



Denmark - on your bike!

The national bicycle strategy

July 2014

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Denmark - on your bike!



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Foreword

Denmark has a long tradition for cycling and that makes us somewhat unique in the world. We must retain our strong cycling culture and pass it on to our children so they can get the same pleasure of moving through traffic on a bicycle.

Unfortunately, we cycle less today than we did previously. It is quite normal for Danes to get behind the wheel of the car, even for short trips. It is comfortable and convenient in our busy daily lives. If we are to succeed in encouraging more people to use their bicycles, therefore, we must make it more attractive and thus easier to cycle to work, school and on leisure trips. We can achieve this by, for example, creating better cycle paths, fewer stops, secure bicycle parking spaces and new cycling facilities.

In the government, we are working for a green transition and we want to promote cycling, because cycling is an inexpensive, healthy and clean form of transport. The state has never before done as much in this regard as we are doing at present.

As recently as June 2014, the Government again allocated funding for cycling by agreement with the other parties who are part of the agreement governing the transport sector. Denmark will invest a total of DKK 180 million on providing more Cycle Superhighways and better bicycle parking facilities. We have also allocated DKK 175 million for new initiatives on both the state roads and local roads. We have established a new Bicycle Fund of DKK 50 million for new cycling solutions and we set aside DKK 21 million for measures to prevent right-turn accidents.

My ambition is that even more people will discover the many advantages associated with using a bicycle in their everyday life. In city rush-hour traffic, bicycles can glide past traffic jams, and in the scenic natural areas cyclists can enjoy new experiences from the saddle, while also getting their daily exercise.

At the same time, it should always feel safe to travel around on a bicycle. We must therefore continue to focus on designing school roads and intersections so that even more people can enjoy cycling in their daily life. We also need to focus more on secure bicycle parking so that we can be sure that we will find our bicycle where we left it last.

The bicycle strategy has been created in collaboration with a number of organisations and municipalities, all of whom are working to improve cycling conditions. It is important to use the experience that already exists and to continue to build on the work that many enthusiasts across the country have begun with great success. I hope that this bicycle strategy will serve to inspire even more Danes of all ages to get on their bikes.



Magnus Heunicke

Magnus Heunicke
Minister for Transport
Copenhagen, June 2014

Indhold

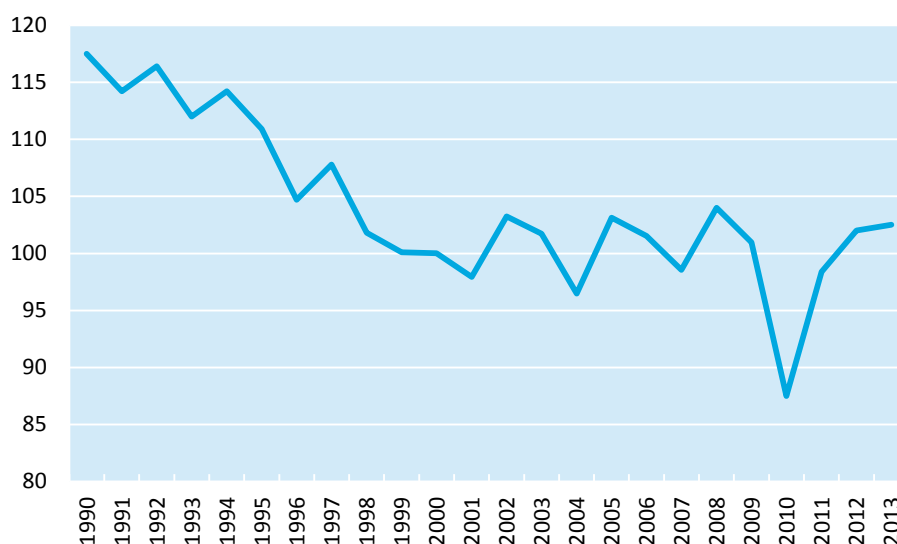
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1 Summary

Although Denmark is one of the leading cycling countries, fewer Danes use their bicycles than in the past. The good cycling habits are under pressure, as we can see if we look at the trends for bicycle traffic over time.

At the national level, Danes cycle less today than in the 1990s, as illustrated in the chart below. If we compare 1990 with 2013, there has been a decline of more than 10% in bicycle traffic nationwide. However, the volume of bicycle traffic has stabilised in the 2000s.

Box 1.1 | Traffic index of bicycle traffic trends nationwide in the period 1990-2013 (2000 = 100)



Note: Including mopeds 30

Source: Danish Road Directorate

In addition, there has been an increase in vehicle traffic over time. The Danes seem to be more inclined to take their cars and leave their bicycles at home.

This has been reflected in an increasing level of car ownership in Denmark in recent years. In 1970 there were approximately 0.2 private cars per capita in Denmark, while the figure today is around 0.4. In other words, four out of ten Danes have a private car. When the car is available, it is tempting to use it, even for short trips: One third of all car trips are shorter than 5 km and more than half of all car trips are 10 km or less. If only some of these trips were made by bicycle instead, the traffic conditions would look quite different. Congestion could be reduced and the environment would be improved.

Extensions and improvements to public transport can also challenge the use of bicycles. The better the service provided by buses, metro and commuter trains, the less likely we are to choose the bicycle as our primary means of transport. It can thus be a challenge to maintain the bicycle's share of com-

muter trips in connection with tangible improvements to public transport services in and around the cities.

The bicycle is in hard competition with other modes of transport, but it also has its advantages.

Compared to buses and trains, the bicycle is very convenient and you can decide on the route, as with the car. Compared to the car, it is more attractive to cycle when congestion increases. The bicycle also takes up significantly less space than a car, both on the road and when it's parked.

The bicycle is an easy, inexpensive and accessible means of transport that is economically viable, both for the individual cyclist and for society generally. No driving license is required for a bicycle and there are no costs for fuel or parking tickets when you use a bicycle. If you use an average bicycle worth up to DKK 4,000 to and from work for four years, your costs for transport are about DKK 5 per working day.

At the same time, cycling is a mode of transport that provides exercise and thereby promotes public health, to the benefit of both the individual cyclist and of society. For every kilometre travelled by bicycle instead of by car in the city, the health benefits for society are estimated to be worth nearly DKK 7 in terms of improved health and extended life expectancy.

The use of bicycles contributes significantly to reducing congestion, particularly in the larger cities. For example, an average of approximately 35,000-40,000 cyclists cross Dronning Louise's Bridge and Knippels Bridge in Copenhagen every weekday. If they had taken a car instead, traffic would come to a complete standstill.

Furthermore, bicycles produce no pollution. It emits no harmful particles and produces no noise pollution on the street. When motorists leave their cars at home and take the bicycle instead, they help to make transport more environmentally friendly and create a more sustainable society. It also benefits future generations.

The trend for cycling in Denmark must be reversed so that more people again choose the bicycle every day for work, education and leisure activities. Children are a particular area of focus. Far more children are driven to school by car today compared to earlier generations. This must be changed. More children should cycle to school, because today's child cyclists are the adult cyclists of the future.

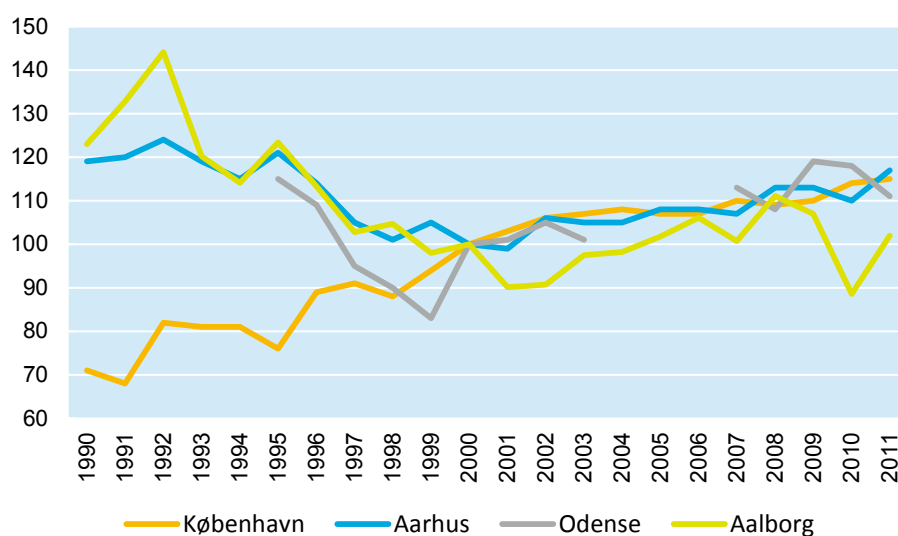
The Danes have always enjoyed cycling, also compared with other countries. Denmark should hold on to this cycling tradition, because there are many good reasons to prioritise cycling.

It's a matter of focusing on more cycling and continuing to find new solutions that make it attractive to choose the bicycle as a means of transport, for both adults and children. Once the framework is established so that it is

safe and secure to take the bicycle, people will have the opportunity to make the healthy choice.

When we look at the trend in bicycle traffic in Denmark's largest cities, it is clear that there is good reason to make an extra effort with regard to cycling. It pays to invest in more cycling because it makes a real difference. It is actually working quite well in several places, especially in Copenhagen. Other large cities have also managed to turn the tide, and cycling has again gained more momentum.

Box 1.2 | Traffic index of bicycle traffic trends in the period 1990-2011 (2000 = 100)



Note: There is no usable data for Odense for the period 2004-2006
Source: The Danish Road Directorate and the municipalities

The new national bicycle strategy will focus on both everyday cycling, school cycling and recreational cycling to ensure that Denmark gets cycling.

1.1 Three pillars of the national bicycle strategy

The new national bicycle strategy was launched to encourage more people to cycle, to make them consider whether the bicycle could be an option next time they are heading out the door. And for people to leave their car keys and bus passes at home occasionally and experience the joys of cycling instead.

The bicycle strategy should be an inspiration to the municipalities and to other actors who would like to participate in the green transition and who wish to invest in promoting cycling. Funding is therefore continuing to be allocated through funds that can help to bolster new cycling solutions and encourage cycling.

The national bicycle strategy is built on three pillars, each containing a number of specific initiatives to support and increase the use of bicycles as a

means of transport for the benefit of mobility, the environment and public health:



1.1.1 EVERYDAY CYCLING

More everyday cycling increases mobility and provides a cleaner environment and better climate. Traffic congestion on the roads would be reduced if more people choose to cycle to work and to school instead of taking the car. Where the distance between home and work or school exceeds the range of the bicycle, a greener transportation solution would be to combine the bicycle with a train or bus. This is the focus of the Door-to-door strategy. It is about ensuring good parking facilities at train stations and other hubs and about establishing new bicycle solutions in the workplace, so commuters will have an incentive to switch from the car to the bicycle, possibly in combination with public transport.

Another strategy is to encourage more people to cycle on weekdays by creating more coherent bicycle routes. For example, several places in the country have established Cycle Superhighways to attract bicycle commuters. Many municipalities have also invested extensively in cycling, where the construction of new bicycle tracks, the use of bicycle ambassadors and the implementation of bicycle events and campaigns combine to encourage more people to cycle on a daily basis.

The Bicycle Cities' initiatives focus on cycling as a mode of transport and allow commuters to find new sources of enjoyment by cycling more on a daily basis. A high level of accessibility is an essential part of increasing mobility. Therefore, a variety of initiatives are utilised to make life easier for cyclists. These include, among other things, initiatives to reduce the number of stops on the route with coherent networks of cycle paths, green lights and short cuts for cyclists.

