of delay was, however, far higher than normal.

In June delays amounted to approximately 9,500 hours, which is the highest monthly value for the month of June in 10 years. During the first part of the month there was summer heatwave in southern and central Sweden. Because of the heat rail buckling and embankment fires occurred, which affected quality negatively.

In October the delays amounted to 9,019 hours, which is the highest monthly value for 10 years for this month. Some of the delays at the beginning of the month were the result of leaf slippage, primarily in central Norrland. High water levels also occurred between Sundsvall and Ånge, which caused lower speeds for services. At the weekend of week 43 a deep low pressure came in which brought with it strong winds and heavy rainfall. The result was fallen trees and high water levels, primarily around Göteborg. Faults in the overhead contact lines and power supply problems contributed to the large number of hours of delay. *Graph 24, 25.*

### INCREASED TRAFFIC MEANS A GREATER RISK OF DISRUPTION TO SERVICES

Capacity utilisation can be measured in how great a proportion of the time a train is occupying the line. This proportion depends on the number of trains, the types of trains, the performance of the train, the design of the traffic management system and whether the line consists of single or double track. The capacity utilisation is calculated partly for the day and partly for the 2-hour period when the track is most heavily utilised.

If the utilisation exceeds 80 per cent, the susceptibility to disruption is high, the average speed low and it is very difficult to find time to maintain the track. An utilisation of between 61 per cent and 80 per cent means that a balance has to be struck between the number of trains on the line and the service's demand for quality. The service is still sensitive to disruption and it is difficult to find time to maintain the track. For an average weekday 24 hour period in 2008 utilisation has exceeded 80 per cent and only a small number of sections of the line. For the two-hour period however a large number of sections of the line have an utilisation of more than 80 per cent. Serious shortage of capacity is to be found in the Metropolitan areas of Stockholm, Göteborg and Malmö, and for parts of the Bergslagsbanan, Norra stambanan, Ostkustbanan, Södra stambanan and Värmlandsbanan lines.

In 2007 Banverket carried out statistical analyses of the relationship between total traffic volume and the total number of delays arising in the rail system. These analyses show that an increase in traffic volume by one per cent results in an



*Actions within mobilisations in metropolitan areas have already produced results. The punctuality of Stockholm Public Transport services increased by 5.8% this year.*

equally great increase in the number of delays.

### **New priority criteria for efficient capacity management**

When the line is congested, it is important for it to be used to achieve the greatest possible benefit to society. Priority criteria are used to determine how Banverket should prioritise when there are conflicts of interest between different applications for space on the track.

The Rail Agency (now the Transport Agency) has criticised Banverket's priority criteria. They consider that the current priority criteria do not result in a socio-economically efficient use of the infrastructure. They also consider that Banverket should have a method for evaluating track work against train paths in allocating capacity on the track. Partly as result of this in 2008 Banverket initiated a project to revise and develop those priority criteria used in allocating capacity.

Apart from developed priority criteria, the whole management of priority issues is being reviewed. The project will also study whether fees can be employed as

a supplement to the administrative rules in allocation. Finally, the project will investigate whether, and in that case how, operative priority issues can be linked to the criteria.

New priority criteria will be included in Banverket's network description in 2011, which was published in December 2009. The new principles for privatisation will be used in the process of allocating capacity in 2011. Applications for train paths in this process will begin to be considered by Banverket in April 2010.

### **COLLABORATION ON X 2000 SERVICES**

The punctuality of X 2000 services was very poor for parts of 2008. For October punctuality fell below 60 per cent. Neglected infrastructure, congestion on the tracks and defective trains are the reasons for the poor result. In order to put this right a dialogue was initiated between SJ AB and Banverket and an action programme developed to improve punctuality. After the implementation of a large number of actions, punctuality improved in November and December.

Some examples of actions included in the action programme are:

- Banverket and the franchise holders have close contacts so as rapidly to be able to remedy faults in the plant.
- Works management centres contact the train driver if they suspect that X 2000 trains have problems.
- A co-worker from Banverket staffs SJ AB's national management. The aim is to improve communications between Banverket and SJ AB.

### **TREE SAFETY PROGRESSES**

A major reason why the quality of the rail system differs from year to year is the effects of the weather. Trees falling on the track because of snowfall or strong winds can cause major delays in service and comprehensive damage to the plant. Banverket is therefore running the project "Tree Safety on the Railway" in order to reduce the risk of train accidents and damage on the railway at the same time as improving train punctuality. Tree safety is partly about tree-free zones along the 4,500 km of strategically important line, and partly about individual trees posing a risk being removed along other lines.

TABLE 5

**Satisfied customer index for Banverket's traffic information 2006–2008**

	SCI 2006	SCI 2007	SCI 2008
Satisfaction with Banverket's channels	56	47	48
Satisfaction with clarity of information	71	50	52
Satisfaction with reliability of information	65	44	43
Overall satisfaction with traffic information	72	50	49
<b>Satisfaction index</b>	<b>66</b>	<b>48</b>	<b>48</b>

Tree safety has so far been carried out on approximately 1,000 km of railway, amongst others on the entire route from Stockholm–Malmö. The work is also complete on a large part of the strategically important freight route through Bergslagen. During 2008 the work on tree safety was being pursued at a faster rate than in the original plan. Approximately 500 km of railway have been secured during 2008. In 2009 1150 km of railway will be remedied. If the work continues at the same rate as at present, the project will be completed earlier than 2015, which was the original plan.

### SYSTEMS FOR INFORMATION, BOOKING AND TICKETING

Passengers' perceptions of the attractiveness and quality of public transport is greatly dependent on how simple it is to book and pay for a journey. In the Doubling Project, which is a continuation of Looking Ahead, there are two sub-projects which will produce systems for information, booking and ticketing.

The subprojects "Journey Planners and Competition-neutral Booking Systems" have the objective of developing travel planners to be marketed during the second quarter of 2007, and that the passenger will feel that it is simple to book and buy their journey, irrespective of who is selling their journey and what form of transport in question.

Today there is already a national travel planner including all kinds of transport. The idea is that it will be supplemented by more services, such as greater information for people with disabilities and information about the climatic impact of different forms of transport.

And as regards a common booking system, this is a question of further work on development on the part of Samtrafikens interface – a system which makes it possible for different booking systems to sell each other's tickets. It is also a question of the supply of the different combinations of means of transport and transport companies within Resplus. The intention is to integrate new booking systems in Samtrafikens interface as they appear on the market.

The subproject "Co-ordinated Payment Systems" has as its objective the creation of a co-ordinated payment system for the sales of local and regional public transport journeys. The payment system is based on smart contactless cards, that is to say a plastic card with a programmable chip, which has been launched as "Travel Card in Sweden". The card will be a carrier for both simple tickets and payment card and season tickets. The passenger will be able to fund their payment card with money in advance and can then at any time activate a valid ticket.

Through the new payment system it will be possible to use the card anywhere in the

country even if the different transport authorities and operators have different tariff systems. It will also be simpler for transport authorities and operators all using the same platform to cooperate.

### Passenger dissatisfaction with traffic information

In order to be able to follow how passengers perceive the traffic information provided by Banverket an annual satisfaction survey is conducted at selected stations. The results of the survey in 2008 show that only approximately half of passengers are satisfied with the traffic information as a whole. Women are generally more satisfied than men.

Those sources of information that receive high scores in this year's survey are, as before, platform signs and multi-train signs, where 7/10 is satisfied. The loudspeakers get the lowest point scores. Only 3/10 passengers are satisfied. Here we should mention that loudspeakers are a very common source of information. The open answers show a widespread dissatisfaction with how the loudspeakers function and are used. WAP, answerphones with information about delays, Banverket's home page and information hosts are to a large extent unknown channels of information for those people interviewed.

As in previous years, the information which is regarded as most reliable is that about which platform trains leave from and arrive at, whilst information about disruption and delays to service and new times in cases of delay are regarded as least reliable.

There are tendencies for those people who travel every day to give lower point scores as regards clarity about disruption, delays and departure times and about the reliability of departure and arrival times. Those people who travel for reasons other than work and study generally give higher point scores for questions about reliability and clarity of information. There are very slight trends showing that

» *The passenger will feel that it is simple to book and buy their journey, irrespective of who is selling their journey and what form of transport in question.* «

those people over 65 years of age give higher point scores.

This year's study continues to point to a clear dissatisfaction among passengers. The hypothesis for the poor result for 2007 was that the satisfaction with delays to a great extent was reflected in the results. In other words, it is assumed that passengers found it difficult to distinguish in their point scores for traffic information from how the journey was felt to have gone in other respects. In the 2008 survey an association analysis was carried out, which supports this assumption. The analysis shows that there is a clear correlation between general dissatisfaction and low point scores for information about delays and disruptions. It should be noted that the 2008 study was carried out in October, which was a month with very poor punctuality results.

In 2008 Banverket tested a new method of assessing passenger satisfaction with traffic information in parts of Western Sweden. By means of an internet survey passengers can provide feedback to Banverket on how traffic information is perceived and how the equipment for traffic information works. The trial has gone well, and Banverket intends to use the assessment method at several places in 2009.

### PASSENGERS' RIGHTS

The deregulation of the rail market in recent years has led to services which were previously provided by a single public actor now increasingly often being provided by competing parties, at both local, regional and national level.

The EU is working to strengthen passengers' rights and establish a basic level as regards the quality which should be provided irrespective of who is operating the service. In December 2009 an EU regulation about the rights and duties of rail passengers will come into force. The regulation contains among other things rules for passengers being given relevant information in different forms, that services for assistance and guiding should exist at stations, and that passengers hit by delays should be entitled to compensation.

Certain fundamental rules, amongst others about information, will apply throughout the EU when the regulation comes into force. On other rules about compensation member states can be granted dispensation. This applies for example to the rules about compensation.

For services in cities and suburban services as well as regional passenger traffic permanent exceptions may be granted.

On January 1, 2007 the law about information to passengers etc came into force. This law applies to all carriers in bus, rail, and underground and light rail traffic. The carrier has to have a system for paying compensation to passengers hit by delays or other disruption to services. The carrier has a general responsibility to provide clear and reliable information about these services and about their compensation system.

### Compensation for passengers hit by delays

The transport authorities and railway companies have compensation systems for passengers hit by delays and other

problems with their service. These systems are relatively similar in their design, particularly as regards the grounds for compensation and levels of compensation. It is normal in the transport authority services for a passenger to receive compensation for a journey by taxi or another carrier, if the passenger is or is felt to be at least 20 to 30 minutes late at their destination because of shortcomings in the commitment by the transport authority's carrier.

In rail company services it is normal for the passenger to receive compensation in the form of a voucher or cash at different levels dependent upon the length of delay in relation to the travel time according to the current timetable. Consequential costs are not compensated. ■



*With common systems for booking and payment it is easier to travel on public transport.*



# Safe traffic

Light rail services today show a very high level of safety for passengers and transport purchasers. This is the result of long-term and purposeful effort in which the system is constantly improved. Those fatalities and personal injuries which nevertheless occur are primarily the result of people trespassing on the track.

## **KILLED AND INJURED IN RAIL-BASED TRAFFIC**

It is unusual that passengers on trains, light rail or the underground die as a result of accidents. No passenger has in recent years died as result of derailment, collision or fire. There are, nevertheless, every year people in the light rail system who die, and some are seriously injured.

