



Ministry of Transport

# A Greener Transport System in Denmark

Environmentally Friendly and Energy Efficient Transport

eu2012.dk

DANISH PRESIDENCY  
OF THE COUNCIL OF THE  
EUROPEAN UNION 2012

Udgivet af:

Ministry of Transport  
Frederiksholms Kanal 27  
DK-1220 København K

Udarbejdet af:

Transportministeriet

ISBN, trykt version:

978-87-91013-65-2

ISBN, netdokument:

978-87-91013-66-9

Forsideill.:

Ulrik Jantzen

Tryk:

Rosendahls · Schultz Grafisk a/s

Oplag:

500



# Contents

A Greener Transport System in Denmark .....	5	Improved and Efficient Infrastructure .....	14
Energy Efficient Modes of Transport and Cleaner Energy .....	7	The Fehmarn Belt .....	15
The Greenest Drivers in the EU.....	8	More and Better Railways.....	17
Energy Efficient Freight Transport .....	10	Better Infrastructure for Maritime Transport.....	19
Fewer Pollutants and a Better Climate.....	11	Improved Public Transport .....	20
New Technological Transportation Solutions.....	13	More Bicycles Every Day .....	22



# A Greener Transport System in Denmark

Denmark has a well-developed and generally environmentally friendly transport system. The transport system has been improved in several areas including public transport, integration of the different modes of transport and new technologies like electric vehicles and modular vehicle combinations. However, Denmark is determined to continuously reduce the impact of the transport sector on the environment.

Higher mobility and accessibility are important elements for growth and welfare in Denmark. Every day the citizens need transport to and from work as well as companies has a need to transport goods to customers – both locally and globally.

The development of a greener transport system in Denmark combines growth and a high level of mobility, thereby ensuring both a well-integrated transport system and less noise and pollution.

The future solutions are to be found in a combination of different instruments and innovative technologies. A greener transport system combines a more efficient use of traditional fuels, the utilisation of electric vehicle technologies, buses using bio-gas and a strong public transport sector.

## 6 | A Greener Transport System in Denmark

Facilitating a greener transport system in Denmark is of high priority to the Danish Government. The aim is to make Denmark independent from fossil fuels by focusing on several initiatives such as less congestion, more use of public transports, more competitive railway sector and an increased use of energy efficient and environmentally friendly technologies.

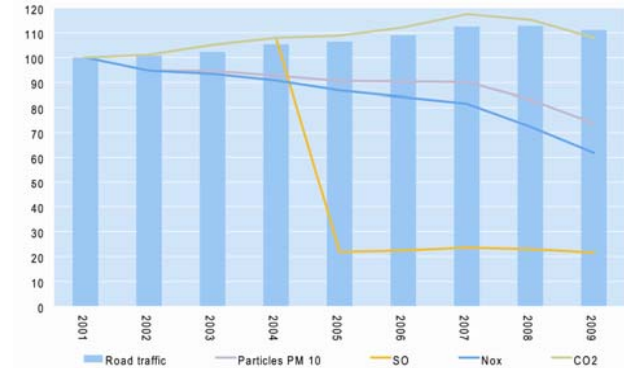


Photo: René Strandbygaard

## Energy Efficient Modes of Transport and Cleaner Energy

Today road transport is responsible for the largest share of air pollution and CO<sub>2</sub> emissions in the transport sector. Passenger cars are the main source followed by heavy goods vehicles. The scenario is likely to endure in the near future as traditional fuels will still play a major role in the years to come.

Figure 1 | Emissions from road transport and road traffic in DK



Source: Denmark's investigations of the environment (DMU) and The Danish Road Directorate

Denmark is dealing with the challenges of reducing emissions in road transport by introducing concrete steps and actions. As a part of this, the transport sector must contribute to the goal of the Danish Government, to reduce CO<sub>2</sub> emissions in Denmark with 40 pct. by 2020.

In order to improve mobility in a green and environmentally friendly way, it is essential to focus on energy efficient and clean modes of transport. This includes initiatives aimed at improving the effectiveness of traditional fuels and promoting the use of cleaner energy and new technological solutions. The Danish Government will present a strategy for improving the use of energy efficient vehicles like hybrid plug-in and electric vehicles including improving the corresponding infrastructure.