Tests are also being carried out to allow cyclists to turn right at selected intersections when the light is red.

The wide range of cycling initiatives are intended to result in citizens of all ages cycling more on a daily basis, regardless of whether it is for short or long trips.

1.1.2 ACTIVE HOLIDAYS AND RECREATION

But the bicycle is not only a good means of transport on weekdays. It is also a convenient and inexpensive way to get out and experience Denmark during your leisure time. Increased use of the bicycle for both vacations and leisure can provide a healthier lifestyle and new experiences from the bicycle saddle.

Cycling can be a hobby for a greater number of people if good recreational routes are made available, which offer opportunities for a leisurely trip in beautiful natural surroundings or more demanding routes that are suitable for e.g. mountain bikes. The routes must also be well signposted so that it is easy to follow the route and identify the area's attractions etc.

If more people are to go exploring by bicycle, it is essential to establish a good correlation between the cycling initiatives, so they target both recreational cyclists and cycle tourists.

In order to achieve success as a cycling destination, there must be a good interaction between good-quality cycling routes, attractive holiday packages and exciting experiences. And it should be easy to discover where to find cycle routes and how to book experiences and accommodation along the way. An expert group shall explore ways to develop Denmark as a cycling holiday destination. At the same time, the year's cycling tourism solution shall be selected in order to highlight the initiatives that can provide inspiration to other actors or municipalities.

1.1.3 NEW AND SAFE CYCLISTS

A third major area of focus is to establish safe roads and cycle paths so that even more new cyclists will be attracted to them. Children must be able to get safely to school and to other recreational activities, so that cycling becomes a natural choice as a mode of transport and so that they learn to become part of a good traffic culture.

It is healthy to cycle and it is important therefore that both children and parents feel reassured about children cycling to school. The Danish municipalities are working in several ways to make school roads safer and to encourage cycling to school through various initiatives, school activities and cycling campaigns. School bicycle cities should establish traffic safety solutions around schools in order to highlight the relationship between infrastructure and good traffic culture.

New construction of cycle paths and conducting cycling campaigns benefits not only school children. It benefits cyclists of all ages. It must be safe and must feel safe to cycle. The Ministry of Transport will therefore also continue to focus on improving risk zones, including through efforts to prevent right-turn accidents and increase safety at railway crossings.

2 EVERYDAY CYCLING

Increased mobility, a cleaner environment and better climate with the bicycle as the means of transport



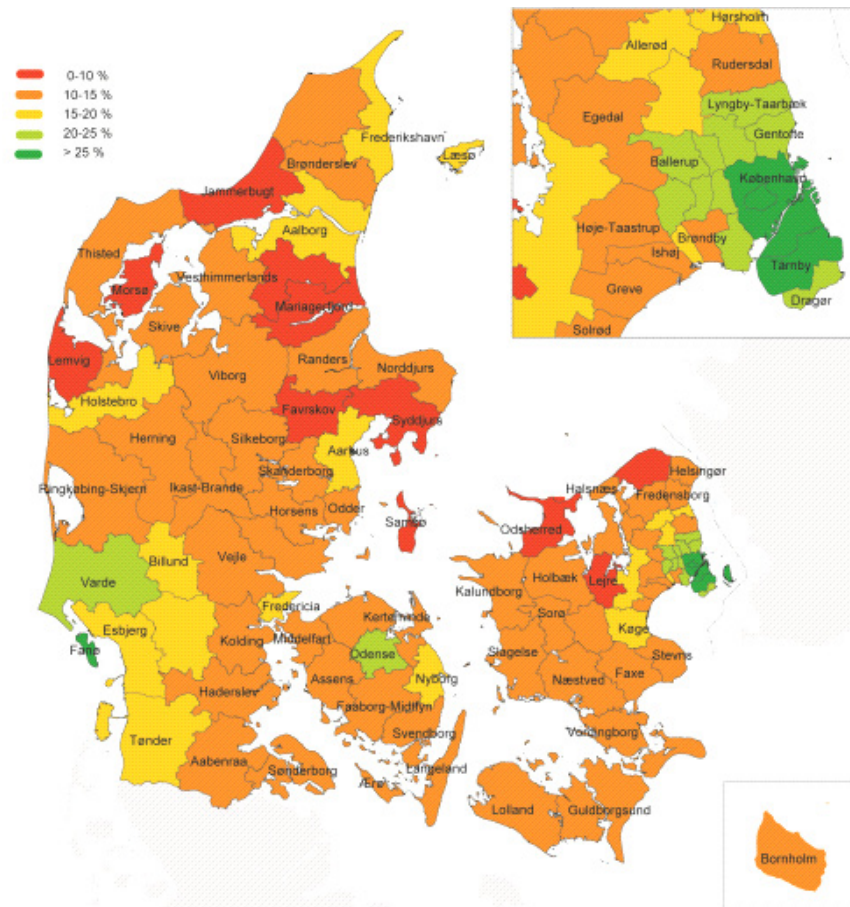
Photo: Danish Road Directorate

The bicycle should be the natural choice as a means of transport for far more Danes on a daily basis. We must therefore improve the links between the bicycle and public transport. It must become more attractive to cycle to work and school and during our leisure hours.

On weekdays we prioritise getting as fast and conveniently as possible from A to B. Many Danes use a car as their preferred means of transport, but there is no reason why the bicycle cannot be a major part of daily transportation for both short and long trips.

There is a clear potential to increase the use of bicycles as a means of transport in Danish cities and suburban areas. Several cities have shown the way, but many more need to join in.

Box 2.1 | Proportion of cyclists in the country's municipalities (bicycles used for trips as a percentage)



Note: The uncertainty is greater for smaller samples. The figures for the proportion of cyclists in the smaller municipalities must therefore be treated with caution.

Source: The Danish National Travel Survey 2010-2013 (map illustration by the Danish Road Directorate)

The map shows that municipalities with large cities are doing an excellent job. It is especially in Copenhagen that bicycles are used extensively. But cycling is also thriving on an island municipality like Fanø, and Varde municipality's commitment to cycling not only puts the municipality high on the map of Denmark, but has also earned them the Danish Cyclists' Federation's award as Bicycle Municipality of the Year 2014.

So, it is possible to get more people to cycle, regardless of whether there are many or few residents in the municipality, or whether it's a distinctly urban municipality or a rural municipality. There are also good examples that some of the municipalities, where cycling is not quite as popular as in other places, still manage to get more people to cycle. Randers is a good example of a municipality where a targeted, comprehensive investment in promoting cycling has meant that more of the local residents have recently begun to cycle.

In other words, it is possible to make a difference at a local level in order to develop cycling. The towns where cycling is least popular must be helped to reach the same level as the best towns, who should preferably continue to develop and become even better.

Since 2005, the Danish Cyclists' Federation has awarded the Bicycle City/Municipality of the Year, and the awards have demonstrated that efforts are being made to develop cycling throughout the country. The awards have been given to: Varde, Randers, Herning, Herlev, Ballerup, Copenhagen, Aarhus and Bornholm.

The awards of the Danish Cyclists' Federation show that by prioritizing conditions for cyclists, it is possible to succeed in encouraging more people to cycle. The important thing is to have long-term strategies for how the construction of new bicycle paths, safe intersections and bicycle parking, as well as efforts aimed at different groups of citizens, can help to promote cycling in the municipality.

The bicycle as the natural choice of transport

The bicycle must be developed to become the natural transport choice for many more citizens in their daily lives. This applies both for short trips and for longer distances that may also involve combining the use of the bicycle with public transport.

More cycling means less traffic congestion and healthier lives. It also benefits the environment and the climate. This also applies to the combination of cycling and public transport, which can reduce congestion and result in more sustainable transport patterns for longer trips.

Specific initiatives to encourage everyday cycling:

- The Ministry of Transport is establishing many more safe and attractive parking facilities for cyclists at train stations and at other hubs
- The Ministry of Transport has set up an expert monitoring group to explore ways to reduce the number of bicycle thefts at stations, including a design competition
- The Ministry of Transport will also set up a task force to focus on parking conditions for cyclists when constructing new stations
- The Ministry of Transport supports Cycle Superhighways for improved accessibility in more cities
- The Ministry of Transport supports Cycling Cities that invest in promoting cycling through holistic solutions
- The Ministry of Transport is working to allow bicycles to turn right at suitable intersections when the lights are red. This is intended to make commuting easier for cyclists.

Other recommendations:

- Improved opportunities for combining cycling with public transport
- Increased focus on cycling by employers, with new bicycle solutions, commuter bicycles and mobility schemes.

2.1 "Door-to-door strategy": Connection between cycling and public transport



Photo: Rie Visby, Ministry of Transport

A far better relationship shall be fostered between cycling and public transport with the help of a new Door-to-door strategy.

The bicycle in combination with public transport

Many Danes take the car today because it is an easily accessible mode of transport once you have already purchased a car. The car offers individual freedom to travel wherever you want. When the bicycle is combined with a bus or train, however, there is also a door-to-door solution where individual needs are met, while also providing a healthier and greener mode of transport.

The Door-to-door strategy therefore suggests new initiatives that can establish better ways to combine cycling with public transport.

Box 2.2 | From Start to end of trip with the Door-to-door strategy



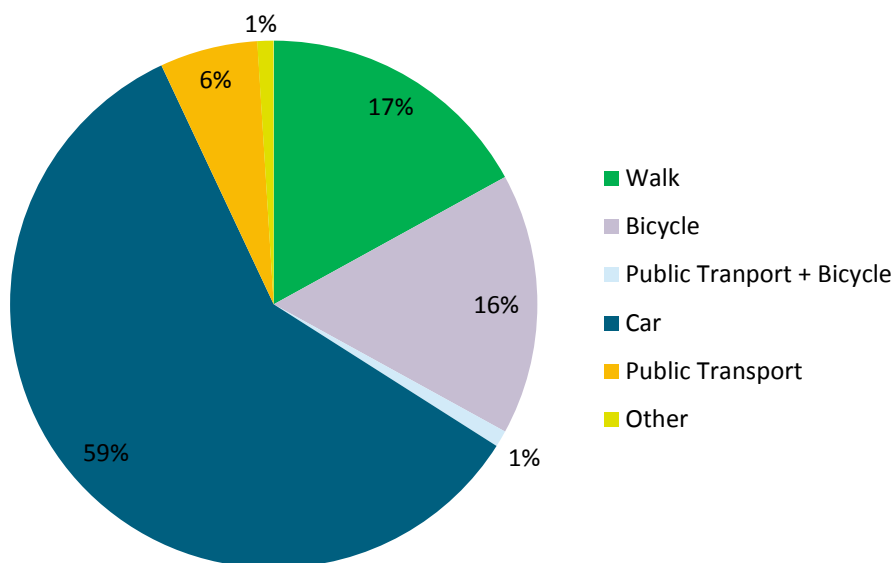
Today, 27% of rail passengers cycle from their homes to the train station, while 8% cycle from the station to their final destination. This means that more than three times as many commuters use a bicycle to get to public transport as use it to get from public transport to their final destination.

However, this is not problematic in itself. It is quite natural that more people cycle to than from the train station in the morning, because the distance from workplaces to a station is often shorter than the distance from a station to a residential area. This is also true outside of the metropolitan area. Approximately 67% of all current traffic from the train station to the final destination is done by walking. In addition to the 8% who cycle from the station to their final destination, 18% choose to go by bus, while the remaining 6% take a car from the station to their final destination.