Most incidents involving fatalities and serious injuries are collisions with pedestrians and crossing accidents. These are two areas where the sector is working purposefully, but where results are difficult to influence in the short term. Those killed or injured have in most cases have been trespassing on the track, for example by taking an illegal shortcut across the

tracks, or have been playing in the vicinity of the tracks.

In 2008 24 (27) people were killed in the light rail system excluding suicides, and 28 (66) were seriously injured. The number of suicides was 75 (88). There is always a delay in police reporting of suicides. For this reason the figures for 2008 are still unreliable.

On the railway 18 (24) people were killed, excluding suicides, and 18 (21) were seriously injured. The number of suicides was 70 (81).

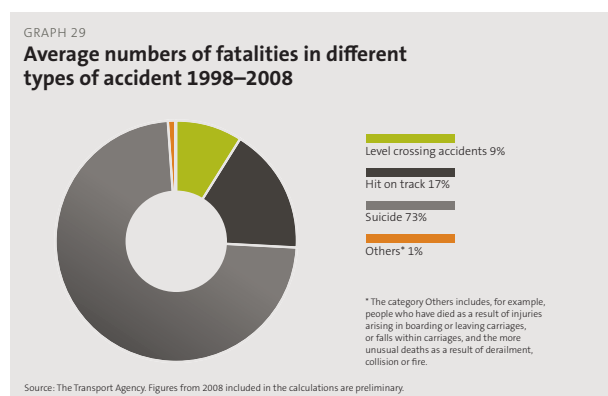
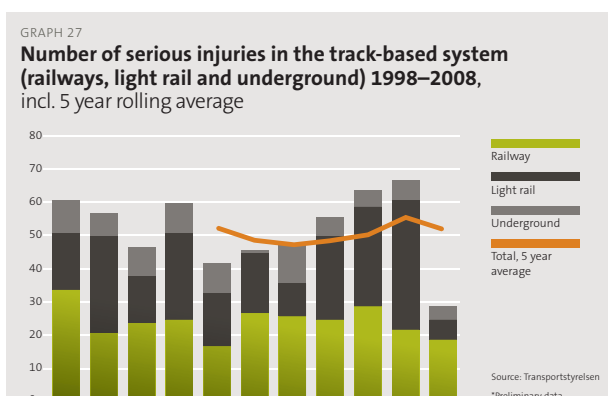
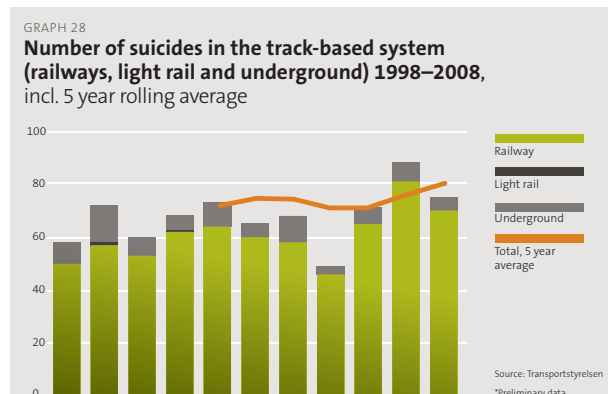
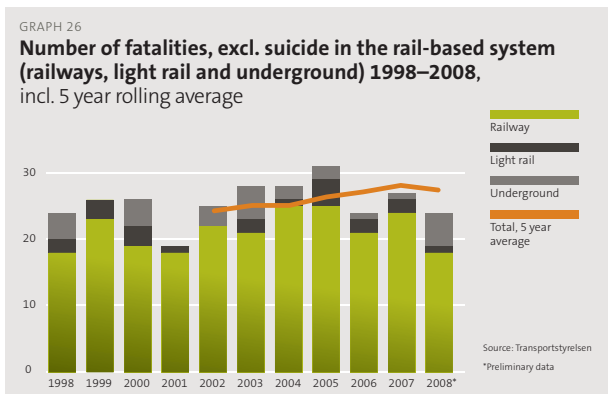
On light rail 1 (2) deaths occurred, and 6 (39) were seriously injured. No suicides occurred.

One explanation for the fact that the number of dead and seriously injured has

dropped in 2008 is the natural variation from year to year. Infrastructure administrators, rail companies and collaborative partners are carrying on a continuous work with physical measures in and around the infrastructure, such as greater protection from access and rebuilding level crossings, training staff in safety issues and the dissemination of information to the general public. *Graphs 26, 27 and 28 (all figures for 2008 are preliminary).*

## **Collisions on the track**

The greatest proportion of deaths occurring in the light rail system is of people who have chosen to take their own lives. Collisions often occur in or in the vicinity of urban centres, at places somewhat



obscured and where the surrounding environment does not provide sufficient obstacles to people reaching the tracks. Of the total number of dead in the rail transport system between 1998 and 2008, 73 per cent were suicides.

Accidents also occur in which people, for different reasons, find themselves on the track. This is primarily a question of people who are taking a short cut across the tracks to save a minute or two. A survey undertaken by Banverket in the Stockholm area shows that the greatest proportion trespassing on the track are people commuting to work. Of the total number of deaths in the period 1998 to 2008, 17 per cent were caused by trespassing on the track. *Graph 29.*

In 2008 15 people were killed and 18 seriously injured on the railway as a result of collisions. In the light rail system no one was killed, but 6 people were injured seriously. Corresponding data for the underground was 3 dead and 4 injured.

Collisions with pedestrians are a common type of accidents, and actions to increase safety on the track are therefore given high priority. Banverket prioritises actions aimed at greater prevention from

access to sidings, putting up fencing, clearing sightlines, putting up signs, the rebuilding of station areas and cooperative ventures with the rail companies.

Apart from these actions, the sector conducts continuous work with CCTV camera surveillance, security surveillance and patrols at sensitive points. In Lerum new cameras have been installed at the Aspedalen station and at several places in Malmö there has been a review of existing camera surveillance.

Information about the dangers of crossing the track is another important action. The survey shows that approximately 3/4 people are aware that it is illegal to be on the tracks. Information projects about trespassing on the track have been carried out at a number of places during the year, amongst others Kungsbacka, Sala and Uppsala. At the Vasa Run fair, which brought together 30,000 visitors, Banverket was represented under the slogan "A shortcut to save a minute can cost a lifetime".

In Norrköping the municipality has collaborated closely with Veolia Transport who run the light rail service. The rail network there is being improved in that

dangerous crossings and sections of track are being altered and removed. Rules and routines are continuously reviewed.

#### Level crossing accidents

Places where road and rail cross each other at the same level are called level crossings. Accidents at level crossings constitute a threat to train passenger safety. This is why the choice of level of protection level crossings is a very important one. What protection a level crossing should have is determined in part by the so-called traffic flow product (the number of road vehicles multiplied by the number of trains per average day in the year). Other factors affecting the choice are the maximum permissible speed of the train, visibility, disturbing traffic environments and the presence of heavy road vehicles. In 2008 48 level crossings were removed and protection was increased at 7 level crossings.

Considerable resources are invested in enhancing safety at level crossings with a poor road profile, that is to say crossings where long road vehicles risk grounding. In 2008 level crossings constituting a potential risk were identified. Approximately

» *ATC was installed at passenger sidings in Borlänge and Gävle in 2008.* «

2,200 level crossings have been listed. Through cooperation with Banverket, the Association of Road Haulage Companies and the National Road Administration, all of the reports coming in about dangerous level crossings have been analysed. In 2008 37 level crossings with poor road profiles were rebuilt and approximately 300 reports about providing level crossings with warning signs were submitted. A new standard for an acceptable road profile has been produced in order to ensure that level crossings have the same standards as roads in general.

In 2008 42 level crossing accidents took place in the rail system. Accidents also occurred in the light rail system. As trams share roads with other traffic, it happens that the collisions with pedestrians and other vehicles occur. Collisions on protected level crossings are unusual however. In 2008 no level crossing accidents occurred in light rail traffic.

In the accidents occurring in 2008 3 (8) eight people died and as many were seriously injured. In not a single one of the fatal accidents could any fault be proved in the rail plant.

For 2008 the number of level crossing accidents is somewhat higher compared with 2007. The number of accidents can be seen against the background of an increased mileage on rail. Measured as a five-year rolling average, development has, however, been unchanged between 2006 and 2008. Graph 30.

**ACCIDENTS WITH ROLLING STOCK IN RAIL-BASED TRAFFIC**

According to the Transport Agency's preliminary statistics for 2008 62 (41) so-called class one accidents occurred with rail rolling stock, that is to say incidents which are notifiable or which are suspected of resulting from safety-related system failures. The number of accidents of this type has increased. The trend for accidents with railway rolling stock is, according to a five-year average value, somewhat downwards. Measured as a five-year rolling average value this type of accident declined from 89 in 2007 to 79 in 2008. Graph 31.

Those rail accidents in which passengers risk being killed or seriously injured are primarily collisions and derailments. Even if these incidents are relatively rare, they can have very serious consequences. For this reason concerted actions are needed to further reduce risks.

**Actions for avoiding train collisions**

Banverket has continued to expand automatic train control (ATC) at those stations which do not have the system. The intention is to be able to equip two stations each year. ATC was installed at passenger sidings in Borlänge and Gävle in 2008.

ERTMS (European Rail Traffic Management System) is a joint management system for Europe. The aim is among other things to create the preconditions

for cross-border rail traffic. This year Banverket has been working on the safety rules for ERTMS.

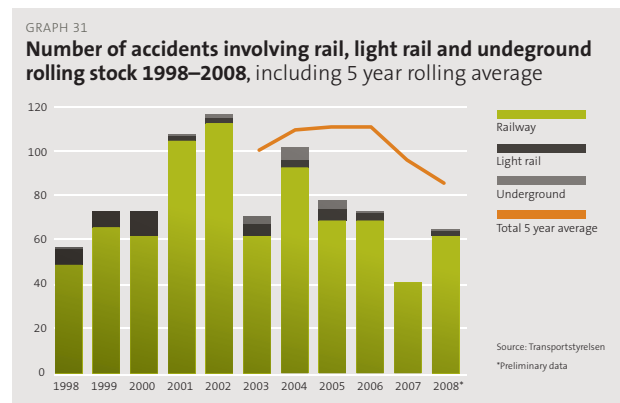
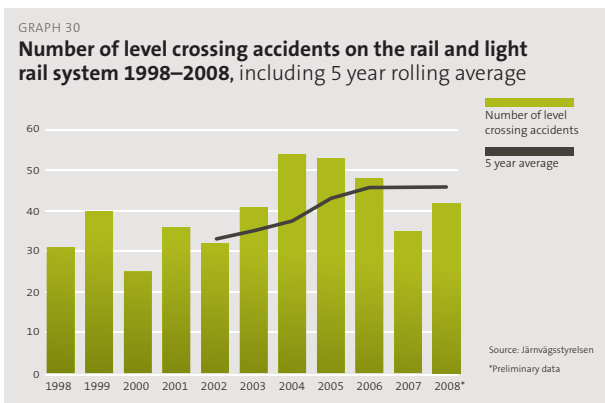
Etam (electronic train announcement) is a new IT support aimed at raising safety on stretches with manual train dispatch and contributing to a modern working environment and a more efficient documentation system for train dispatchers. Etam is expected to be in operation at the beginning of 2009.

**Actions for avoiding derailment**

Derailment can have catastrophic results, which is why it is most important that actions are taken to prevent these accidents. Banverket is working on a number of actions of this kind in order to further improve safety on the railway.