## **The Greenest Drivers in the EU**

Today Denmark has the greenest drivers in the EU with an average emission of 127 g CO<sub>2</sub> per kilometer. To reach this point the Danish car stock has undergone remarkable improvements in terms of energy efficiency and CO<sub>2</sub> emissions. From 2000 to 2010, CO<sub>2</sub> emissions from new cars in Denmark were reduced by more than 25 pct. on average, leading to a total reduction in emissions of 500,000 tonnes CO<sub>2</sub>. As a consequence Denmark already meets the requirements of the EU to limit the emissions of CO<sub>2</sub> from new cars to a maximum of 130 g CO<sub>2</sub> per kilometer in 2015 – and thus is already on the right path towards greener road transport.



The Danish achievements in reducing CO<sub>2</sub> emissions are partly due to the Danish taxation system of vehicles that favors fuel and energy efficient cars, but also due to a general focus on energy efficiency and the availability of knowledge and competences in Denmark in areas such as electric vehicles and intelligent transport systems.

In addition to domestic initiatives the EU has adopted requirements on environmental performance of new vehicles in the EU. The EURO norms limit the amount of harmful emissions that vehicles are allowed to emit. The norms have been highly successful in decreasing the air pollution caused by the transport sector. In the years to come the EURO norms will continue to play a significant role in reducing the environmental impact of road transport.

In the area of alternative fuels, experiments have been carried out which show that Denmark has several opportunities to produce both 1<sup>st</sup> and 2<sup>nd</sup> generation bio fuels.

A number of concrete initiatives on energy efficiency have already been implemented in Denmark. These include energy and environmental requirements for taxis, recommendations and advices for purchasing vehicles and an energy labeling scheme that informs consumers of the green characteristics of products. In addition to these initiatives, energy efficient driving habits can also help produce a reduction in the use of fuels and lower CO<sub>2</sub>-emissions, while at the same time reducing the fuel expenses for Danish citizen.

### **Tools for greener transport**

The Ministry of Transport has initiated a number of national campaigns and implemented a “Drive Green”-program in order to make the Danish citizens more aware of energy efficient driving habits. Energy efficient driving can cause a reduction of 5-15 pct. fuel consumption.

Through the implementation of tools like green recommendations when purchasing cars and a volunteer certification scheme for companies and public organizations, incentives are created for consumers to think environmentally friendly in connection with transport and awareness of the economic benefits of greener transport choices is raised.

### **Energy Efficient Freight Transport**

Due to the amount of freight that is transported on roads, it is essential to improve the energy efficiency of the sector to move towards a greener transport sector.

To achieve a more energy efficient freight transport sector, public initiatives has to be complemented by the private sector taking responsibility in supporting energy efficient freight solutions.

### **Green actions in the freight sector**

Several initiatives are utilised to develop efficient freight transport, e.g. a pilot project that tests the use of modular vehicle combinations (Eco-combies), charges on heavy goods vehicles, a congestion charging zone in Copenhagen, increased gross weight and axle loads of heavy goods vehicles and efficient freight delivery in cities.

Since 2007 the use of Eco-combies has been tested on Danish roads. Two Eco-combies can transport the same amount of freight as three regular heavy goods vehicles, which means that fuel consumption is around 15 pct. lower per. transported unit when driving an Eco-combies, thereby reducing CO<sub>2</sub> emissions correspondingly.

### **Fewer Pollutants and a Better Climate**

Emission of pollutants remains a highly prioritised issue both on a national level as well as a global level. Determined efforts are necessary. However, fewer pollutants and a better climate can not be reached by domestic action alone but has to be addressed at a European level.

In the last 20 years, EU legislation has aimed to reduce the amount of pollution that vehicles are allowed to emit. Through the EURO norms, air pollution has decreased significantly and the EU provisions have proved a great success.

The countries in the EU have been able to successfully adopt requirements for automobile manufacturers that en-

sure fewer pollutants and a cleaner environment. EU legislation requires all automobile manufacturers to ensure that new cars sold from 2015 do not emit more than 130 g CO<sub>2</sub> per kilometer on average. In the longer term, the aim is that new cars will only emit 95 g CO<sub>2</sub> per kilometer in 2020.

The EU provision thus supports the development of an energy efficient transport system across the EU.

From 2012, the aviation sector will be included in the EU emissions trading scheme (ETS) in order to reduce the environmental impact of the European aviation sector.