However, far more Danes could choose a greener transportation solution than is currently the case. The combination of cycling and public transport, in the form of bus or train, is only a small part of the transportation picture today. Only about 1% of all trips today are comprised of bus/train in combination with a bicycle. That figure could be much higher.

For comparison, a bicycle is used for 16% of all trips, while 6% of all trips are with public transport. Cars are the Danes' favorite mode of transport and it is used for almost 60% of all trips.

Box 2.3 | Trips for all purposes distributed by main means of transport plus the combination of public transport and bicycle (%)



Source: The Danish National Travel Survey 2010-2013

There is a major potential, therefore, to get more people to see the possibilities for a real door-to-door solution by combining the bicycle with the train, so that this form of transport can substitute some car trips to a greater extent. A combination of bicycle and train or bus would provide a realistic and relevant alternative for many car commuters, who can preserve the individual transport solution, while also travelling in a way that is friendlier to the environment.

The Door-to-door strategy should therefore focus on making it convenient and flexible to combine cycling with public transport, so that many more commuters will find it an attractive transport solution. The bicycle can cover

a relatively large area from the train station, so it is possible to reach a destination that is relatively far away in a short space of time. The bicycle is also flexible compared to the bus, where passengers have to wait for it to leave the station and it may not stop close to their workplace.

The more options that are available to combine the bicycle with the train or bus, the more Danes will take advantage of this opportunity. However, there can be large differences in the incentive to combine cycling and public transport, for example depending on where you live and work. It is also a problem if there is no bus stop close to your workplace, or if the cycling distance is too large.

There will usually be many opportunities to combine different forms of public transport and cycling in the larger cities. In smaller towns, however, there may only be a few bus lines, which also makes it relevant to consider taking the bike all the way to the station or to other transportation hubs.

Bicycles offer a significantly greater freedom of movement in relation to public transport hubs. On foot, it would typically be possible to travel about 700 metres in 10 minutes. By bicycle, it is easily possible to travel 3 times as far, i.e. about 2 km. This means that, all things being equal, the "catchment area for cyclists" for public transport is about nine times the "catchment area for pedestrians". This significantly increases the passenger base, and the potential for transfers.

Some of the factors that may be important for a good door-to-door solution include whether there is good and safe bicycle parking at the station, and whether there are good opportunities to proceed on the route by either bus or train. For example, the provision of commuter bicycles from the station to the final destination could be an appropriate solution, particularly if the workplace or school are some distance from the station.

We know from studies that companies that are located within walking distance of well-serviced stations will often have twice as many employees who use public transport, compared to companies without stations nearby. In connection with the possibility of encouraging more people to choose the combination of bicycle and train/bus, therefore, it is appropriate to consider a *bicycle proximity principle*.

2.1.1 Better and more secure bicycle parking at stations and transport hubs

There can hardly be too many bicycle parking spaces at stations, and there must be a constant focus on identifying the places where they are most needed.

To ensure well-functioning facilities that can attract more cyclists, bicycle parking must meet the following objectives:

Box 2.4 | Objectives for good bicycle parking at stations and transport hubs

- Bicycle racks should be placed on a naturally straight line between the point of arrival at the station area and the platform. The cyclist should not be sent on a detour to find parking.
- It should be continuously ensured that there is free capacity. The cyclist must feel that there is always enough space.
- The bicycle racks should be designed so that it is easy to lock the bicycle frame to the rack. The cyclist must feel that it is safe to leave their bicycle.

These objectives for good bicycle parking opportunities must be realized in future plans for more and better bicycle parking facilities, including as part of the implementation of the Fund for better access to public transport (the DSB Fund).

Better parking facilities must also include spaces for carrier bikes and bicycles with trailers. They are becoming increasingly common, for example for bringing children to the kindergarten, but the supply of bicycle parking spaces has not followed this development. Carrier bikes are therefore often left chained to the nearest lamppost.

The increasing number of electric bicycles also imposes requirements for the design of bicycle parking facilities, and charging stations for electric bicycles could also be considered in relation to bicycle parking.

Another way to meet the needs of cyclists is to offer relevant services in conjunction with parking facilities. Several locations in the metropolitan area, for example in connection with Cycle Superhighways and at stations, have established covered bicycle parking with good bicycle racks, bicycle pumps, and traffic information.

DSB has already modernised the bicycle parking facilities at many stations and has created many new bicycle parking spaces. DSB also offers locked bicycle parking at more than 80 stations spread across Denmark.

But there is still a need to develop secure parking solutions for bicycles so that users can feel confident about leaving their bicycle at the station. Bicycle theft is one of several barriers to combining cycling with public transport. Therefore, the possibility to secure a bicycle against theft must also be considered when establishing parking facilities for bicycles.

Addressing bicycle theft

As part of the door-to-door strategy, the Ministry of Transport has set up an expert monitoring group to gather more information about bicycle thefts at stations, and what measures can be employed to reduce the risk of bicycle theft at stations.

In addition, the advisory group are looking at both Danish and foreign experience with secure bicycle parking and combating bicycle theft.

There will also be a competition launched from June to August 2014, where citizens can submit their best ideas on how to reduce the number of bicycle thefts. The expert monitoring group will help to qualify the ideas based on the members' knowledge of ensuring bicycles against theft and of the existing parking facilities at train stations.

The ideal solution would be safe, would take up as little space as possible, would be easy to use in everyday life and be inexpensive to maintain.

The goal of the Door-to-door strategy is that it should be just as attractive to use a bicycle and public transport as to use a car. So, it is no use if bicycles cannot be parked or are stolen.

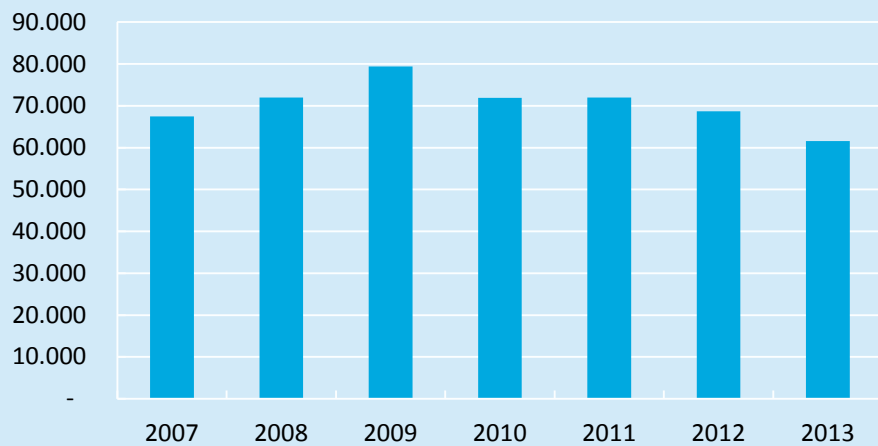
Box 2.5 | Reported bicycle thefts in Denmark 2007-2013

Bicycle theft is a nuisance for many people, irrespective of whether cycling is primarily used as a means of transportation on weekdays or as a source of pleasure and exercise in your free time.

In 2013, 61,613 cases of bicycle theft were reported. This is a decrease compared to 2009, where the figure was almost 80,000 stolen bicycles.

Notwithstanding the downward trend in recent years, bicycle theft remains a major problem in relation to choosing the bicycle as the preferred means of transport.

Number of reported bicycle thefts



Note: Information on the number of bicycle thefts on Bornholm is incomplete from the 1st quarter of 2011

Source: Statistics Denmark

2.1.2 Improved opportunities for bicycle commuting

Good and secure bicycle parking is a prerequisite for encouraging more people to cycle.

It is therefore essential to establish good opportunities for bicycle parking around the Cycle Superhighways in connection with public transport, at the new stations and at other locations where there are many cyclists.

Experience shows that good bicycle parking at major bus stops can also help attract more cyclists.

Box 2.6 | Better bicycle parking in Furesø municipality

The basic elements of Furesø municipality's efforts are that it should be "faster, smarter, more pleasurable, healthier, better, cheaper and more climate-friendly" for citizens to move about.

One way of achieving this objective is to make it attractive to commute by bicycle and to ensure that it is fast and convenient to combine different means of transport in order to achieve flexibility for the journey.

Upgrading cycle paths to Cycle Superhighways, as well as significant improvements in bicycle parking facilities at major bus stops and stations along the commuter paths, are therefore a target area. At the same time it must be safe against theft to leave your bicycle in order to use other means of transport.



The municipality, in collaboration with Bicycle Innovation Lab and HOE360 Consulting, has developed a bicycle rack, where the frame can be locked to the rack quickly and easily.

The distance between the individual bicycle racks also helps to ensure that a bicycle can be parked quickly. There is also a focus on ensuring that the entire bicycle parking area should appear welcoming, attractive and open.

The project to provide better bicycle parking in Furesø Municipality is co-funded by the Bicycle Fund and the Cycle Superhighways Fund.

Capacity for bicycle parking

At some train stations that have a large traffic base, there are specific capacity challenges associated with bicycle parking. This will only be increased by the efforts to encourage many more people to use the combination of cycling and public transport.

It is also important to be aware of what the expansion of public transport, e.g. in the form of the Metro City Ring in Copenhagen and light rail systems in major cities, will have on travel patterns and the demand for bicycle parking.

Box 2.7 | Bicycle parking and capacity in the larger cities

At some stations, the occupancy rate for bicycle parking is well over 100%. This applies to e.g. Nørreport Station, Copenhagen Central station, Odense and Aarhus. This means that there is a far greater need for bicycle parking than the stations can accommodate with the parking facilities currently available to them.

Based on the Danish Transport Authority's passenger prognosis, DSB has calculated the prospective need for bicycle and car parking spaces at stations. DSB expects that in 2017 at e.g. Ny Nørreport, they will have an occupancy rate of about 150%, about 180% for Copenhagen Central station (including the upcoming metro station) and an occupancy rate of about 150% at Odense station. DSB is currently working with various options to address the capacity challenges.

Nørreport will have about 2,100 bicycle parking spaces when the joint Ny Nørreport is completed by the end of 2014. The station is being developed jointly by Rail Net Denmark, DSB and the City of Copenhagen. Before the major reconstruction commenced, there were approximately 900 bicycle parking spaces.

Source: DSB

In order to ensure easy transfers between bicycle and train or bus, it is essential to be aware of the complex ownership situations that often apply to the area around the stations.

The station will usually be owned by the traffic operator, while the surrounding areas, such as concourse in front of the station, will usually belong to the municipality. It is therefore essential that the different actors collaborate to find constructive solutions to handling the issue of bicycle parking, including how to establish adequate, accessible and secure parking facilities that are appropriately located in relation to both bicycle paths and platforms.

But it is not only a question of establishing additional bicycle racks. It is essential to consider the urban space around the station as a single coherent area, where there is easy access to the facilities, and where it feels safe and comfortable to walk. This contributes to a more efficient use of space and

better links between the cycling infrastructure and public transport. It also works better aesthetically.

Box 2.8 | Room for more bicycles at Horsens Station with the DSB Fund

In continuation of Horsens municipality's decision concerning the renewal of the bus terminal at Horsens Station, Horsens municipality and DSB signed an agreement to implement a joint project based on a common plan for the use of the station area.