Rolling stock damage which might cause derailments can be discovered by using detectors. Quality assurance of components in detectors was carried out in 2008. Banverket has also focused on improving the functions of alarms, to give fewer false alarms. Collaboration with the railway companies has been extended to provide feedback and analysis of alarms that have been set off.

One cause of derailment may be buckling of the rails. This can arise in high temperatures, because the rails expand and become deformed. Nowadays buckling is normally prevented by the fact that the rails are so firmly fixed in ballast that they cannot move. In 2008 buckling





*Rail is a high-tech industry in which different IT support systems are central to the work on safety.*

has been found to be the cause of three derailments.

This year the project “Buckling – Actions 2008” was initiated, which has as its objective reducing the number of number of cases of buckling and reducing the risk of derailment. Examples of activities carried out are repairs to track and ballast, a revision of norms and documents as well as actions to raise quality in the reporting of buckling. Banverket has also raised awareness on the part of purchasers and installers and at the same time has reviewed training standards.

#### **Accidents with trams**

Light rail traffic is a public transport system in urban areas which has to share with other road traffic. This can lead to conflicts and accidents. The most common type of accident is a collision between a tram and a road vehicle. Collisions between two trams also occur. As the speeds are often low, personal injuries

rarely occur. The costs of material damage can however be significant.

According to the Transport Agency’s preliminary statistics for 2008, 2 (0) so-called class 1 accidents involving trams occurred.

#### **Accidents with underground trains**

The design and location of the underground system means that conflict situations with other forms of traffic rarely occur. The underground has very few accidents with trains. Most incidents are reported to have occurred at vehicle crossings. The Transport Agency’s preliminary statistics for 2008 show that 1 (0) reportable accidents with an underground train happened that year. The five-year rolling average for this type of accidents remains on 3 for 2008. Graph 31.

#### **SAFE RAIL SHIPMENTS OF DANGEROUS GOODS**

Rail shipments of dangerous goods have in 2008 continued to be made with a

very high degree of safety. No accidents involving dangerous goods have occurred this year, that is to say no discharge of chemicals or other dangerous substances in connection with rail rolling stock in motion, for example in a collision or derailment.

It happens that chemicals or other dangerous substances leak from wagons that are not moving. In 2008 6 undesirable incidents occurred in which dangerous substances leaked out. In 4 of these leakages the leak came from taps, valves or hatches which were not shut properly. One person suffered burns from hydrogen peroxide leaking from a tank where inspection hatches were not shut. On one occasion hydrochloric acid leaked from a wagon loaded with batteries, and on one occasion diesel leaked from a fuel tank on a multiple-unit train. These incidents are, however, considered to be deviations and not accidents or near accidents in the transport of dangerous goods. Discharge occurred because of material faults or faulty handling of the freight. In 5 cases there were dangerous goods in wagons which are involved in accidents, but no discharge occurred.

The Transport Agency – previously the National Railways Board – is the supervisory authority for shipments of dangerous goods by rail and each year checks 100-150 wagons intended for dangerous goods. That corresponds to 10 to 15 per cent of the total tank wagon park used in Sweden. In 2000 and 819 tests were carried out. In 16 cases shortcomings were discovered.

#### **THE SAFETY OF CHILDREN AND YOUNG PEOPLE**

The accident statistics for children and young people are quite low, which makes it difficult to see trends. This year provisionally 7 (9) children have been killed on the rail net administered by Banverket, of whom 4 (5) were found to be suicides. 1 (2) child was seriously injured. Collision, suicide and electrical accidents while climbing on trains are the dominant types of fatal accidents involving children and young people.

A number of information projects have been carried out during the year to reach the target group of children and young people. Examples of activities to be carried out are the production of information films, a safety week with school information and focusing on safety

*Continuous efforts to phase out and rebuild level crossings are decisive in order to improve safety in the rail transport system.*



information in schools. In total 12,400 students were given school information. At a school fair in Malmö 700 teachers received information from Banverket.

For the underground Stockholm Local Transport is working continuously on making travel safer. Major resources have been invested, among other things, in proactive information work in the county's schools, from the work with 6-year-olds up to the senior classes of compulsory school and upper secondary school level.

Information initiatives are important for influencing behaviour and attitudes. Surveys show that children and young people often possess an awareness of the risks, and sometimes find themselves on the track precisely because it is forbidden. The greatest opportunities of influencing behaviour are among the youngest children in the 1st to the 3rd class at school.

#### **NEW REGULATIONS FOR RAIL TRAFFIC SAFETY**

After years of preparation new unified traffic safety rules (the Swedish Rail Agency's traffic regulations, JTF) have been published. The rail industry with its

operators, entrepreneurs and infrastructure administrators, has been involved in the work of producing the rules. The traffic regulations have, therefore, been adapted to today's deregulated transport market, and the rules have also been adapted to international rules and international terminology. The new rules will apply from May 31, 2009 and will then replace today's safety regulations. The new rules mean that all of the actors concerned in the rail sector need to train their staff.

#### **RESEARCH INTO A SAFER RAIL TRANSPORT SYSTEM**

Banverket finances research in different areas whose common objective is to make the railway safer. One example is rail buckling – a phenomenon which can lead

to derailment. Chalmers University of Technology and SP in a research project financed by Banverket have studied lateral track stability. In the project they have worked with models to be able to predict the occurrence of buckling and have studied the possibility of better models for measuring stress-free temperature. As a result of this project in 2008 another research projects has been started in which they are studying the opportunity of measuring tensions in weldless track with the so-called resonance frequency method. This is a so-called non-destructive method of measurement.

Suicide is not merely a tragedy in itself, but also a problem for rail staff. Banverket is supporting a project at the University of Karlstad in which they

*» Sweden has higher safety standards in rail plant compared with many other European countries. «*



study the preventative measures which Banverket can take in order to get to grips with the problem. The project has provided greater knowledge of where, when and how suicide is committed. The project is also to come up with proposals for possible strategies for preventing rail-related suicides. To promote, introduce and evaluate the strategies is outside the project, which means that important future work of development is ongoing.

In the project "Evacuating Trains" the company MTO Psykologi in association with Brandskyddslaget has studied routines for the evacuation of passengers from stationary trains. Data has been gathered from passengers and trained staff. A number of rail companies have collaborated in the project, and representatives of, among others, rail companies, rolling stock manufacturers, the Rail Agency and National Rescue Services Agency have taken part in an expert panel. The project has resulted in information that may lead to safer and more efficient evacuation of trains.

Rail's production environment is a workplace with safety critical factors. Banverket has constantly to work to

ensure that routines and instructions are formulated so that staffs are not injured. Banverket has three research projects studying this from different perspectives.

"Taking Risks on the Railway" is a pilot study at the University of Linköping in its final phase. The pilot study treats the problems of, on the one hand, conscious risk-taking, for example in order to minimise traffic disruption in maintenance work, on the other unconscious risk-taking which is the result of ignorance or changed circumstances. Based on the conclusions of the pilot study Banverket can decide on the need for further research in this field.

In the project "Dialogues in the Service of Safety", also conducted at the University of Linköping, comparisons are made with how air travel works with safety-related communication. The aim is to suggest forms making safe communication between traffic controllers and train drivers or staff on the track, in order in this way to avoid near accidents and accidents. The project is in its initial phase, and its continuation will be discussed at the beginning of 2010.

The Karolinska Institute has initiated a project in which lifestyles are studied

for train drivers, train stewards and traffic controllers. The aim is to ascertain in what way better lifestyles, for example diet, physical exercise and sleep, may help improve their health situation and in this way safety on the rail system. The background of the project is that there is a great deal of ill health related to being overweight in the transport sector. Excess weight brings with it chronic illnesses such as diabetes and heart and vascular disease. Better health counteracts not merely time off for illness and early retirement on health grounds, but also leads to a greater ability to concentrate, to tolerate stress, and to general well-being. This in its turn affects traffic safety in a positive direction. Representatives from, among others, Banverket, SJ AB, Stockholmståg and Veolia are taking part. The study comprises a total of 3,876 participants.

For light rail traffic a research report about the "Methods for Reducing the Probability of Certain Types of Collisions in Light Rail Traffic" has been prepared. The project is being carried out in close collaboration between Göteborgs Spårvägar, Stockholm Public transport and Veolia Transport in Norrköping.

## INTERNATIONAL COMPARISONS

Sweden has higher safety standards in rail plant compared with many other European countries. For passenger collisions the average value in Europe is 0.55 incidents per million train-kilometres. For Sweden the figure is 0.2. Sweden comes far below the average value also when it is a question of suicide, rolling stock collisions and collisions with pedestrians on level crossings per million train kilometers.

## GENDER EQUALITY PERSPECTIVES

More men than women die in rail traffic. Where data about gender has been reported for deaths on the rail net administered by Banverket the distribution is that provisionally 20 (34) women and 47 (57) men have been killed. No more detailed analysis has, however, been carried out. ■

Development within the sector is regarded as being of great significance for opportunities of achieving several objectives of environmental policy. This applies particularly to *limited climate impact, a non-toxic environment and a rich flora and fauna*. Rail in relation to other forms of transport is relatively well environmentally adapted. For each transport movement transferred from other forms of transport, primarily roads, we come a step nearer to a long-term sustainable society.



# A healthy environment

## LIMITED CLIMATE IMPACT

The environmental quality objective of limited climatic impact means that Swedish emissions of greenhouse gases will, as an average for the period 2008 to 2010, be at least 4 per cent lower than the emissions in 1990.

The foremost contribution of rail to the national environmental objective lies in the increase of the market share of rail in total mileage, in that each transport transferred from other forms of transport contributes to less climatic impact overall. Rail is energy-efficient and causes very low emissions of greenhouse gases.

The emissions of carbon dioxide in total in Sweden in 2007 amounted to approximately 65 million tonnes of carbon dioxide equivalents. The statistics for 2008 are not yet available. The transport sector is responsible for approximately 1/3 of these emissions. Road traffic is responsible for approximately 85 per cent of the emissions of the transport sector. The emissions of carbon dioxide in Sweden have had a diminishing trend since 1996. However there is a continued increase in emissions from road traffic. Above all, heavy truck transports are growing in scale.

Emissions from the rail sector have been cut substantially during recent decades. In 2008 emissions from rail-based diesel services amounted to 65,400 tonnes, which is approximately 37,000 tonnes less than emissions in 1990 (102,900 tonnes). Emissions in 2008 were distributed as 49,700 tonnes for freight traffic and 15,700 tonnes for passenger traffic. Overall the emissions of the rail sector were only a very marginal part of the total emissions of the transport sector.

### Energy use in the rail sector

Energy use in the rail sector in 2008 amounted to 2.7 terawatt-hours. Electrical energy represents approximately 90 per

cent of total energy needs. The remainder is made up of fossil fuels, primarily petrol and diesel. The energy needs of the rail sector have been almost constant in recent years. In 2008 approximately 90 per cent of the energy was used for rail services and approximately 10 per cent for operation of the infrastructure. The use of fossil fuels in the Swedish rail sector is very low by comparison with many other countries.

The electrical energy bought in since 2003 comes solely from renewable energy sources. In 2008, 99.2 per cent came from hydroelectric power and 0.8 per cent from biofuels.

There are major differences between countries in Europe as regards the electrical energy used for rail traffic. This is, on the one hand, because of the actual energy assets of each country, on the other because of political direction and objectives. Norway and Switzerland have a similar electrical power supply to Sweden. In central European countries such as Germany, Hungary and the Czech Republic coal is used to a great extent.