### **Cleaner air for citizens in urban areas**

In Denmark, there is a great focus on creating cleaner air in the cities. Therefore, environmental zones have been introduced in big cities in Denmark incl. Copenhagen, Odense and Aalborg. In these environmental zones, special requirements are in place for driving with highly polluting heavy goods vehicles and buses (e.g. filtering of their exhaust) in order to limit the emission of particles into the air.

## New Technological Transportation Solutions

New technological transport solutions are crucial for developing a greener transport system that enables high mobility in a sustainable and environmentally friendly way. Denmark takes an active approach in promoting the development of new and green transport technologies.

It is not sufficient to focus on one technological track. Several solutions have to be investigated in order to assess the various strengths and weaknesses. The future mobility of the transport system is thus likely to be facilitated by a combination of different technological solutions.

Among these solutions are electric vehicles, hydrogen cars, hybrid buses and buses on biogas as well as other alterna-

tive fuels such as biodiesel and bioethanol. A number of experiments on energy efficient transport solutions have been initiated in Denmark. These projects represent a broad range of vehicle technologies and alternative fuels, cleaner energy, efficiency of freight transport, energy efficient driving techniques and reduction of CO<sub>2</sub>-emissions.

### **Testing the use of electric vehicles in Denmark**

A large-scale project has been launched in Denmark testing Danish families' use of electric vehicles. During the next years, families have the opportunity to test the use of an electric vehicle as their everyday means of transport. The project will increase focus on electric vehicles and promote them as alternatives to regular vehicles.

## Improved and Efficient Infrastructure

In the years to come, Denmark will continue its large infrastructure investments in order to improve the capacity of all modes of transport in an efficient and environmentally friendly way. However, due to the transborder nature of the transport sector, an improved infrastructure must also be addressed at the EU level. At the European level, emphasis is placed on the transport corridors across national borders for both freight and passenger transport. Such transnational transport corridors facilitate a more efficient transport system in the EU at large.

In Denmark efforts are focused on strengthening the links between different modes of transport and integrating

these to a higher extent than today. The Danish Government wants to invest 2/3 of the funds for infrastructure in greener transport choices such as public transport, light rails and the use of bikes. The ambition is to strengthen the infrastructure at large by focusing on all modes of transport.

It is central that environmental concerns are taken into account when investing in infrastructure. Assessment of consequences for nature and wild life is thus mandatory in all phases of new infrastructure projects – from the planning phases to the actual construction.

### **Taking environmental impact into account – the Copenhagen-Ringsted railway**

The consequences for nature and wild life have been addressed in the construction of the new railway line between Copenhagen and Ringsted. Assessments of environmental impact show that the construction of the railway will not have significant consequences for natural areas and habitats for animals and plants.

Furthermore, by facilitating a transfer of passengers from road to rail, the new railway is estimated to cause a reduction in CO2 emissions of approximately 10,000 tonnes annually.

### **The Fehmarn Belt**

From 2020, a new fixed link across the Fehmarn Belt will be part of a transport corridor that links Scandinavia to continental Europe. The Fehmarn Belt is an important step towards more cross-border freight transport, but also a step towards a shift in freight transport from road to rail. The transport corridor will enhance the competitiveness of the railway and thereby make it an attractive alternative to road transport.

**A Danish priority: the transport corridor connecting Scandinavia and continental Europe**

To Denmark, establishing an effective transport corridor that links Scandinavia to continental Europe is of high priority.

Major investments have been made by Denmark to establish the infrastructure needed for the corridor to become effective and competitive.

Investments include the Femarn Belt Fixed link, the Öresund Bridge, increased capacity on the railway between Copenhagen and Ringsted and the full implementation of the ERTMS.

With the new fixed link across the Fehmarn Belt, freight between Hamburg and Copenhagen can be rerouted to the Fehmarn Belt fixed link instead of the current route via Flensburg, across Jutland and the Great Belt Link. The shorter distance of the Fehmarn Belt corridor will reduce transport time, reduce costs and decrease the environmental impact. In addition, the implementation of the ERTMS signaling system will further increase the efficiency and safety of the transport corridor.



### **Environmental gains from the Fehmarn Belt fixed link**

The Fehmarn Belt fixed link will make the freight route between Copenhagen and Hamburg 175 km shorter compared to the current route through Jutland and across Funen in Denmark. As a consequence air pollution, noise pollution and climate impact will be reduced considerably. The main contribution to these reductions will come from the termination of the ferry services between Roedby Harbor and Puttgarden. Calculations show that CO<sub>2</sub>-emissions will be reduced by 220,000 tonnes annually, which is equivalent to the amount of CO<sub>2</sub> currently emitted by approximately 20,000 persons a year.