The municipality was responsible for the renewal of the bus terminal, while DSB was responsible for establishing 500 covered bicycle parking spaces on two levels in the immediate vicinity of the entrance to the platform tunnel.

The cost of the bicycle parking spaces at Horsens Station was approximately DKK 3.1 million and was paid for by DSB.



Bicycle parking at Horsens station

Source: DSB

Following the agreement on a Green Transport Policy from January 2009, the Ministry of Transport has signed an agreement with DSB to establish, within a budget limit of DKK 1 billion, car and bicycle parking facilities and associated access roads and interchanges at stations throughout Denmark in the period 2009-2020.

During the period 2009-2013, DSB spent about DKK 165 million on bicycle and car parking projects and on improving access to public transport, of which approximately 25% was spent on bicycle parking. The cycle parking facilities established as a result of the DSB fund are distributed throughout Denmark. For example, bicycle parking facilities have been established in Ballerup, Frederikssund, Grenå, Herlev, Horsens, Ringsted, Roskilde, Svendborg, Laven, Tarm, Køge, Aarhus Central Station etc.

The fund has so far resulted in nearly 4,000 new bicycle parking spaces established at train stations throughout Denmark.

DSB has specific plans to establish about 4,000 additional new bicycle parking spaces around Denmark in 2014. The estimated construction costs for the bicycle parking in 2014 is approximately DKK 18 million.

DSB has announced that they are also examining the possibilities to establish more than 11,000 additional bicycle parking spaces. DSB is focusing especially on Copenhagen Central Station, where the Rail Net Denmark, the City of Copenhagen, the Danish Transport Authority, the Metroselskabet and DSB are examining the possibility of expanding bicycle parking by up to 2,000 spaces at Tietgenbroen bridge in connection with the implementation by Rail Net Denmark of a major renovation of Tietgenbroen over the next 5-6 years. DSB is also engaged in a dialogue with both Aarhus and Odense municipalities regarding the planning and financing for major expansions of the numbers of bicycle parking spaces.

In Copenhagen especially, there are major challenges in terms of providing adequate capacity for bicycle parking. Much has been done, but the opening of the Metro City Ring and a light-rail system in Ring 3 will substantially alter the rail-borne public transport system. This will also have an impact on which stations the cyclists will use. A task force is therefore being established that will be required to recommend the best way to prepare the stations for the expected changes in relation to bicycle parking.

The Danish Transport Authority will be the chairman of Task Force Bicycle Parking and it will also consist of DSB, Rail Net Denmark and Metroselskabet. Task Force Bicycle Parking will report to the Minister for Transport in 2015.

Bringing bicycles on commuter trains

Today, bicycles can be brought on commuter trains free of charge in the metropolitan area.

Experiences from commuter trains have shown that free carriage of bicycles results in a marked increase in the number of bicycles brought on the train. However, it can be a very expensive solution, because a passenger with a bicycle takes up about twice as much space as a passenger without a bicycle. It also causes problems if bicycles push other passengers out, as may be the case during rush hour.

Outside of rush hour, there will often be excess capacity on trains and there is therefore room for both bicycles and passengers. People with flexible working hours and many students can benefit from this. The combination of bicycle and train can also provide new opportunities for recreational interests, excursions or holiday trips.

Box 2.9 | Costs of bringing bicycles on commuter trains during rush hour versus the cost of having a second bicycle at the station at the end of the line

The cost to bring a bicycle on the train during rush hour is estimated to be DKK 38 per bicycle trip, if there is no vacant capacity on the train.

Assuming that the bicycle is brought on the train in both the morning and afternoon during rush hour, the price per day is DKK 76.

There is thus a major expense associated with bringing bicycles on the train free of charge during rush hour. At the same time, more bicycles on trains will result in fewer seats for passengers.

From a societal point of view, it is more economical to have a bicycle at both stations, instead of bringing the bicycle on the train during rush hour.

It is assumed that the second bicycle costs DKK 4,000 to buy. If it is assumed that it is written off over four years, it then costs DKK 1,000 per year.

With just over 200 working days a year, this gives a cost per day for the second bicycle of approximately DKK 5, excluding maintenance.

In addition, there is ordinary maintenance of the bicycle. The Danish Cyclists' Federation estimates that the annual costs to maintain a bicycle is about DKK 500.

Commuter bicycle schemes can be an option to have a bicycle available at both ends of the trip.

The cost of bringing bicycles on the train during peak hours is more than 10 times higher than if the individual commuter can make use of two bicycles.

For trips during leisure time, however, there is rarely an option to use a second bicycle, as these trips are usually made to different destinations. But since these trips are often conducted outside of peak hour, there will usually be enough space to bring a bicycle on the train.

It is often relevant to have two bicycles if you commute daily to and from work during rush hour. It may therefore also be relevant for larger companies to provide commuter bicycles for their employees.

Better and more secure parking will make it more attractive to buy a second bicycle to use between the station and the workplace or college.

If a passenger needs to bring their bicycle on the train elsewhere in the country and for longer distances, there are a number of options, depending on where and when they are travelling. It is often necessary to purchase a ticket or multiple ride card for the bicycle at the station. Pre-booking and reservation is also often required.

There is thus a difference between commuter trains and regional and long-distance trains in relation to the option to bring a bicycle. Specific conditions such as the design of the train place practical limits on what is possible.

2.1.3 Increased focus on bicycles by employers

Companies and workplaces must take more responsibility for providing better bicycle solutions for their employees. With an active cycling policy, companies can take responsibility for their employees in relation to creating more sustainable and flexible mobility and healthier employees.

A company's bicycle policy may involve commuter bicycle schemes, good parking facilities on the company's site, service bicycles for transport during working hours, ensuring good facilities for cycling employees in the form of changing rooms, shower facilities and towel schemes and bicycle services such as bicycle pumps and repair schemes etc.

In particular, large companies with many employees are encouraged to develop mobility plans, where commuter bicycles and the relationship between cycling and public transport is part of a series of measures designed to change transportation habits in a greener direction. This can also apply to participating in campaigns and by testing or loaning out electric bicycles.

Commuter bicycles at the workplace

In many cases, individual companies can establish simple and convenient commuter bicycle solutions that are appropriate to their location and staffing structure.

It is also important to incorporate parking solutions for company commuter bicycles at stations to make it easier to combine trains and bicycles, even when the workplace is some distance from the station.

Box 2.10 | Commuter bicycle scheme in Regionsgården in Hillerød

In 2009, the Capital Region introduced a commuter bicycle scheme between Regionsgården and Hillerød Station. The scheme is intended to make it easier for employees to access Regionsgården and is also intended to improve the employees' health.

30 bicycles are included in the scheme. They are placed in different locations at Regionsgården and Hillerød Station. If an employee takes a bicycle from the station, it must be returned on the same day.

All the bicycles are equipped with 3 gears, a basket and lights.

Approximately 75 employees are enrolled in the scheme.



Source: Capital Region of Denmark

A commuter bicycle can for example be provided by an employer who wants employees to have convenient, healthy and flexible transport to the workplace.

Box 2.11 | About the possibility of an employer-paid tax-free commuter bicycle

If an employer-paid commuter bicycle is made available to an employee on the entire distance between home and work, the employee will have the bicycle available at their private residence. The employee will therefore be liable for tax on the commuter bicycle.

Conversely, an employer-paid commuter bicycle is tax free for the employee if the employee does not have the bicycle available at their private residence, but only makes use of the bicycle between a station and the workplace. This is then a form of free transport.

There are two conditions for tax exemption for the employee:

1. The employees may not take the bicycle home or otherwise use the bicycle for private purposes.
2. The employee cannot claim tax credit for commuting on the stretch where the employer covers the cost of transportation by providing a bicycle.

The cost of purchasing commuter bikes that the employer chooses to make available to the employees can be written off under the general depreciation rules. Provided that the acquisition cost of a commuter bicycle does not exceed DKK 12,600 (2014 prices), the commuter bicycle can be fully depreciated in the first year.

The employer's right to deduct VAT on the cost of acquisition and operation of commuter bicycles depends partly on the company's tax status, and partly on the use of the bicycles.

Companies that only have VAT liable activities, have full deductibility of VAT on expenses that only relate to taxable activities of the company. There is a limitation in the deduction rights if the bicycle is also used for purposes not related to the business, including for the private use of the proprietor or the employee. This means that the company can only deduct the portion of the VAT which is estimated to equal the use of the bicycle in the VAT-registered part of the company. If the bicycle is only for the private use of the proprietor or employee, such as for commuter cycling to/from work, the company is not entitled to deduct any part of the VAT.

Companies which have both VAT liable and VAT exempt activities have partial deductibility of VAT on expenditure for mixed use. This means that the company can deduct the portion of VAT which proportionately corresponds to the turnover in the VAT registered part of the company. There is a further limitation of the deduction rights if the bicycle is also used for purposes not related to the business, including for the private use of the proprietor or the employee. If the bicycle is only for the private use of the proprietor or employee, such as for commuter cycling to/from work, the company is not entitled to deduct any part of the VAT.

Source: Ministry of Taxation and SKAT

Companies and employers are crucial actors in relation to ensuring an increased focus on cycling in the workplace, to the benefit of more sustainable travel behaviour.

Renting of commuter bicycles

Several Danish cities have already established commuter bicycle schemes. This applies to e.g. Odense, Randers and Copenhagen/Frederiksberg. DSB is involved in the urban and commuter bicycle concept that exists in the capital. The reason for this commitment is the limited space available for bicycles on the trains.

The bicycle systems operate differently in relation to the lease terms and pricing structures. It will take time to assess how great the need is for these systems in the various cities, especially in light of the fact that many Danes already have a bicycle, or even more than one bicycle. Urban and commuter bicycle systems can thus quickly be limited to benefiting the city's visitors and tourists, or when one's own bicycle has a puncture.

If the systems are to function optimally, there must be enough users who find them attractive. This requires, e.g. reasonable rental rates, availability, ample parking options and they must be easy to be set up as a user.

2.2 "More pedal - thank you": Cycling for both short and long trips



Photo: Aalborg municipality

New options for bicycle commuting improve mobility and make it even easier to cycle on a daily basis.

Good accessibility and direct routes are key focus areas if more people are to be persuaded to commute to and from work or school by bicycle and if it is also to be attractive to take the bicycle on both short and long trips.

Cycling on weekdays

Apart from the four largest Danish cities, no Danish town has an area greater than 7x7 km, equivalent to 49 km². The four largest cities also have dense centres.

It is possible to travel 3 km in 15 minutes by bicycle. This means that in a typical town, you can reach the centre by bicycle in 15 minutes from almost anywhere else in the town.

The bicycle thus has the potential to be a realistic alternative to the car in all towns in the country, both big and small. The decisive factor for whether there is cycling potential is the distance to the destination, and this is not necessarily connected to the size of the population or the size of the town.

In the major cities, many services such as grocery shops are found in the different neighbourhoods and are thus within cycling distance of home. Many of the residents of the medium-sized cities live within reasonable cycling distance to work, leisure, public transport etc. In the smaller towns, it is possible to reach all parts of the town in 15 minutes.

The issue of urban structures and urban densification also plays a role in transport patterns. Urban facilities, which are dispersed over a larger geographical area, result in long transport distances, which can be difficult to negotiate by bicycle and walking, while a denser urban development creates a good basis for more people finding it natural to cycle.