In Poland almost 100 per cent of electrical energy comes from coal power. Gas is a major energy source in Finland, the UK and Italy. Nuclear power is responsible for much of the electricity in France. Another country with a great deal of nuclear power is Belgium. Oil is used to a very minor extent for rail traffic in Europe. Denmark is the country which has the greatest proportion of electrical energy from renewable sources other than water power, for example wind power.

### Energy efficiencies in the rail sector

In the rail sector surveys and actions are being carried out to make rolling stock and infrastructure more efficient. Through the installation of energy meters and the use of Drive Style Manager, energy consumption is being cut in both new and old rolling stock.

Banverket is improving its power management in order to avoid transferring power from northern Sweden to Stockholm, and reducing power losses in connection with transformation of electrical energy. Other ongoing projects are, for

TABLE 6  
Energy use per kilometre

	2006	2007	2008
Energy use for passenger services GWh	1 177	1 136	1 113
Passenger work in billions of passenger-km	9,6	10,4	11,0
Energy use kWh/passenger-km	0,12	0,11	0,10
Energy use for freight traffic GWh	1 232	1 265	1 329
Transport work in billions of gross tonne-km	22,3	23,3	23,3
Energy use, kWh/gross tonne-km	0,05	0,05	0,06

Source: Banverket

example, actions for improved management of heat from heat exchangers and a survey of the need for station lighting.

#### **Environmental and climate declaration for transports**

Together with Banverket, Botniabanan AB is running a development project to produce an environmental and climate declaration for rail infrastructure and rail transports according to ISO-standards 14025 and 14040. The environmental declaration will state the total environmental impact from both rail infrastructure and rail transports in a lifecycle perspective. In a climate declaration the climatic impact alone is stated. The information will be used for communicating with passengers, freight purchasers and decision-makers about the environmental impact of a certain shipment. A train ticket of the future would, for example, be able to contain information about the total carbon dioxide emission of the journey, where, apart from the service itself emissions from the infrastructure would be included

#### **SJ AB has Sweden's greenest brand**

In a survey carried out in the summer of 2008 about which brand is regarded as Sweden's greenest, SJ AB came out top in the category journeys. SJ AB was also the company that had the highest average value overall among Sweden's biggest brands.

#### **A HEALTHY URBAN ENVIRONMENT – SUB-OBJECTIVE NOISE**

The sub-objective for noise within the environmental quality objective of a healthy urban environments and at

the same time the intermediate stage in transport policy, that noise disturbance above the guidelines as regards maximum noise levels should have been cut by 5 per cent between 1998 and 2010, has already been met by some margin within the rail sector. With developments in service today, the objective will, however, presumably not be met for equivalent noise levels

#### **Action programmes 2009–2013 according to the regulations on environmental noise**

Since 2002 there has been an EU directive on the assessment and management of environmental noise. By environmental noise is meant noise from roads, rail, airports and industrial activity. The requirements of the directive have been incorporated in the regulations (2004:675) about environmental noise. In the regulations there are requirements that the Road Administration, Banverket, the Civil Aviation Administration and municipalities with more than 100,000 inhabitants should survey noise and establish an action programme. In December Banverket decided on an action programme according to the regulations for stretches of line with more than 60,000 vehicle movements per year. The action programme, which applies to the period 2009 to 2013, has been limited so as mainly to refer to overarching and strategic actions over which Banverket has control. The programme contains, on the one hand, protective measures in the housing areas most subject to noise, on the other, actions to reduce noise at source and actions in connection with physical planning on railways and/or

other building development.

Actions to reduce noise at source may, for example, be special track polishing projects, rail lubrication for rail dampers on stretches of line in densely populated areas where these projects provide a noise reducing effect for many people.

In the construction of new railways or the building of new homes Banverket always strives to achieve the guideline values and long-term goals for noise established by Parliament. This level of ambition is considerably higher compared with actions according to intermediate stages 1 and 2, which comprise existing rail lines and housing areas.

#### **Actions in the infrastructure and existing environment in 2008**

Actions to protect against noise are being taken in connection with new builds and major rebuilding of rail lines. The follow-up for 2008 shows that actions have only been taken in the case of approximately 20 dwellings in those investment objects which Banverket has completed during the year. Actions have, however, been taken in considerably more dwellings, but then in the case of investment objects which have not yet been completed. This applies, for example, to the City Tunnel, City Line and Ådalsbanan projects.

Banverket has remedied facades on approximately 80 dwellings this year, with the aim of securing intermediate stage 1 of a maximum of 55 dBA L<sub>max</sub> indoors at night in bedrooms. Banverket has also initiated actions according to intermediate stage 2 of protective measures in residential areas, above 70 dBA Leq24h, and protective measures in care institutions, child care

» *The emissions of carbon dioxide in Sweden have had a diminishing trend since 1996.* «





*The Swedish rail sector uses a very small proportion of fossil fuels in comparison with many other countries in Europe.*

centres and schools with high maximum noise levels indoors, 55 dBA L<sub>max</sub>. Most protection actions have in 2008 being carried out in the outdoor environments of 15 dwellings, and in 15 schools and other buildings.

Within the framework for the aim to prioritize those most seriously affected by noise, as in the period from 1998 to 2008 remedied 22,300 apartments. According to assessments from 1998, at that time 410,000 people were exposed to high maximum sound levels, above 45 dBA L<sub>max</sub> indoors at night, and 337,000 people to high equivalent sound levels, more than 30 dBA Leq24h indoors. Rail mileage has increased substantially in recent years. The increased mileage means that the equivalent noise levels along the route way in general have increased. Taking as a basis the increase in traffic and those noise protection measures so far carried out, Banverket assesses that in 2008 390,000 people were exposed to levels above 45 dBA L<sub>max</sub> indoors at night, and 350,000 people to levels above 30 dBA Leq24h indoors. This means that, compared with 1998, more people were exposed to equivalent noise levels above

the long-term guide values. The number of people exposed to maximum noise levels higher than the guide value indoors has, however, declined by more than 5 per cent since 1998.

#### **The EU commission prioritizes actions on noise on the railway**

The EU has established requirements for maximum permissible noise levels from new rolling stock. The requirements are defined in the technical specifications for interoperability according to 96/48/EG for high-speed trains, and directive 2001/16/EG for conventional trains. The requirements for conventional trains began to be applied in June 2006 and will mean quieter trains in the future. When all rail rolling stock is replaced, noise levels from each individual train passing will decline by up to 8–10 dBA compared to current levels. A reduction in the noise level 8–10 dBA corresponds experientially to a 50 per cent cut in noise level.

The greatest problem is the existing vehicle fleet and its operating life. Rolling stock approved for service before June

2006 is covered by EU requirements only in the case of rebuilds requiring a new approval by the Swedish Transport Agency. Bearing in mind that rail rolling stock has a long life, it is necessary to take action as regards existing stock, particularly freight wagons, in order to achieve a considerable reduction in noise levels within a reasonable time.

At European level it has been considered very important to establish an exchange programme for brake systems on the existing freight wagon stock. The international rail union, UIC, has identified a change in brake shoes of freight wagons is one of the most cost-efficient actions to reduce noise from the rail sector. Only the scrapping of old wagons and the introduction of new wagons which are 10 dBA quieter, would, it is felt, lead to a reduction in equivalent noise levels by on average approximately 3 dBA over 20 years.

The EU Commission put forward a package of measures in July 2008 for greener transport. Included in the package is a notification of actions to reduce rail noise in existing rolling stock. In this

» In 2008 Green Cargo continued to test new brake shoes on existing freight wagons. «

notification the Commission proposes, among other things, that differentiated track fees based on the noise emitted by rolling stock should be introduced across Europe. The Swedish government has said that they in general accept the Commission's notification and that they support the idea that track fees be used as a financial incentive, with the aim of helping reduce the noise disturbance to which rail traffic subjects people

#### **Actions on rolling stock**

New passenger trains generally have a lower noise level, even though they were purchased before 2007. New commuter trains of the X60 type generally have at least 3–4 dBA and up to 8 dBA lower noise levels than older types of train (X1 and X10).

In order to bring about a change to quieter brake shoes on freight wagons, it is important for the rail companies to take part in tests of new brake shoes. In 2008 Green Cargo continued to test new brake shoes on existing freight wagons. In the autumn of 2008 major tests began on so-called LL shoes on complete trains in "Stålpendeln" between Luleå and Borlänge. The freight wagons in the two trains have been equipped with two different types of LL shoes. Lifecycle analyses of wear and cost will be conducted. Noise assessments are also planned for the tests. On the supposition that the track is in good condition, actions on new brake shoes may be expected to lead to a reduction in noise by up to 8–10 dBA.

#### **A NON-TOXIC ENVIRONMENT**

In connection with new builds and operations and maintenance of the rail net different materials and chemical products are used which might impact the environment. It is, therefore, important to do preventative work by choosing materials and chemical products with as little environmental impact as possible. The Environmental Objectives Council states in its latest evaluation that the environmental quality objective of a non-toxic environment is an objective that is difficult or impossible to reach before 2020, even if further actions are taken. This applies to society as a whole and not merely to the rail sector.

#### **Banverket and the National Road Administration are developing joint chemicals inspection**

In 2008 Banverket and the national Road administration have been working on a project to develop joint requirements and criteria for inspecting chemical products, and a new routine for chemical inspection. The new routine will come into force on May 1, 2009. The project is a stage in the work conducted by Banverket and the National Road administration in meeting the sub-objective of reducing risks or phasing out particularly dangerous substances, which is part of the objective of a non-toxic environment.

The objective is to achieve a working environment, environmental and quality-assured handling of chemicals, and short inspection times. The inspection criteria will be harmonized with the EU's new chemical legislation, REACH, as well as BASTA, the tool used by the building trade for phasing out especially dangerous substances.

Joint requirements for Banverket and the National Road Administration seek greater clarity vis-à-vis entrepreneurs and other people working with chemical products. This will also lead to a more efficient handling and greater scope for real action in the work of reducing risk and phasing out particularly dangerous substances in the construction sector.





*The railway is an important habitat for many threatened species. By adapting the maintenance of railway areas to the needs of such species, the rail sector is helping to check the loss of biodiversity.*

### **Actions for chemical control**

In 2008 Banverket has inspected approximately 1500 products, which is an increase of 20 per cent compared with the previous year. The use of chemical products follows to a great extent the rise and fall in investments and maintenance. The substantial investments in rail infrastructure in the year lead to a greater number of products inspected.

The dominant product groups are lubricants, paints and surface preparation products and cleaning agents. The proportion of products approved, that is to say with less environmental impact, has increased over a three-year period. This is in line with Banverket's ambition to replace dangerous products with those which have a lower environmental impact

### **Polluted areas**

Banverket is working in the long term to reduce the number of polluted areas which risk resulting in injury or nuisance to people's health or the environment. This is being carried out in accordance with the environmental quality objective of a non-toxic environment, which means that the polluted areas which comprise

a high or very high risk should be investigated and if necessary given follow-up treatments up to the 2050. Our current assessment is that Banverket is responsible for approximately 1,000 areas of this kind as a result of the level of action stated in the plans for the future (SEK 50 million/year) there are possibilities of reaching the environmental objective.

Banverket's actions are part of prioritizing in such a way that those areas comprising the greatest risk are remedied first. In 2008 actions and investigations have been carried out at a number of places countrywide. In this way it might be mentioned that Banverket has carried out follow-up treatments at Gunnita marshalling yards and has completed the cleanup at Krylbo. Refuelling points and the foundations of houses have also had follow-up treatments.