### **More and Better Railways**

Railway transport is an attractive alternative to road transport due to a lesser environmental impact as well as it potentially helps reduce congestion on the road network. Increasing the competitiveness of the railway sector is thus of high priority to the Danish Government. Investments are made to ensure more frequent and faster trains between the provinces in Denmark, to implement new and improved technologies such as the ERTMS, and by establishing new railway lines, e.g. between Copenhagen and Ringsted.

The full implementation of the ERTMS signaling system is scheduled to be complete by 2018 and will enable fewer delays, increased and uniform level of safety, more efficient use of the railways and shorter travel times.

## 18 | A Greener Transport System in Denmark

By improving the railway network, it becomes a more attractive mode of transport. The railway network ensures that the major cities in Denmark are well connected. The political vision is to have a travel time of one hour between Copenhagen-Odense, Odense-Aarhus and Aarhus-Aalborg (“The One-Hour Model”).

All in all the implementation of the One-Hour Model will improve the railway system at large and provide faster connections for all passengers that make use of whole or parts of the route between Copenhagen and Aalborg.

In addition to making the railway system a more competitive alternative to road transport, the shorter travel times in the One-Hour Model will help reduce CO2 emissions.



Photo: Ulrik Jantzen

## Better Infrastructure for Maritime Transport

Maritime freight transport represents an important alternative to other modes of transport in terms of congestion and environmental impact. Significant investments to improve infrastructure in and around Danish sea ports are carried out in order to promote maritime freight as a competitive alternative to land based transport.

Increased port capacity, improved ports infrastructure and well-functioning combi-terminals strengthen the basis for maritime freight transport

A modern sea port infrastructure increases the potential contribution of ports to a greener transport system. Improved access in ports to freight terminal tracks enables a smooth transfer of goods between waterborne and land based freight networks and contributes to an overall efficient distribution of goods.



Photo: René Strandbygaard

## Improved Public Transport

More and better public transport is an essential element of a greener transport system in Denmark. Public transport should be an attractive everyday alternative to the car. Accessibility and flexibility are central issues in order to make public transport more attractive.

Public funds have been invested in projects on public transport solutions. Among these are projects that improve the accessibility of train stations and projects that integrate the use of mobile phones in planning and purchasing public transport services. Public funds are also invested in public transport solutions for the larger cities such as Aarhus and Odense, e.g. light rails that will make

public transport even more attractive. With the planned congestion charging zone in Copenhagen, more funds will be available for improving public transport, as the revenues from the congestion zone will be invested in improving and expanding the public transport sector.

The public transport system needs to be expanded and become more efficient, in order to better connect cities and provinces across Denmark. More terminals, more passenger stops and increased utilisation of IT are just some of the actions, which contribute to a more efficient and environmentally friendly public transport system.

### **The Metro in Copenhagen**

The Copenhagen Metro is currently undergoing expansion as a new circle line is being constructed. In 2018 the new metro city ring is scheduled to be completed and will provide a valuable improvement to public transport in central Copenhagen.

The establishment of the metro city ring will have positive effects on traffic safety, noise pollution and air pollution in the city due to the expected decrease in car and bus traffic.



## More Bicycles Every Day

In Denmark many individuals rely on the bike as their primary means of transport. More than 35 pct. of the individuals in Copenhagen thus use the bike to and from work or school every day. Initiatives that improve the facilities for cyclists are therefore of priority. In comparison with other modes of transport, bicycles have a lot of advantages. Among others, they contribute to the reduction of environmental problems such as noise and CO<sub>2</sub>-emissions.

During many years, the conditions for cyclists have been successfully improved and the bicycle has become a more attractive and safe mode of transport. Currently funds for promoting bicycle traffic are invested in 86 ongoing national and local projects in Denmark within the themes biking in the cities, bicycle and parking, biking to school and leisure activities, bicycle campaigns and knowledge-projects. Included in these projects are planned expansions of infrastructure for cyclists by building paths and tunnels for bicycles.



Photo: René Strandbygaard

ISBN 978-87-91013-65-2

Ministry of Transport  
Frederiksholms Kanal 27  
DK-1220 København K

Phone + 45 41 71 27 00  
Fax +45 33 12 38 93  
trm@trm.dk  
www.trm.dk