Box 2.12 | Urban structure and cycling - results from a research project

If the Danes are to be encouraged to cycle more, cities must be very careful how they locate their businesses, shops, schools and services.

The best cycling cities are characterized by keeping their functions close together. They especially keep the shops close together. The shops are between 1 and 4 km from the residents' homes. Primary and secondary schools must be within 3 km and there must be a wide range of jobs and services within 4 km.

This is according to a study commissioned by the Danish Nature Agency from the University of Copenhagen and the Technical University of Denmark.

Source: "Bystruktur og cyklisme" [Urban structure and cycling], IGN Report (March 2014) and the Danish Nature Agency

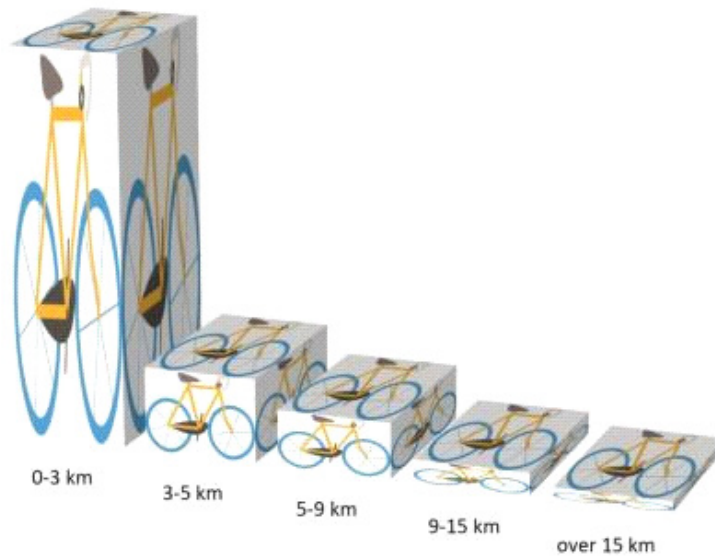
Many short trips are made by car in urban environments around Denmark. Today, about one third of all car trips are 5 km or less. Many of these short car trips could be replaced by cycling.

At the same time, there is potential to use the bicycle as a means of transport for longer distances, i.e. trips of 5-10 km and more, in many more locations around the country. This is particularly relevant in the context of commuting to work and education.

The bicycle is used predominantly on short trips, as shown in the illustration below.

Cycle trips of 3 km or less represent about 70% of all bicycle trips today while trips of more than 15 km alone account for about 2% of all trips. All bicycle trips over 5 km represent approximately 15% of all trips by bicycle.

Box 2.13 | Cycle trips and lengths of trips



Source: Illustration by the Ministry of Transport based on The Danish National Travel Survey (2012)

2.2.1 Cycle Superhighways, also in medium-sized cities

New Cycle Superhighways can have a great potential to get more people to cycle, including over longer distances in the large and medium-sized cities.

In order to maintain and develop better mobility through cycling, the main corridors for cyclists must be prioritised and developed further. Extra impetus must be given to the development of a coherent, strategic network of Cycle Superhighways that are linked to traffic hubs.

Cycle Superhighways with few stops at intersections and with a high standard can change perceptions of what is regarded as an acceptable and natural cycling distance. The use of bicycles can be further increased through the linking up to public transport hubs, facilitating the combination of cycling and public transport.

Box 2.14 | Example – the Frederikssund route

Both locally and regionally, the Frederikssund route constitutes an important alternative to the car between Frederikssund and Copenhagen.

Its direct route along the railway, away from the busy Frederikssundsvej and the link to the stations, makes it an attractive proposition for a broad target group of cyclists. Cycling commuters and other cyclists can thus combine their cycling trips with public transport, depending on wind, weather and mood.

The Frederikssund route has been granted about DKK 6 million from the Bicycle Fund and approximately DKK 11.5 million from the Super Cycle Highway Fund.

Source: Danish Road Directorate

Most of all bicycle trips, about 70%, are 3 km or less. The Danes are more than ready to use their bicycles for these types of short distances, which also makes it possible for many people to reach public transport hubs by bicycle. The Super Cycle Highway must therefore also be seen as an element in the door-to-door strategy.

Better routes for bicycle commuters

The Cycle Superhighways are intended to improve conditions for cyclists and especially for commuters so that more people will chose to cycle rather than taking the car for longer distances.

It is important, therefore, to focus on improving the bicycle's ability to compete with other modes of transport when working with bicycle commuting and Cycle Superhighways. This can be done by creating better conditions for cyclists with more service, good parking facilities at stations and more coherent cycle paths that enable cyclists to reach their destination faster on the bicycle with fewer stops. Compared to ordinary cycle paths, Cycle Superhighways are an improvement in a number of specific areas.

Box 2.15 | Examples of improvement initiatives for Cycle Superhighways

- Green wave at traffic lights
- Division into Fast Track and Comfort Track
- Marking lights along the Super Cycle Highway
- Park and bike (parking facilities)
- Comfort accessories such as footrests
- Service stations with e.g. bicycle pumps, drinking water etc.
- Separation of bus passengers and cyclists



Photo: The Capital Region of Denmark's cycle superhighways

Work is already under way to establish c Cycle Superhighways in a number of major cities in Denmark.

Box 2.16 | Bicycle commuter routes in Aalborg

In recent years, Aalborg municipality has worked to achieve a differentiation of the routes in the cycle path network. At the top level are bicycle commuter routes that have a high level of service.

The bicycle commuter routes are established on key commuting routes in Aalborg and Nørresundby between large residential and work areas. The bicycle commuter routes focus on creating good conditions, particularly for the shorter commuting trips of up to 5 km.

Bicycle commuter routes have already been established on three sections and two more are being planned. In Aalborg municipality's new Bicycle Action Plan, principle requirements have been set for, among other things, the routes' design, signage, snow removal and service facilities.

Evaluation of the first bicycle commuter route to Aalborg University, which was established in 2011, showed an increase of about 20% in the number of cyclists.

Aalborg municipality has received co-funding from the Bicycle Fund.

Source: Aalborg municipality

But Cycle Superhighways are not only relevant in the large cities, but also in medium-sized cities where they are already working on the promotion of cycling.

Viborg municipality used their co-funding from the Bicycle Fund to complete a major part of the Central Jutland Bicycle Star project. The project consists of a number of bicycle paths between Viborg and the city's hinterland starting from Viborg Train Station. The primary purpose of establishing the Central Jutland Bicycle Star is to create optimal conditions and coherent cycling opportunities between residential areas, workplaces and educational institutions, both in the municipality and across municipal boundaries to neighbouring municipalities, especially towards Skive and Vesthimmerland. The ability to combine cycling and public transport at the railway station and the bus station is important in this context.

Based on its climate plan, Herning municipality has received co-funding for the projects Herning Bicycles, phase 1, 2 and 3. These have prioritised commuter trips and focused on, among other things, implementing a number of Cycle Superhighways, including to Snejbjerg, Gellerup and Tjørring, all of which are under construction and are expected to be completed in 2014. The next phase will be a Super Cycle Highway between Herning and the new regional hospital in Gødstrup, which according to the Traffic Agreement for 2014 will receive a commitment for funding from the Bicycle Fund 2014.

In other medium-sized cities such as Svendborg and Helsingør, much has already been done to increase bicycle traffic, including for commuters. Hel-

singør has prioritised creating integrated solutions for bicycle traffic, including with new cycle paths in the city centre and better bicycle parking facilities at the station. Svendborg, has mainly focused on increasing bicycle traffic through an advertising campaign, but also with new paths and improved bicycle solutions around the harbour and the schools.

Cycle Superhighways can be extended to more towns and even outside the major cities, it is possible to focus wholeheartedly on increasing commuter cycling. Electric bicycles can also contribute to more people wanting to cycle long distances, especially if the routes, in the form of Cycle Superhighways, have quick and easy access.

As the bicycle volumes increase, especially in the larger cities, capacity increases in the form of Cycle Superhighways can also help to prevent congestion problems on the cycle paths.

Electric bicycles

There is a potential with electric bicycles that provides an opportunity to commute over longer distances, and at the same time offers a more environmentally friendly choice than a moped or a scooter.

The electric bike can mean, for example, that more people will use the Cycle Superhighways for longer commutes to work or education.

And in rural areas, where distances may be farther to daily activities such as shopping and leisure and to public transport, the electric bicycle may also mean that more will retain the bicycle as their means of transport. On an electric bicycle, distance, hills and headwinds are simply much more surmountable for young and old alike.

There is therefore a potential that more people will make the bicycle their means of transport and thus will be able to cycle longer and more often on a daily basis.

It has been demonstrated in Randers that municipal lending of electric bicycles for commuters who have more than 5 km to travel to work has made more people chose to cycle, even after the loan term expired. According to Randers municipality's evaluation, some commuters have even begun to use their regular bicycles more, and the participants have generally become more physically active.

Recently, Randers Cykelby has begun to lend out 3-wheeled electrical bicycles to citizens who find it difficult to keep their balance on a normal bicycle. The 3-wheeled electric bicycle is intended to help users to get more exercise in their daily life, and the bicycle also provides increased mobility and freedom to move around in a larger geographical area. The bicycles are funded by Health and Aging (Sundhed og Ældre) in Randers municipality and are loaned out for six months at a time.

The electric bicycle has gained in popularity in recent years and it is used by more and more people in their daily lives. The trend is strong and the bicycles are gradually becoming both better and less expensive.

The electric bike can also be of great importance, especially for older people, to encourage them to cycle more. This is particularly important for a group that traditionally cycles less than other age groups.

2.2.2 Cycling Cities across the country

In order to further develop cycling in Denmark and ensure greener mobility, it is important to continue to spread the cycling city concept. It provides a holistic approach to encouraging more cycling for both shorter and longer trips.

The potential for persuading more people to leave their car keys at home and get on their bicycles can be found in cities across the country. But it requires a willingness to change behaviour, and that is a challenge, even for transport behaviour and choice of mode of transport.

It is important, therefore, to combine different approaches that have a wide range. From investments in infrastructure in the form of new bicycle paths, bicycle parking and service facilities to "softer" measures like cycling campaigns, information about cycle routes and bicycle ambassadors in the municipalities.

Box 2.17 | The Cycling City - the holistic promotion of cycling

The *Cycling City* concept is about a holistic approach to the promotion of cycling through various forms of initiatives.

It is characteristic of a cycling city that a very wide range of initiatives are implemented to persuade people to cycle more. The various initiatives are interrelated and complement each other in order to achieve the greatest possible impact.

In the Cycling City projects, it is relevant to look at the possibility for inter-municipal sector cooperation, for example by involving both the school and health services in the context of efforts to promote cycling.

In addition, it may be relevant in a Cycling City to work with trials involving speed zones and differentiated speed limits in urban areas, particularly around major roads. A lower speed for cars will be an effective tool to avoid more bicycle accidents and help make it more secure and safe to travel by bicycle.

The combination of the construction of new paths and the implementation of campaigns is also important. Campaigns can help to encourage more people to travel by bicycle, if they become aware of the benefits of cycling or the opportunity to try new initiatives, such as loaning bicycles, new path

networks or better facilities on the bicycle paths. The use of bicycle ambassadors and the organization of cycling events and cycling races can help to highlight the bicycle as a means of transport for both everyday use and for leisure activities.

Campaigns can also focus on good and considerate road behaviour, to the benefit of both safety and security. The vast majority of people belong to more than one group of road users. Many cyclists are also motorists and bus passengers, etc. We all have a responsibility, therefore, for a good and safe traffic culture.