An important part of the directed actions is to fulfil the information requirements of the Environment Code. This will be met primarily by identifying those point sources which might have caused pollution in these areas and listing them. So far approximately 3,500 point

sources have been identified, which is assessed as being approximately 80 per cent of the total number. In 2008 the inventory has entered its final phase

### **A RICH FLORA AND FAUNA**

Rail has a number of different effects on the natural environment, despite the fact that, from the point of view of area, its intervention is relatively limited. Rail's directly negative impact on the natural environment is divided into: loss of biotope, barrier effects, accidents involving game, and disturbance effects. Rail also has a positive impact on the natural environment in that areas around the track itself can form habitats for different species

### **The positive impact of rail on natural environments**

The countryside of Sweden is changed a great deal of the past 50 to 100 years. The greatest changes for flora and fauna have occurred in that agriculture and forestry have been rationalized. This has resulted in the disappearance of the habitats for many species, and as a result of this certain species are today threatened and risk disappearing.



The existing rail system accommodates many of these threatened species, which previously had their habitats particularly within traditional agriculture. This is because the areas around the track have been tended in a similar way as in older agricultural methods. One example of this is the grass harvest. The railway is, therefore, an important habitat for many threatened species.

In 2008 a survey was initiated into habitats and the existence of threatened species in station areas. This survey will continue for several years and will result in plans for how the care of these areas might be adapted to the needs of the species. So far, parts of southern Sweden have been surveyed. An example of care is the clearing of vegetation at certain times of year and a reduction or cessation of the control of growth in specified areas. The survey is part of the rail sector's contribution to fulfilling the objective of halting the loss of biodiversity in Sweden by 2010.

#### **Animals run over on the railway**

The rail sector can also contribute to meeting the objective of halting the loss of biodiversity by reducing the number of animal accidents. Rail causes approximately 3,500 animal collisions each year. Animals are either hit directly or indirectly by trains. The secondary accidents occur when predators are hit after being drawn to the tracks to eat carrion.

Today several of the predator groups are small and are included on Sweden's official red list – containing those species assessed as at risk of extinction. Each animal killed is a blow to the population,

and small changes in numbers may have a major impact on the opportunities of the species for survival.

Eagles and wolves are two red-listed species killed by trains. The number of eagles killed by trains has increased continually over the last ten years. Tasked by Banverket, the Museum of Natural History has conducted a thorough analysis of the existing statistics for train collisions with sea eagles and golden eagles. The objective is to produce data for effective actions where the need is greatest. This analysis should be completed in 2009. Banverket is also working to reduce secondary animal accidents by improving the management of animal accidents generally. It is a question, for example, of rapid and efficient clearance of, and search for, animals that have been hit. In 2008 according to Banverket's fault reporting system 40 or so eagles, three bears and a wolf were hit.

#### **International comparisons**

Up to the end of the 1990s Sweden was among the leading countries as regards analyzing the effects of rail infrastructure on ecological processes and functions. Subsequently national developments have progressed slowly. Other countries, primarily the UK, the Netherlands, Germany, France, Switzerland, Austria and Australia have made great progress compared with Sweden. In these countries much stricter requirements are made for actions to reduce the negative impact of the infrastructure on the natural environment.

Many of the new EU countries are also at the forefront as regards their demands

for awareness of the natural environment. This results in large part from the fact that the EU has made demands on environmental protection, so that countries can receive funding for the development and expansion of the infrastructure.

Banverket is working on producing objectives for the work which will lead to the rail sector reducing rail of rail's negative impact on the natural environment. This work is expected to be completed within a couple of years.

#### **GENDER EQUALITY PERSPECTIVES**

Women's travel habits, with a greater proportion of public transport journeys than men, impact less on the environment and are important for the opportunities of attaining several of the environmental policy objectives. As regards noise, it is not possible on the basis of existing research to assess whether there are any differences between women and men in how they are affected by noise. For the objectives concerning a non-toxic environment and a rich flora and fauna, comparisons from a gender equality perspective are irrelevant.

In general more women than men state that they can imagine travelling on public transport to reduce the negative environmental impact of transport. One survey carried out by the National Environmental Protection Agency in 2008 shows that 76 per cent of women as opposed to 59 per cent of men can imagine increasing their travel by public transport to reduce carbon dioxide emissions. ■





# An equal opportunities transport system

An equal opportunities transport system is a precondition for an equal opportunity society. In designing the rail transport system it is important that the different preconditions, values and needs of women and men are ascribed equal importance, and that women and men have the same opportunities of influencing planning, decisions and the administration of the system.

## HOW CAN WE ACHIEVE AN EQUAL OPPORTUNITIES TRANSPORT SYSTEM?

The sub-objective of an equal opportunities transport system consists of two parts – on the one hand that the transport system should correspond to the transport needs of women and men, on the other that women and men should have the same opportunities of influencing planning, decisions and the administration of the system.

There is in today's society a difference between the opportunities of women and men to satisfy their mobility needs within the transport sector. This also applies to the opportunities of influencing the transport system. In order to rectify these disparities,

it is relevant that work is carried out in the long-term and systematically on actions within strategic and physical planning as well as training and information.

In order to be able to assess whether the rail transport system is an equal opportunities system, other transport policy sub objectives have to be analyzed from an equal opportunity perspective. What is more the degree of equal opportunities integration on the part of actors in the rail sector has to be analyzed. Equal opportunity integration means that the business is planned and run in such a way that services offered to the general public are equally accessible, have equally high quality, and are equally well adapted for everyone, irrespective of gender.

## THE TRAVEL HABITS OF WOMEN AND MEN

There are no formal obstacles to equal opportunity in the rail transport sector. There are, however, in practice general and structural differences in the conditions for women and men. These differences sustain an imbalance in society. In order to have an opportunity of eliminating the differences between the conditions for women and men and of creating greater customer benefits for the citizens, we need information about the needs and travel habits of women and men.

Results from the Swedish Institute for Transport and Communications Analysis national travel habits study, RES 2005/2006, and the travel habits



study “Travel Habits in Stockholm County 2004”, show the following main relationships between the travel habits of women and men:

- Women and men make approximately the same number of journeys overall.
- Men more often have access to a car and use the car to a greater extent than women.
- Women use public transport to a greater extent than men.
- Women make more service and leisure time journeys.
- Men make more journeys to work and business trips.
- Men make longer journeys.

#### **Women travel on public transport more than men**

Women travel on public transport to a greater extent than men, both on rail-based services (train, underground and light rail) and by bus. Men, on the other hand, are responsible for a major share of all car travel in Sweden measured in passenger-kilometres.

Men’s car use is higher than women’s for all travel and in all lifecycles. One reason that men use the car to a greater extent is access to a car. Among men between 18 and 84 years of age, 82 per cent and a driving license and access to a car in 2007. The corresponding figure for women was 70 per cent. However it seems as if the differences in car use are not more about the division of power and responsibility in the household – rather than the reverse. There are, it appears, greater differences in car use between men and women in single households than between men and women in shared households. Among those living on their own many more men than women have

a car, and this fact does not seem to be explicable on the basis of income or status. Men seem quite simply to put a higher priority on car use than women.

The travel habits surveys show that women make more leisure time journeys than men. The difference between the genders is greatest for single households and shared households with small children, whilst the difference is less in shared households without small children. This is presumably a result of the fact that couples without children have more time for joint activities.

Women also make more service trips than men. For example, women in shared households with children do almost twice as much picking up and dropping off of children in the same kind of households, even if one takes account of differences in status.

#### **Men make more journeys to work and business trips**

As regards journeys to work and business trips, there is in total a major difference between women and men. If men and women in the same socioeconomic group and with the same status are compared, then there are however no systematic differences. Men make more and longer business trips than women. One reason is that considerably more men than women are in employment. There are, for example, more women who study, work part time or are on parental leave. Men’s journeys to work, are what is more, longer than those of women. One reason for this is that women’s local labour market regions are more numerous and smaller than men’s.

Men make more business trips than women of the same age, which in part can

be explained by the fact that more women work part-time. This results in a smaller number of business trips. Whilst younger men make considerably fewer business trips than older men, the same relationship does not apply as regards younger and older women. One reason for this difference between the genders is presumably the career effect which can exist in male-dominated professions.

Men’s and women’s journeys are approximately of equal length for all forms of transport, apart from as regards car journeys as driver, where men’s journeys are considerably longer than women’s – 19 km and 13 km respectively. As travelling by car is by far the most common form of transport, this means that men’s journeys in total are longer than women’s journeys.

Certain differences between women and men as regards the choice of the form of transport and of length of journey can probably be explained by social structures. Women work, for example, more often in the public sector than men. Hospitals, schools and similar enterprises are often located centrally in communities and places with good access to public transport. Men’s higher salary on average may also have an effect on travel habits. Many women take a greater responsibility for the family situation than men. One indicator of this is that of the days set aside for the care of children (temporary parents’ allowance), women take out approximately 64 per cent, and men 36 per cent. This presumably also influences the forms of transport demanded by men and women.

#### **OPPORTUNITIES FOR INFLUENCE AND EQUAL OPPORTUNITIES**

Women and men should have the same power to shape society and their own lives. This is the overarching equal opportunities policy objective decided by the Swedish Parliament. On this basis the government has decided that equal opportunities integration is the strategy to be used in order to achieve a more equal society. In order to achieve this, the transport policy sub-objective of an equal opportunities transport system can be seen not as a codicil, but as part of the plan.

#### **The sector’s work on equal opportunities integration**

Within Banverket equal opportunities integration has been pursued in 2008



*There are differences between the travel habits of women and men. These have to be taken into account in order for the rail transport system to become more equal.*

by means of a compulsory course on gender and equal opportunities for all co-workers at units administered by the company. The course comprises theory and practical exercises on the basis of a historical, scientific and political perspective. The aim is to raise the general level of knowledge and to raise questions and promote discussion about gender and equality in day-to-day work within all work areas.

Banverket is an important actor in the development of the rail transport system. Banverket's efforts for the greater opportunity of women's influence are, therefore, important in order for the transport system to be more equal. One way of measuring women's opportunities for influence is to measure the number of women in the industry's monitoring groups. The target is that by 2010 no gender will have a representation of less than 40 per cent. The number of women on Banverket's board and on internal boards has increased between 2007 in 2008 from 23 per cent to 29 per cent. On management teams the increase has been less, from 34 per cent to 35 per cent. The proportion of boards and management

teams keeping to the gender distribution objectives has also increased, from 33 per cent to 38 per cent.

Among other actors in the rail sector the distribution of women and men on boards and management teams varies considerably. Some relatively positive examples from 2008 can be found in

Veolia Transport Sverige AB where 4/9 on the management team were women, and Inlandsbanan AB where the management team consisted of 50 per cent women. Green Cargo's board in 2008 consisted of 4 women and 7 men (including trade union representatives). Three women and 10 men sat on the management team. On SJ AB's board were 3 women and 6 men (including trade union representatives). The management team consisted of 3 women and 7 men.