Cycling Cities in both small and large municipalities

In conjunction with the Bicycle Fund, grants for Cycling City projects have been allocated in 22 municipalities across the country during the period 2009-2014. Among others, Aalborg, Randers, Aarhus, Odense, Herlev, Herning, Lolland, Horsens, Albertslund, Copenhagen and Favrskov have received co-funding for cycling projects in their municipalities.

Copenhagen is especially well-known as the city of bicycles, even outside Denmark. Nearly 1.3 million kilometres are cycled every weekday in Copenhagen.

But a holistic approach to bicycle promotion also takes place outside the major cities, and there are many good experiences with Cycling City projects across the country.

In Horsens municipality, investments in new cycle paths, traffic-safe school routes, better services for cyclists and cycling campaigns seem to have achieved an increase in bicycle traffic. The proportion of traffic on bicycles in Horsens municipality has increased from 8.7% in 2006 to 12.4% in 2012. Over time, it will become possible to see whether this is a permanent trend.

Box 2.18 | Cycling City Project: Randers municipality - The city on the move

Randers municipality has marketed Randers as a cycling city through construction projects, public involvement and the use of bicycle ambassadors. Among the side benefits achieved are improved public health, less pollution and increased climate awareness.

Since 2011, the municipality has implemented bicycle projects in the suburbs of Hornbæk and Dronningborg and in 2014 a major new bicycle project was launched in Randers Sydby. Based on the Traffic Agreement of 2014, the municipality is continuing to establish commuter and school cycling routes to and in the three catchment towns of Langå, Assentoft and Spentrup.

In Hornbæk, safe routes to school, continuous cycle path networks and secure crossings have been established. A bicycle ramp now connects Hornbæk with the city centre, where the "Cycle Ring" with signage and markings and covered bicycle parking facilities provide better conditions for cyclists in Randers city centre.

In Dronningborg, the cycling city has held a series of cycling activities such as cycling events, family trips and BMX shows on a newly established BMX track. The municipality has also loaned out electric bicycles and offered free spinning classes for employees of the cooperating companies. Learner bicycles have also been loaned out to local kindergartens in the district.

According to the Bicycle Accounts 2012 for Randers municipality, bicycle traffic has increased by 45% from 2009-2012. The share of trips by bicycle in the municipality has increased from 11% in 2009 to 16% in 2012. Far more cyclists feel safe in traffic and the level of satisfaction with Randers as a cycling city has also increased significantly.

The many new initiatives led to Randers being named the Bicycle Municipality of the Year in 2013 by the Danish Cyclists' Federation.

Randers Municipality received subsidies of about DKK 9 million in the period 2009-2013 for the project "Randers Cycling City - The city on the move". Based on the Traffic Agreement of 2014, the municipality has received pledges for additional co-funding of DKK 2.6 million.



A cycling event in Randers Sydby, where children could gather Easter eggs on a 2.5 kilometre cycling route, can be seen here. After the event, bicycle ambassador Ronnie Schwartz drew lots for bicycle prizes that could be won by participants who had their cards stamped along the route.

Source: The Danish Road Directorate and Randers municipality

As can be seen, the concept of cycling cities is relevant throughout Denmark. Work must therefore continue to develop cycling city projects throughout the country. These projects are relevant for both the larger cities and for smaller towns, just as the cycling city initiatives can extend over areas larger than a single municipality.

The results from Odense's cycling city project clearly show that it is worth investing in better conditions for cyclists.

Box 2.19 | Effects of Odense Cycling City

Odense was designated Denmark's National Cycling City for the period 1999-2002. The following results from the project can be highlighted:

- 20% fewer accidents. An increase in the number of cyclists makes them more visible.
- 2,100 extra years of life
- DKK 33 million in saved health costs.

Source: Odense municipality

Efforts to create a good city for cycling include ensuring better accessibility for cyclists. This can be achieved in several ways: Short-cuts for cyclists are one possibility. Green waves at traffic lights are another option.

Box 2.20 | Green waves for cyclists increase accessibility.

Initiatives are set in motion in Copenhagen to establish green waves on some of the most popular bicycle routes, such as Nørrebrogade and Østerbrogade.

Green waves increase accessibility for cyclists: it is faster to get around because cyclists don't have to stop at many traffic lights.

The existing green bicycle waves are based on the traffic light signals being configured such that cyclists meet green traffic lights when they cycle at a constant and normal speed (20 km/h).

The green wave is enabled in the direction towards the city centre in the morning when cyclists are on their way to work. The green wave is then enabled in the direction out of the city centre in the afternoon when cyclists are on their way home from work.

Sections with green bicycle waves in Copenhagen are marked with a specially designed sign and special markings on the asphalt of the bicycle paths.

The establishment of green waves on Nørrebrogade has previously shown significant improvements in travel time of 12% for cyclists for the first trial in 2004. The permanent green wave showed that journey times for cyclists could be reduced by over 2 minutes and their speed could be increased by more than 5 km/h.

Work is also under way to establish a green wave version 2.0 on Østerbrogade, based on adaptive control of the signals. The wave adjusts itself continuously according to the number of bicycles and buses heading towards each intersection, based on real-time data from e.g. radars, cameras and GPS. The wave is better integrated with bus services and takes account of cyclists' actual speed, which may change, e.g. as a result of a headwind.

Custom-designed signs and markings, which mark routes with a green wave in Copenhagen



Photo: Ursula Bach, the City of Copenhagen

Source: The City of Copenhagen

It is essential that the local authorities coordinate the Cycling City projects. The municipalities have local knowledge and most cycling occurs on the municipal roads. The government's task is to support the municipalities' holistic Cycling City efforts by providing a good framework to promote the use of bicycles as a means of transport.

2.2.3 Right-turns on red at selected locations

There are many different means to enhance cyclists' mobility. This could be in the form of more convenient traffic rules for cyclists where possible, without other road users being inconvenienced.

The possibility of allowing right-turns on red traffic lights for cyclists can increase accessibility and thus benefit cycling. In addition, allowing right-turns on red is likely result in fewer cyclists cycling across the pavements.

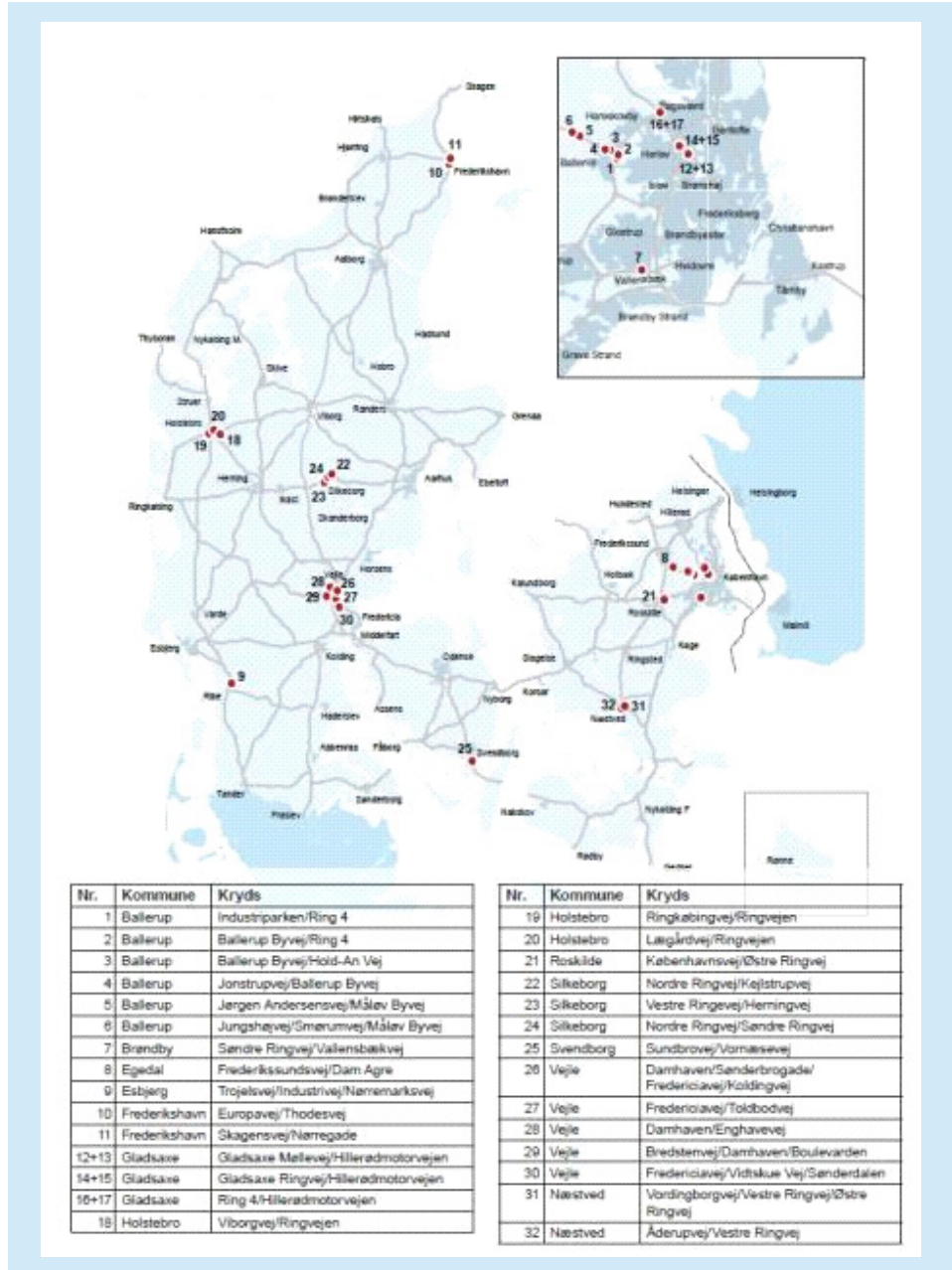
There should not be a general introduction of right-turns at red lights, but it is a possibility that could be applied in specific locations where traffic conditions and consideration for other road users makes it desirable. The option would be ideal in some places and not so good in other places, partly because of conflicts with pedestrians.

There is a possibility to specifically approve right-turns on red for cyclists today. The Danish Road Directorate can grant a dispensation for a municipal road authority to allow cyclists to turn right at a red light. The scheme must also be approved by the police.

Tests with right-turns at red lights on the national road network

The Danish Road Directorate has recently established a large number of test sites on the national road network. The intersections are distributed throughout the country, but primarily on national roads in and around major cities, where there are most cyclists.

Box 2.21 | Trial intersection on the national road network



Source: Danish Road Directorate

The first two trial intersections on national roads were opened on 21 November 2013. These intersections are Gladsaxe Møllevej/Hillerød motorway and Mørkhøjvej/Hillerød motorway, both located in connection with the *Farum* Cycle Superhighways between Farum and Copenhagen. These are ramp intersections. The intersections connect the route to the urban areas Gladsaxe and Mørkhøj to the Farum route.

Box 2.22 | Trials with right-turns on red for cyclists in Gladsaxe

The intersection between Gladsaxe Møllevvej and the Hillerød motorway is an example of a trial intersection with right-turns on red for cyclists.

As can be seen, there is a bicycle path at Gladsaxe Møllevvej, which is divided into a lane for cycling straight ahead and a lane for turning right.



Source: Danish Road Directorate

The tests with right-turns on red for cyclists on the national road network will continue until the end of 2015. The purpose of the testing is to increase right-turn at a red light for cyclists as part of making it easier for cyclists. The trial should inspire municipalities to conduct similar trials and clarify when right-turns on a red light is appropriate.

The Danish Road Directorate has prepared an inspiration booklet for local authorities. The booklet contains advice and guidance on when and how municipalities can experiment with right-turns at red lights for cyclists, taking account of road and traffic conditions, etc., including pedestrians.

The initiative will be particularly relevant for the municipal road network in the cities, since this is where there are most cyclists.

In relation to a specific experiment in Roskilde, where it has been possible since December 2011 for cyclists to turn right at a red light at three T-junctions in the city, the experience has shown that there has been no increase in dangerous situations. The Danish Road Directorate's dispensation for the trial in Roskilde runs until 2015.

As part of trials with right-turns at red lights for cyclists on the national road network, the Danish Road Directorate has also developed specific guidelines that the police can use to assess municipalities' applications for approval of "right-turns on red" intersections for cyclists.

3 ACTIVE HOLIDAYS AND RECREATION

Healthier lifestyles and new experiences with recreational cycling



Photo: Panorama, Niclas Jessen

There must be better conditions for active recreation by bicycle. Recreational cycling and bicycle tourism shall therefore be supported through improvements of infrastructure, accessibility and new experiences.

There are fewer bicycles in the countryside than in the cities in Denmark. In rural areas and villages with fewer than 2,000 inhabitants, an average of about 0.7 kilometres is cycled per person per day, compared with about 1.4 km per person per day in the small and medium-sized towns (10,000-99,999 inhabitants). In Copenhagen and Frederiksberg, people cycle significantly more. Here, each person cycles about 3.3 km per day on average.

In the countryside, the distances to school, work, shopping and leisure activities etc. are often greater than in the cities. In addition, the speed limit on the roads is significantly higher than in urban areas, usually 80 km/h, and accidents on the roads are often more serious. It may in itself entail that cycling appears unsafe. This means, all things being equal, that the bicycle is less attractive as a daily means of transport in rural areas.

In rural areas, therefore, different types of interventions are required than in the cities.

However, it is still necessary to focus on the cycling experiences offered by both rural and urban areas, so that more people will use bicycles in their leisure time and on holiday trips. Active recreational cycling benefits the cyclists' health, and cycling holidays are in harmony with the goals of sustainability and greener transport.

Cycling for recreation

Every Dane cycles about 60 recreational kilometres per year on average. The number of recreational kilometres cycled every year could certainly be increased, as the Danish bicycle paths run through both forest and wilderness areas, along the coasts and close to cultural attractions.

Denmark has approximately 12,000 km of signposted cycle routes. These routes offer good opportunities to experience Denmark on a bicycle when it is easy to navigate the route along the way. This is something that must be continuously improved.

Cycling and cycling culture is also something that many foreigners associate with Denmark. Among our closest neighbours, 70% of those questioned mention cycling as one of the things they associate with Denmark, on a par with wind turbines and only surpassed by open sandwiches (smørrebrød).

According to VisitDenmark, approximately 1.2 million cycling tourists visited Denmark in 2011, 15% more than in 2008. Cycling tourists accounted for approximately DKK 5.5 billion in the Danish economy in 2011. This highlights the potential for continued improvement of the conditions for bicycle tourism.

Specific initiatives for more recreational cycling:

- The Ministry of Transport is working on improving signposting on the national cycle routes.
- The Ministry of Transport is setting up a group of experts to develop cycling tourism and award the Cycle Tourist Solution of the Year.

Other recommendations:

- More recreational cycling routes
- A well-connected network of bicycle routes with good accessibility, also in relation to cycling tourists.

3.1 "Cycling as a hobby": Recreational cycling routes for active leisure



Photo: Danish Road Directorate

Additional good cycling projects focusing on recreation can provide more people with active leisure time on their bicycles.

Cycling in recreational areas provides opportunities for physical activity in nature in attractive surroundings. This provides opportunities for both new experiences and exercise. This is therefore also beneficial to public health and the prevention of life-style diseases.

Almost everyone in Denmark owns a bicycle. This means that it is easy to take advantage of opportunities to take the bicycle if you want to go on an excursion, exercise outdoors or seek out new experiences in nature. The primary purpose of these trips for the recreational cyclist is the cycling trip itself and the experiences associated with it. It is the desire to cycle rather than an actual transportation need that is the motivation for the trip.

As part of creating better opportunities for more active recreation for the Danes, it is also important to increase access to local nature, and thus for recreational experiences, for the urban population.

The ideal is to create better, more well-maintained, consistent and accessible bicycle routes.

Recreational cycling is a good example of an area where several stakeholders, including state agencies, must play a role. Attention must be given to this area so that it can be used proactively in order to ensure that even more people take their bicycles into nature areas.

3.1.1 Better signage and directions on bicycle paths

It should be easy to find the way to attractive and enjoyable nature experiences throughout Denmark. It is therefore important to provide clear signage of recreational cycling routes and directions to attractions.

When you are having your coffee on a Sunday morning, you are more likely to decide to go cycling in the countryside if you know where to find recreational cycling routes to suit both your mood and the weather.

In order to encourage people to cycle more recreational kilometres, there must also be a focus on the coherence of the recreational bicycle route network, as there are different networks in Denmark.

Improved signage of bicycle routes can provide better cycling experiences, targeted at both recreational cyclists and cycle tourists. The signage should recognize that attractive cycling routes can run across existing routes and route networks, municipal boundaries, etc.

It should also be easy for tourists to find out about special tourist-friendly routes that, for example, lead through scenic areas or past cultural attractions.

There are currently 11 national cycle routes, which together form a nationwide network. They run along attractions and sights in scenic natural areas with services and accommodation facilities. The municipalities through which the cycle routes are established are responsible for designating, planning and changing the routes. The municipality shall report to and apply for approval from the Danish Road Directorate in connection with the reorganization or modification of existing routes or in connection with the designation of new routes.

There may be a need for improvements to the routes, both in terms of signage, routing, surface, naming, numbering, digital registration, etc. A more coherent recreational network also requires coordination in relation to the planning and development of both regional and national cycle routes to ensure better utilisation of the routes and to ensure improved interaction between the two route networks.

3.1.2 More recreational cycling routes

It is important that recreational cycle routes enable different kinds of leisure activities. It should be possible to take a pleasant and relaxing bicycle trip in the countryside. At the same time, it should also be possible to enjoy a more physically demanding trip, such as mountain biking in the woods.

It may also be a good idea for recreational cycle routes to be integrated into larger recreational areas, for example in connection with the establishment of new national parks.

The development of cycle routes for recreational purposes can be based on several of the following criteria, which the Cooperation Committee regarding Service Guides and Tourist Information uses to assess changes in the national cycle routes.

Box 3.1 | Characteristics of good recreational cycle routes

Safety and security: A route should not be changed from a cycle path in a separate layout to a cycle path along a road, or from a cycle path along a road to no cycle path. A route should generally not be moved from a less busy road to a busier road, where most of the traffic consists of cars and trucks, or where the move leads to an increased number of busy intersections to be passed.

Tourism: A new route should improve the cycling experience along the route, including in relation to cultural and natural tourist attractions that will enhance both the cyclist's experience and the potential to attract more cyclists. Route reorganizations must take account of the proximity to national landmarks.

Service: A new route layout should increase the potential service level along the route, so that the possibilities are improved for accommodation, shopping, bicycle repair, refreshments, etc.

Comfort: A change of route layout should not cause reduced comfort, for example by introducing more climbs, conversion from paved road to gravel or dirt roads or a greater number of 90 degree turns, unless it is dictated by considerations regarding possibilities for experiences, services or improvement of safety (e.g. the disadvantages of hills may be offset by the attractiveness of the venue).

Signage: A route should be provided with signs in accordance with the Danish Road Directorate's guidelines (also in city centres) and shall ensure coherence with regard to, for example, regional and local cycle routes.

Meaningfulness: A national route is a main artery that meaningfully leads cyclists from hub to hub. A change of layout should not entail a clearly perceived detour from the shortest cycle-friendly route. All routes should begin and end at a traffic hub with service facilities and possibilities for experiences. Links should be provided to the European route network EuroVelo.

Source: The Cooperation Committee on Service Guide and Tourist Information

These criteria and guidelines may be useful and serve as inspiration in connection with the development of the route network, including in relation to routes that cater to an international audience. This can ensure coherence between efforts to promote recreational cycling and initiative to promote cycling tourism.

Box 3.2 | Cycling on Copenhagen's old fortifications

In connection with the renovation of Copenhagen's fortifications, one of the goals was to exploit the area for cycling, because it provided an opportunity to convey the location's military history and establish a good bicycle path.

Among other things, four bicycle challenge routes have been established that are bicycle playgrounds, and inspiration videos were produced with tips and tricks. The design also tells the history of the orderlies who, more than 100 years ago, cycled with messages between the many forts and batteries. Two bicycle routes were also established where an app can be used to access the history of the fortifications and its attractions.

Creating a uniform bicycle strategy for the nine municipalities along the fortifications has provided coherence between the installations in the municipalities. This has resulted in, among other things, major improvements to the bicycle paths along the Vestvolden fortifications, with new asphalt, lighting and bridges, so that the area works for both recreational use and for commuting.

Bicycle challenge track at Rødovre



Photo: Jeppe Carlsen

Source: Danish Cancer Society and the Danish Road Directorate

3.2 "Experiences on two wheels" Greater investment in bicycle tourism



Photo: Randers municipality

Cycling plays an important role for Danish tourism because Denmark is famous as a cycling country. This entails responsibilities in relation to the facilities offered to visitors on bicycles, both domestic and foreign.

Cycling tourists are active tourists, who mainly choose Denmark because of its nature and the many sections of coastline.

Bicycle tourism in Denmark caters to many kinds of visitors with different cycling and holiday behaviour and who thus have different needs. One can distinguish between two groups of cycling tourists:

- **Part-time bicycle tourists:** These tourists cycle short trips and possibly one or two longer trips during their holiday. This could be the couple who cycle for an evening trip, the parent who cycles a few kilometres from the holiday cottage to the bakery in the morning, or a family with children on a day trip with a packed lunch. This group will probably be inclined to use the smaller loop routes, which are shorter routes that often include a number of attractions. This group is estimated to represent 75% of cycling tourists in Denmark.
- **Full-time bicycle tourists:** These tourists cycle considerably more than part-time bicycle tourists. They may have arrived in Denmark by bicycle and they often cycle long journeys of over 10 kilometres. These cyclists will presumably be inclined to use specially established bicycle routes that link together the country, or parts of the country. They will usually have bicycles and bicycle equipment of high quality. This group is estimated to represent 25% of cycling tourists in Denmark.

More bicycle tourism throughout the country's route network

Targeted initiatives for the stretches of national road network that are part of the national routes, municipal route networks in the countryside and the route network on the small islands will establish a basis for expanding bicycle tourism. Denmark's strong position in the competition to attract bicycle tourists must be maintained and expanded.

Box 3.3 | Bornholm - an attractive bicycle destination

Despite the demanding hills and constant wind from the sea, cycling is immensely popular on the island. More than half of the tourists from Germany who were asked in 2010 said that they had cycled during their holiday on Bornholm. More than a quarter of the Danish tourists responded that they had cycled, while 83% of "other nationalities" had used bicycles.