#### **An equal opportunities planning process**

An equal opportunities transport system presupposes an equal opportunities planning process, that is to say that women are represented on working parties and groups where decisions are taken, once the differences in need and values are taken into account and analyzed. In

action planning for Swedish infrastructure in 2010 to 2021 the parties have taken a step towards making the planning process more equal. In regional systems analyses and in other subprojects three starting points on equal opportunities exist which could contribute to the planning result of meeting the aim of the transport policy sub-objective of an equal opportunity for transport system:

- Working parties that govern and support action planning should strive for an even gender distribution.
- Facts about differences in needs and values should be applied.
- Regional traffic systems should be analyzed from a gender perspective. In any conflict of objectives as regards men's and women's needs, choices and attitudes should be documented

Equal opportunity issues should also be taken into account at later stages in the planning process. It is, therefore, important to have an even representation of women and men at consultation meetings with the general public when pilot studies and rail inquiries are reported on. Surveys in 2008 show that women's representation amounted to 34 per cent – though from a limited set of data. The corresponding figure was 28 per cent to 2006 and 23 per cent for 2004.

During the year Banverket has worked to create opportunities for an even representation of women and men when the general public are invited to take up a position on the physical planning process. This refers, for example to:

- special crèches to make it easier for families to participate,
- open house and exhibitions to give people opportunities to speak directly to Banverket's representatives instead of being forced to speak in front of a large group,
- exhibitions at libraries for direct communication with people who would otherwise not have taken part in consultations,
- adapting the times of meetings to make it easier for families. ■

*» The target is that by 2010 no gender will have a representation of less than 40 per cent. «*



# Important events

# 08

## JANUARY

- January 9 was the 25th anniversary of Pågatågen. In 1983 the first little mauve-coloured trains began to run between Malmö, Lund and Helsingborg. Pågatågen have had a great significance for regional development in Skåne. New modern trains will replace the old trains of type X11. The new trains will be equipped with the traffic management system ERTMS so as to be able to operate in the City Tunnel.
- On January 21 the County Council in Norrbotten gave Banverket the go-ahead to begin the first stage of the Haparandabanan line, between Sangjjärvi and Keräsajoki in Haparanda Municipality.

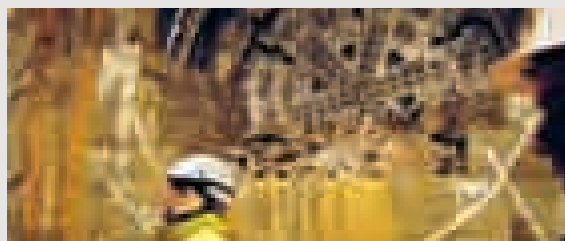
## FEBRUARY

- The new director general of Banverket, Mino Akhtarzand, took up his post on February 1. He succeeded Per-Olof Granbom.
- On February 5 the train manufacturer Alstom presented a new generation of high-speed train, the Automotrice Grande Vitesse (AGV). Its top speed will be 360 km/h and production was started during the year.
- On February 9 SJ introduced a new pricing model which means that a passenger can tailor their journey to their own needs with different choices. Through the new pricing model the passenger decides the ticket price by making selections on the basis of a flexible basic price.
- A storm hit southern and western Sweden on February 22. The storm had major consequences for rail traffic. Several stretches of line in the provinces of Halland, Småland, Östergötland, Blekinge and northern Skåne were closed to traffic.

## MARCH

- The European Parliament celebrated its 50th anniversary on March 12 with plenary sessions in Strasbourg.
- SJ AB announced that more companies are signing agreements with the company. The possibility of using official business travel time as working time and a regard for the environment are stated as the major reasons for the increase.

## APRIL



- On April 10 the tunnel driving machine Åsa broke through the rock wall at the intermediate working tunnel in the Hallandsåsen ridge. The breakthrough means that approximately 50 per cent of the tunnels have now been drilled.
- The international rail union, UIC, was placed under temporary administration according to French law, because of suspicions about bookkeeping irregularities.
- On April 21, the tunnel driving machine Katrin broke through at Malmö Central. The tunnels forming the City Tunnel are therefore complete.
- The government decided on April 29 that the new authority, the Swedish Transport Agency will be established on January 1, 2009. Inspector Staffan Widlert was appointed as director general. The core activity of the authority will be the establishment of norms, permits inspection and responsibility for registration within the transport field.

## MAY

- The Railway Museum in Ängelholm celebrated its 10th anniversary on May 3-4. There was a train and family party with about 7,500 visitors.
- Two people were killed and a further three injured in a workplace accident on May 21 in constructing a new rail bridge outside Härnösand on the Ådalsbanan line.
- On May 29 Banverket concluded three framework agreements for onboard equipment and ground equipment for the traffic management system ERTMS. The Botniabanan line will be the first to use it, and after that the system will be introduced on the Västerdalsbanan, Ådalsbanan and Haparandabanan lines, followed by Malmö Central and the line across the Öresund.

## JUNE

- Banverket submitted a study to the government on June 5 about the future of lines with little traffic. The interest in running rail traffic on these lines has increased, but the standard is low and the lines need to be refurbished. Banverket assesses the need for funds to be able to maintain current traffic at approximately SEK 6 billion.
- The government decided on June 5, 2008 on a review of legislation covering public transport. Ulf Lundin, director general of the National Public Transport Agency, was appointed as special investigator.



- On June 13 the new railway station at Falkenberg was opened and 13 km of double track on the West Coast line. This expansion has been made to create better commuting opportunities and to be able to move freight transport to rail.
- A new era was ushered in on June 16. A freight train for Volvo Logistics pulled by a multisystem locomotive from Railion Scandinavia A/S left Älmhult bound for the continent. Now delays at border crossings between Sweden, Denmark and Germany caused by the necessity to change locomotive will be a thing of the past.

## JULY

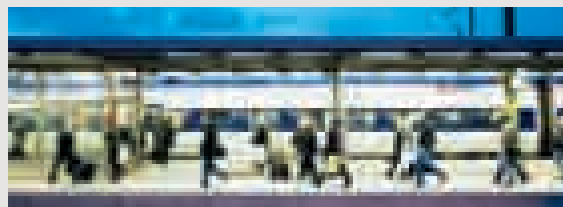
- Banverket celebrated 20 years on July 1, 2008. It was on May 6, 1988 that Parliament took the decision to divide SJ and create a new authority responsible for the infrastructure of the railways.
- On July 1 a new TSD (technical specifications for interoperability) came into force for people with disabilities. It contains new regulations for how rolling stock, stations and platforms should be laid out.
- From July 1 Banverket's safety permit will apply. Infrastructure administrators have no right to administer and operate infrastructure without a permit of this kind. Banverket has previously been exempted from the necessity of having a permit.
- On July 7 the Public Transport Association (Svenska Lokaltrafikföreningen) changed its Swedish name to Svensk Kollektivtrafik. The main reason for the name change was a desire for clear out profiling from merely being a voice for local and regional public transport and working for greater coordination between its members.

## AUGUST

- Stockholm Local Transport's board decided on August 26 to buy in 80 new underground carriages. The cost is estimated at SEK 2–3 billion and Stockholm Local Transport plans to put the carriages into service in June 2013.
- On August 27 Infrastructure Minister Åsa Torstensson opened a new timber terminal at Stockaryd in Småland. The new terminal has been built in collaboration between Banverket, Sävsjö Municipality and Stora Enso Skog AB, and will comprise an important link in shipments of forest products from Småland.
- On August 29 the rail industry's joint website järnvägsjobb.se was relaunched. The website acts as a simple portal for everyone interested in working within the rail sector in future.
- In August the 1,000th train carrying aviation fuel left the Port of Gävle for Brista outside Arlanda. The volumes of aviation fuel have grown constantly since the start of this service in 2006. A single train loaded with aviation fuel replaces 31 trucks on the roads.
- Hector Rail signed an agreement in August with SCA Skog Norrbränslan for shipments all of forest-based biofuel from Norrland to the rest of the country. The annual volume is estimated to be approximately 200,000 tonnes

## SEPTEMBER

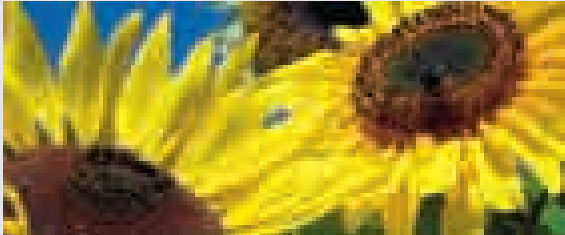
- On September 3 the transport ministers of Denmark and Germany signed an agreement about a fixed link across the Fehmarn Bält. According to plans, the 20 km long link with double track railway and dual carriage railroad will be completed in 2018.
- A new speed record for trains in Sweden was set on the night of September 13/14. The new record is 303 km/hour. The record run took place between Skövde and Töreboda on the Western main line.
- The government decided on September 18 to give Västerbottens länstrafik AB, Jämtlands länstrafik AB, Länstrafik i Norrbotten AB and Länstrafik i Västerbotten AB joint rights to carry out and organize passenger services on the stretch Sundsvall–Östersund–Storlien and on the state rail network north of the stretch.



- On September 30 the government put forward an infrastructure bill for the period 2010–2021. The total framework for operations, maintenance and development of the transport system was proposed to be SEK 417 billion.
- The ATC surveillance system was activated at Borlänge depot in September and at Gävle depot in October. The introduction of ATC means greater safety in the depots.

## OCTOBER

- In a poll presented in October about which brand is considered to be Sweden's greenest, SJ AB came out top in the category journeys. SJ AB is also the company which had the highest average score among Sweden's 100 highest brands. The award was announced on October 2.



- On October 7 Ofotbanen AS lost its license to run services in Norway. The reason was the company's financial difficulties. In so far as Ofotbanen can no longer run services in Norway, services were discontinued on the line between Stockholm and Oslo with immediate effect.
- On October 10 the government's rail investigator Jan Brandborn presented his proposals for actions to increase competition on the passenger service market. In the report "Competition on the Track" there are suggestions for, among other things, the discontinuation of sole rights to passenger traffic beyond January 1, 2010.



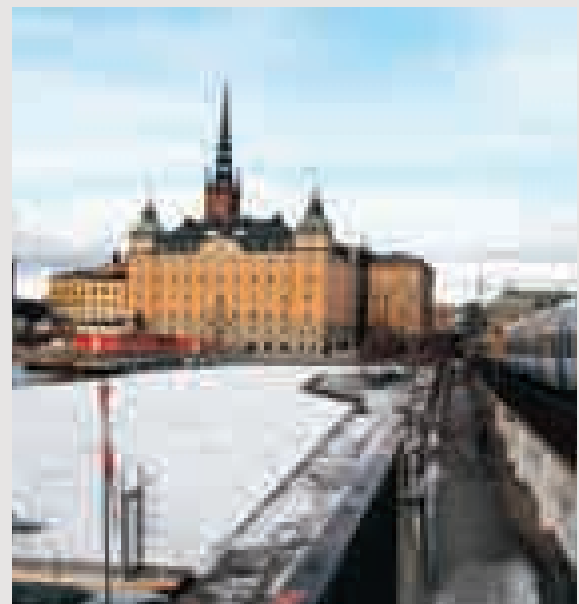
- The first stage of the Botniabanan line, the stretch from Örnsköldsvik to Husum, was opened on October 16. For the first time trains with round timber can access M-real's factory in Husum. Initially the stretch will be operated by two freight trains every week. Only when the entire Botniabanan line comes into service in August 2010 will the line be open to passenger traffic.
- Green Cargo AB and SSAB announced on October 31 that an agreement had been made about freight of steel ingots and milled products between the plants in Borlänge, Luleå and Oxelösund. The agreement, which is the biggest for rail transport so far, is worth a good SEK 2.5 billion, and the volume shipped will be 4,000,000 tonnes a year
- Banverket and the cooperative association Dalabanan signed a statement of intent in October for better connections between the province of Dalarna and Arlanda/Stockholm. The rail line from Dalarna to Arlanda/Stockholm is a busy one and in need of refurbishment, but it is not included among the projects in the future plan. For this reason the parties have produced an alternative finance method in order to make possible necessary refurbishment over the next two years

## NOVEMBER

- On November 14 SJ AB and Banverket announced that they together will be introducing an action programme to improve punctuality on X 2000 services. In the action programme there are actions applying both to rolling stock as well as infrastructure and service.
- On November 27 the government took the formal decision about converting Banverket Projektering and Vägverket Konsult into an independent company. The joint completely stateowned company will have the name Vectura and will have approximately 1,000 co-workers and a turnover of SEK 1 billion.

## DECEMBER

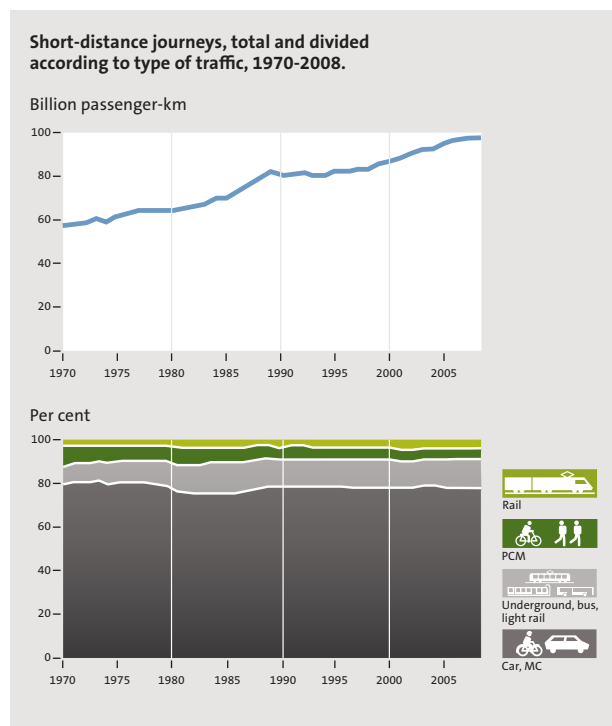
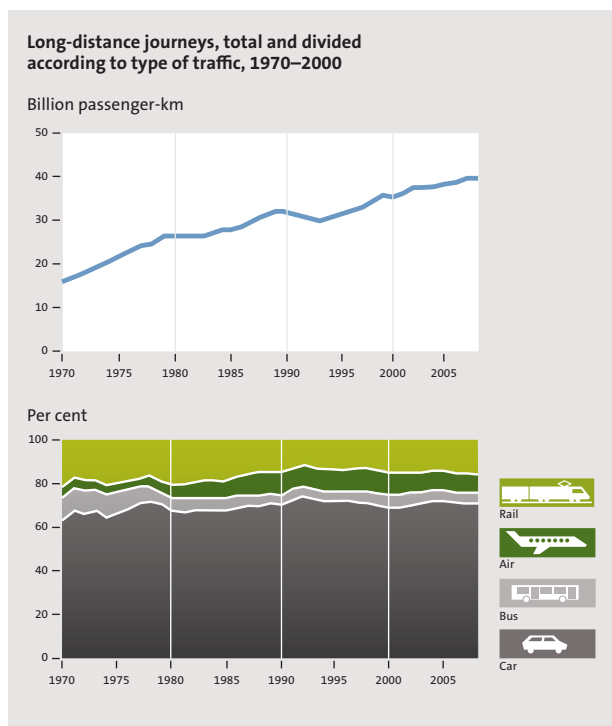
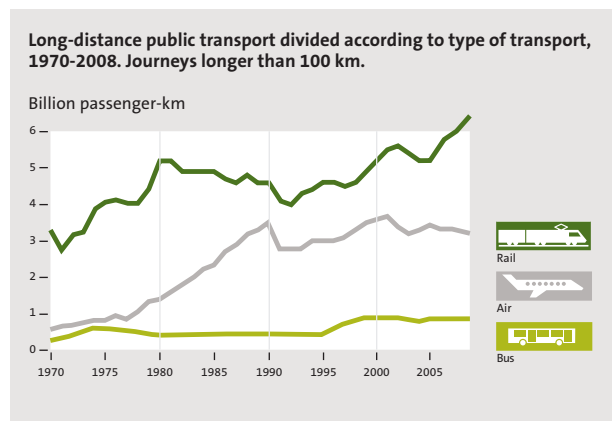
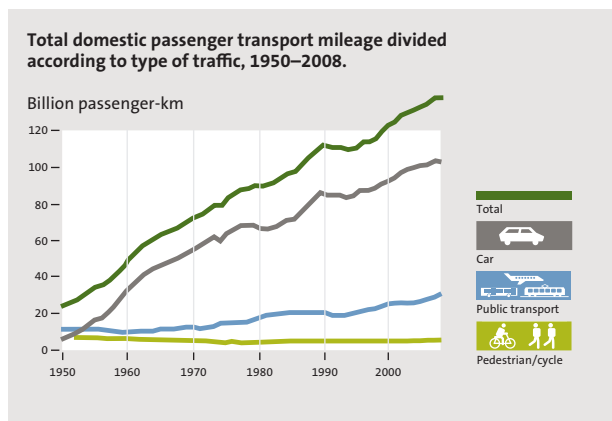
- On December 4 the government approved the Citybanan line's rail plan and detailed plan. Those construction works so far carried out have been preparatory. With the government decision major work on the railway itself can begin.
- On December 5 the government presented a financial stimulus package, in which SEK 1 billion was allocated to operation and maintenance of transport infrastructure.



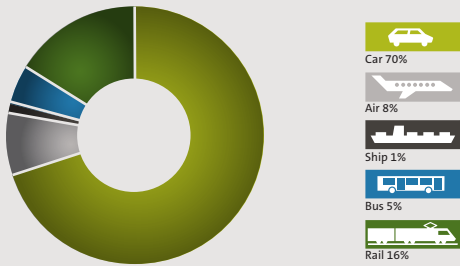
- Coop Sverige announced on December 12 that the company will transfer the majority of its long-distance shipments to rail. The freight shipments will start to roll in 2009 on the route between Helsingborg–Stockholm–Umeå. The results will be 120 fewer trucks on the roads on every working day.
- On December 18 the government appointed Gunnar Malm as special investigator tasked with investigating the preconditions for an expansion of high-speed rail lines in Sweden. In this commission is included, among other things, investigating the effects, costs and finance, and suggesting a general route and the possible division into stages.

The Graphs about passenger and freight transport development are based on data from a large number of sources. The complete year figures for 2008 are provisional. However nothing indicates that the definitive data will change the picture in any decisive way.

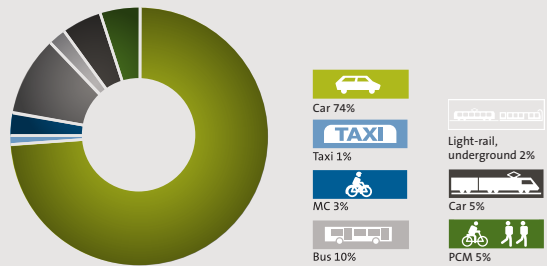
# Swedish transport services in figures



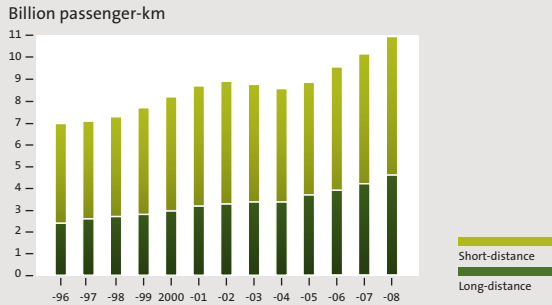
**Long-distance passenger transport mileage 2008 divided according to type transport.**



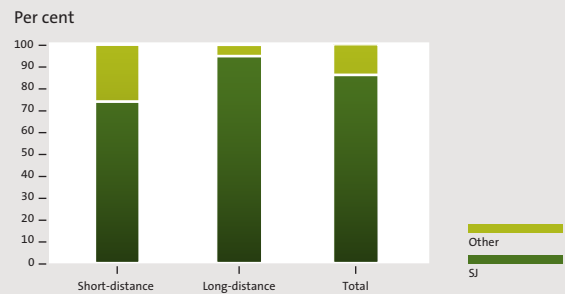
**Short-distance passenger transport mileage 2008 divided according to type of transport**



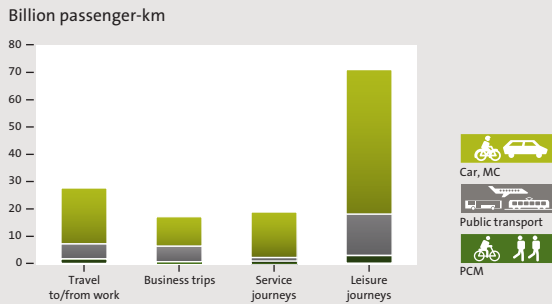
**Passenger transport mileage on the railways, 1996–2008 divided into short long-distance journeys.**



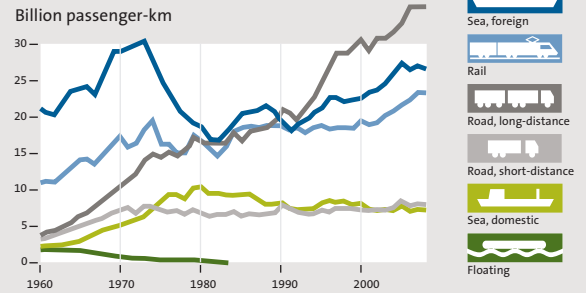
**Total long-distance and short-distance passenger transport mileage on the railways divided between SJ and other operators in 2008.**



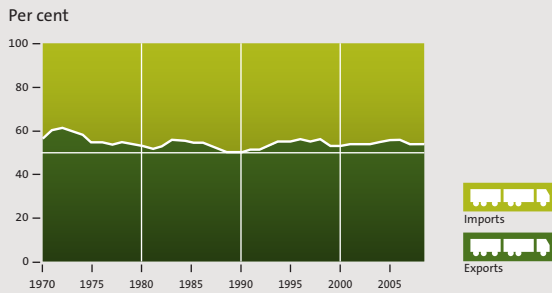
**Passenger transport mileage divided according to type of journey and type of transport 2008.**



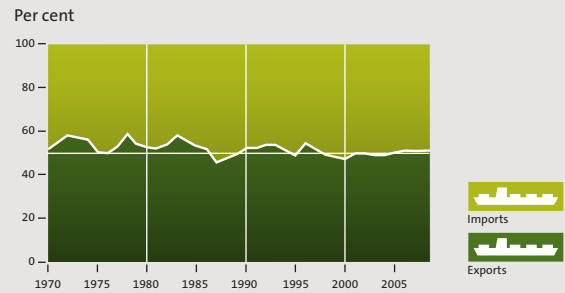
**Domestic freight transport mileage divided according to type of transport, 1960-2008.**



**Foreign freight transport by truck divided between exports and imports, 1970–2008.**

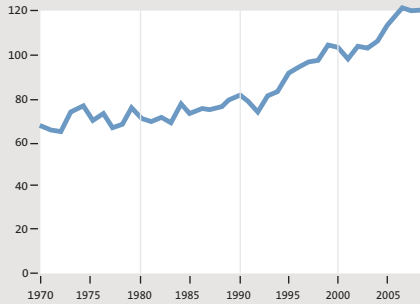


**Foreign freight transport by rail divided according to exports and imports, 1970-2008, excluding ore.**



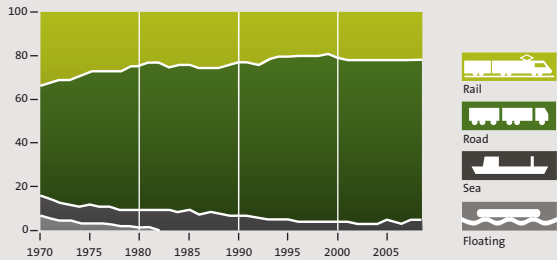
**Domestic\* freight transport total and divided according to type of transport, 1970-2008, excluding oil and ore.**

Million tonne



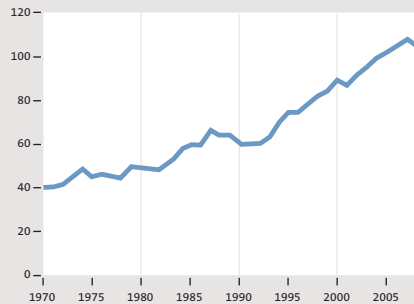
\* Long-distance with origin and destination in Sweden

Per cent

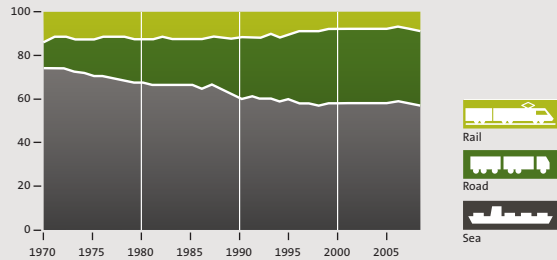


**Foreign freight transport total and divided according to type of transport, 1970-2008, excluding oil and ore.**

Million tonne

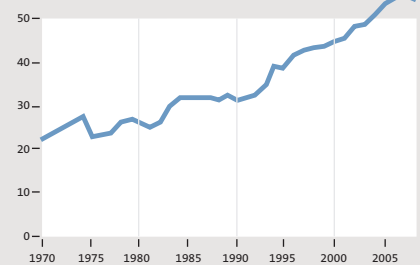


Per cent

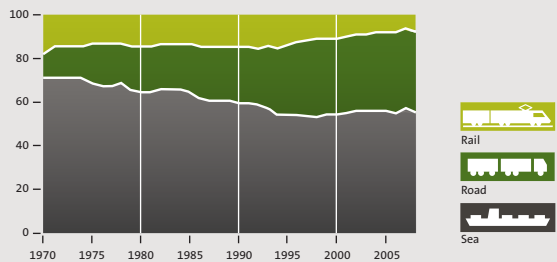


**Export total and divided according to type of transport 1970-2008, excluding oil and ore.**

Million tonne

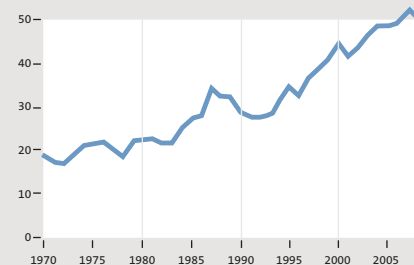


Per cent

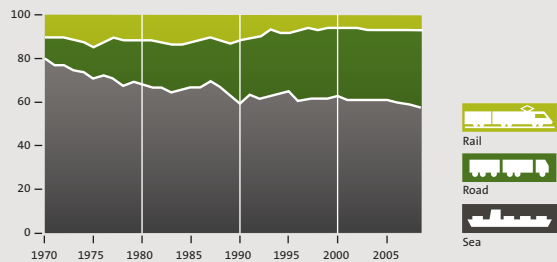


**Import total and divided according to type of transport, 1970-2008, excluding oil.**

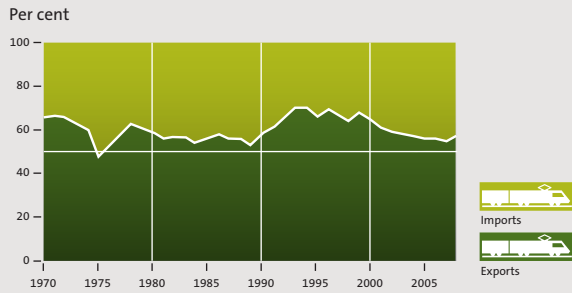
Million tonne



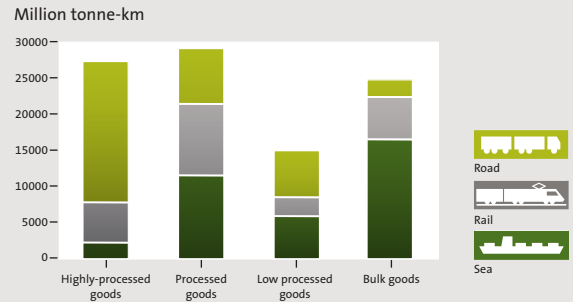
Per cent



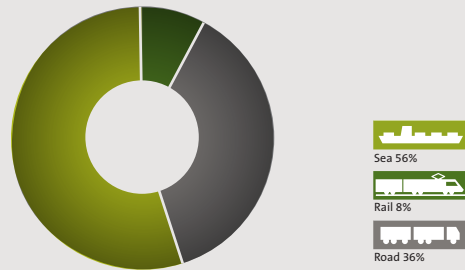
Foreign freight transport by sea divided between exports and imports, 1970-2008, excluding oil and ore.



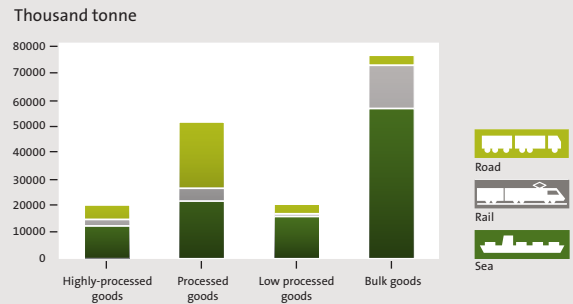
Long-distance freight transport, 2008, divided according to type of transport and level of processing.



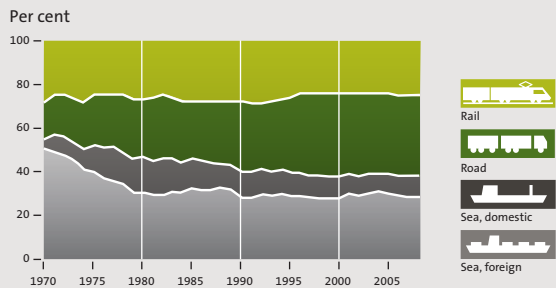
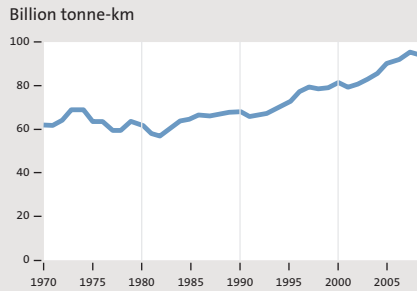
Foreign freight transportation, 2008, divided according to type of transport, excluding oil and ore.



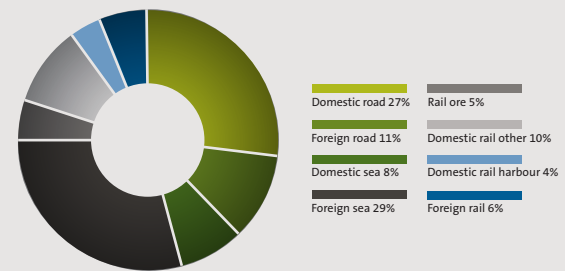
Foreign freight transport, 2008, divided according to type of transport and level of processing.

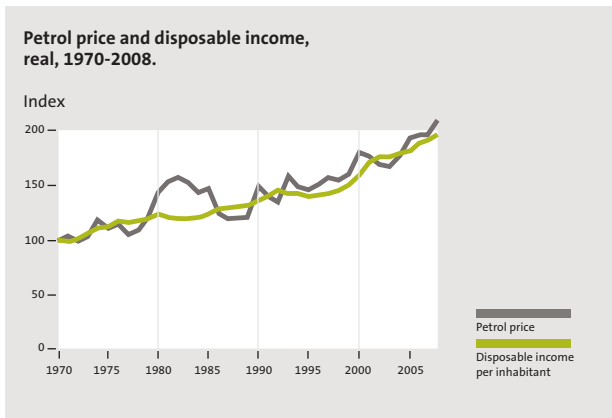
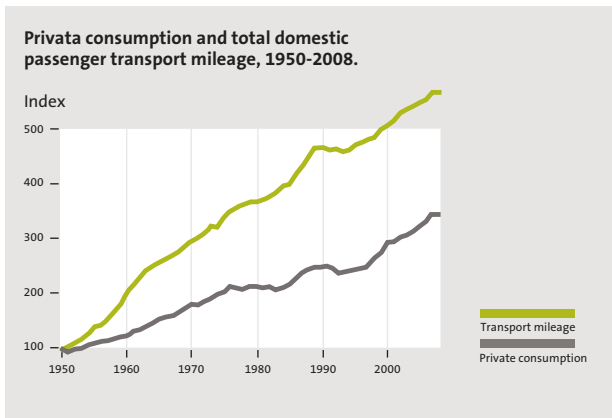
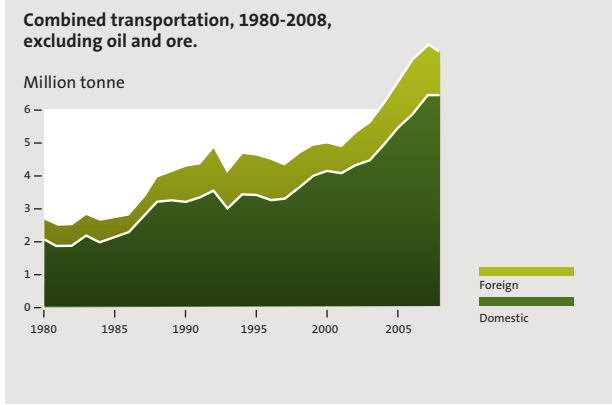
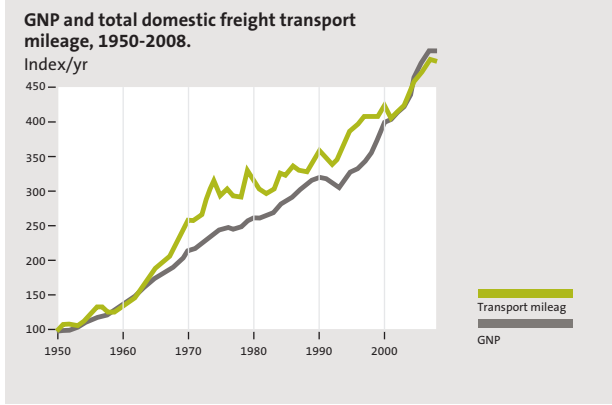


Long-distance freight transport mileage, total and divided according to type of transport, 1970-2008.



Long-distance freight transport mileage, 2008, divided according to type of transport and domestic/foreign.







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