The small size of the island makes it ideal for cycling, but there are other destinations in Denmark that have a similar size and a more suitable topography.

The difference is that Bornholm has chosen to focus on establishing good cycling opportunities. There is a well-developed cycling infrastructure, including disused railway tracks, convenient transport of bicycles on the island's buses, well-functioning systems for the carriage of bicycles on buses and ferries from the mainland, specialized tour operators and general attention to the segment comprised of cycling tourists. Bornholm therefore has a good basis for attracting tourists who want to enjoy an active holiday - and are willing to pay for it.



Photo: Destination Bornholm

Source: Danish Cyclists' Federation

In relation to physical infrastructure, it is important to establish strategically well-placed and well-maintained bicycle routes with a high degree of ac-

cessibility. The focus should be on popular routes and routes with the potential to attract more bicycle tourists.

The work to promote bicycle tourism should pay particular attention to establishing an attractive range of exciting cycling routes with a high degree of cycling comfort, which also caters to an international audience.

Box 3.4 | Powered by Cycling: Panorama

The project Powered by Cycling: Panorama has worked with VisitDenmark, Østdansk Tourism and a number of other parties to make two national routes more attractive for bicycle tourists and recreational cycling.

In Eastern Denmark, this means the Gedser-Copenhagen route, which is part of the international Berlin-Copenhagen route. In 2013, an estimated 10,000 full-time tourists cycled the entire Danish part of the route. In Western Denmark, the work has been concentrated on the west coast route, which is part of the international North Sea route.

26 new Panorama routes have been established, all of which share their route with the two national routes for a shorter or longer distance. The Panorama routes are designed so that they lead cyclists out to the areas' attractions and scenic spots on the best and safest routes.



Photo: Panorama, Niclas Jessen

Source: Østdansk Tourism

A future expansion of routes targeted at bicycle tourist must occur in the appropriate venues. It is therefore important to ensure coherent planning for how bicycle tourism can be developed regionally in order to ensure a strategic approach.

Targeted initiatives must be implemented that promote bicycle tourism in selected parts of the national network and which are part of the cycle route

network. The government must also support initiatives for more cycling tourism along the municipal network in the countryside and on the small islands.

It is important to maintain a special focus on the small islands, especially to ensure growth and employment in areas with a limited population base.

Funds have already been allocated through the Bicycle Fund for bicycle projects on national roads and grants have been awarded for bicycle tourism projects in municipalities and organizations. A special fund has also been established for the development of cycling tourism on the small Danish islands that have fewer than 1,200 inhabitants.

Box 3.5 | Bicycle Safari on Fur

The bicycle project on Fur consists of several different measures, all of which are designed to make it more attractive to be a bicycle tourist on the island:

An existing crushed stone track on the island has been paved with asphalt so that it is more robust and comfortable to cycle on.

Three new routes have been signposted to make them more accessible: A shopping route, a hill route and a coastal route, which together lead cyclists around most of the island.

A number of service improvements have been implemented along the established bicycle paths in the form of rest areas with tables, benches, shelters and a hut.

A new cycling map of Fur has been developed, where the three routes and the island's attractions are plotted.

Skive municipality has received DKK 1.1 million in financing for the project from the Bicycle Fund through the special scheme for small islands.

Source: Danish Road Directorate

Interaction between actors creates better cycling experiences

Cycling tourism is about much more than bicycle paths and signage of routes.

In addition to access to great experiences, attractions along the way and cycling comfort, the cycling routes for bicycle tourists should be characterized by a good and varied range of ancillary accommodation and catering facilities, as well as service options in the form of transport of luggage and bicycles.

If the circumstances around a bicycle route are good, there will be scope for allowing private operators to offer and develop the necessary accommodation and catering, etc.

Box 3.6 | The government's Growth Plan for Danish tourism

The government published its Growth Plan for Danish tourism on 20 January 2014.

The vision of the growth plan is that Danish tourism and the experience economy should achieve growth rates by 2020 at least as high as expected in other European countries.

The development of bicycle tourism of international class is included as one of several target areas in the Growth Plan. The objective is that Denmark should be able to assert itself in international competition as an attractive destination for bicycle tourism.

The background for the growth plan is, among other things, that the growth of Danish tourism has stagnated. From 2007 to 2012, Denmark experienced a decline in foreign tourism, while Europe as a whole has experienced a growth. Denmark has therefore lost market share compared to its European competitors. The trend, however, covers a two-part picture. On the one hand, there has been a growth in city and business tourism, while on the other hand there has been a significant decline in coastal and nature tourism.

Source: The government's Growth Plan for Danish tourism

In order for Denmark to achieve success as a cycling destination, there must be a good interaction between good-quality cycling routes, attractive holiday packages and exciting experiences.

Box 3.7 | Efforts to promote bicycle tourism in Denmark

The government is working on several fronts to develop cycling tourism in Denmark. This is occurring within the framework of the government's growth plan for Danish tourism and the Ministry of the Environment's work with a national outdoor policy.

The Ministry of the Environment has initiated the development of new outdoor and holiday offers that are intended to link good outdoor activities in areas such as cycling with other offers from the tourism industry.

The Ministry of Business and Growth is working to develop the business service infrastructure related to the routes, so that the tourists feel that there are good options for catering, accommodation and bicycle service on the routes.

A new network and centre for international cycling tourism has also been initiated, where the actors behind the international cycling tourism routes in Denmark will collaborate around the development, operation and marketing of bicycle tourism.

VisitDenmark is in the process of preparing a nationwide booking platform - Denmark Direct - to make it easier for tourists to book experiences and entire holiday packages. The new booking platform shall make it easy to book a combined cycling holiday in Denmark on-line, with ac-

commodation, meals and refreshments as well as experiences. The initiative will increase the focus on Bicycle Denmark as a holiday destination and could form the basis for a wide marketing campaign for Denmark as a cycling country.

Source: The Ministry of Business and Growth

A well-developed and accessible infrastructure is only one of several key preconditions for an area to become an attractive cycling holiday destination. Efforts must be made where there is a potential for bicycle tourism and the relevant stakeholders must be involved in the process.

3.2.1 Development of bicycle tourism in the expert group

Strengthening bicycle tourism is a task that must be tackled by many authorities and organizations simultaneously, locally, regionally and nationally in order to meet the various needs of bicycle tourists.

Bicycle tourists can be attracted through, among other things, a broad cooperation to ensure a good and coherent route network with clear signage, electronic planning opportunities and good service facilities along the routes.

The Ministry of Transport will therefore establish a group of experts to discuss how to develop Denmark into an even better holiday destination for bicycle tourists. This will include working with the relevant actors to determine how to create good and coherent route designs with good accessibility for both residents and international bicycle tourists. Furthermore, work should be included to identify how to achieve functional and modern electronic access in relation to routes, attractions, dining and accommodation options etc. so that it is easy to be a bicycle tourist.

The expert group's work will also deal with other ongoing initiatives that are relevant to the cycling holiday area and will coordinate any actions with the relevant parties.

The work will also focus on potential synergies between recreational cycling and bicycle tourism.

3.2.2 The Bicycle Tourism Solution of the Year award

Along with the work of the expert group, attention will also focus on the work already under way in several places throughout the country to improve Denmark's reputation as a good country for cycling holidays. This will be done through the Bicycle Tourism Solution of the Year award.

The Bicycle Tourism Solution of the Year award will help to promote and disseminate successful bicycle tourism solutions that exist around the country. This will also allow successful initiatives to serve as inspiration elsewhere in the country.

The Bicycle Tourism Solution of the Year award will be an annual event to reward initiatives or solutions that successfully promote bicycle tourism. It can be a local, regional or national initiative.

The panel that decides who shall receive the Bicycle Tourism Solution of the Year award will be composed broadly of leading figures and other key people from the areas of cycling and tourism.

4 NEW AND SAFE CYCLISTS

Safe to school and other activities promoting good traffic culture



Photo: Ulrik Jantzen

More people cycle in Denmark than in most other countries, but there has nevertheless been a decrease in the popularity of cycling. It is important to retain our good cycling culture so that even more people will cycle. This is especially true for the school children, who are the future cyclists.

Both adults and children should feel safe when they set off into traffic on their bicycle. This involves taking personal responsibility for engaging in a good and respectful traffic culture when you are on the road, and about designing the roads so that they are safe and cyclists feel secure. We can achieve this by ensuring that it is easy to obtain an overview of the traffic. In this way, we can ensure that all generations can benefit from choosing to travel by bicycle.

Healthy cycling to school

Establishing a good traffic culture and safe roads and bicycle paths is particularly important for school cycling, which is the basis for children learning at an early age how to cycle safely in traffic.

We know that there are many positive effects associated with children cycling, both in the short-term and in the long-term.

For example, the results from the Mass Experiment in 2012 indicate that children who cycle or walk to school are much better at concentrating in school compared with children who arrive in school by car, bus or train. The positive impact of cycling or walking to school even turned out to be greater than the importance of eating breakfast or having a meal in the school.

Svendborg municipality's major school sports project, the Svendborg Project, has also contributed a number of research findings on the positive effects of physical activity on children. The project entails that all children in grades 0-6 have six hours of sport every week instead of two hours. This has produced good effects on both the children's health and on their ability to concentrate. The results from the Svendborg Project show that the schools generally experience fewer conflicts in the school yard and a higher level of concentration and calm in the classrooms.

When exercise has such a major impact on children's everyday lives, it is important that parents consider whether it is necessary to drive their children to school by car every day, as many do at present.

During the period 1978-2000, the number of children aged 6-10 years who were driven to school by car more than doubled (from 10% to 23%). The figure has stabilised in the first decade of the new millennium. In 2009, 24% of children were driven to school by car, and that is far too many. The trend is no better for the older pupils. The figures for 2007-2012 show that on average, only 44% of 10-16 year old children cycle to school.

At the same time, studies show that as many as 2/3 of children and adolescents aged 11-15 do not live up to the National Board of Health's recommendation for 60 minutes of physical activity every day.

Cycling to school can therefore be an essential tool to achieve healthier children and adolescents.

If more children are to be persuaded to cycle to school, it requires that children and their parents feel comfortable about the school road and the traffic conditions around schools, so that the bicycle can become their primary means of transport.

This requires that both the state agencies and the local authorities design roads and bicycle path systems, so that it is safe and feels safe to travel in traffic for everyone. This also imposes demands on schools and parents to teach children about good and safe traffic culture.

Increased road safety

Fortunately, road safety in Denmark has improved markedly over the past several years. This also applies to cyclists. The number of bicycle accidents with injuries has more than halved since 2000. The same is true for the number of cyclists killed.

It is also significant that the number of accidents per kilometre cycled has halved since 2000. The total bicycle mileage has been relatively stable since 2000, while there has been a marked decline in the number of cyclists who are injured or killed in traffic. In other words, it has generally become safer to cycle.

Cyclists are still vulnerable road-users, however, and there is still about five times greater risk of being killed in traffic when you travel one kilometre by bicycle compared to by car.

There must therefore continue to be a focus on the areas where experience has shown that there is a need for greater vigilance.

There must also continue to be an awareness of the special needs of other groups, including in relation to older cyclists. Work on road safety initiatives and secure and safe routes to school will benefit all cyclists, and can also help to promote cycling among both younger and older road-users.

Specific initiatives to increase safety for cyclists:

- The Ministry of Transport supports the development of bicycle paths at schools and near leisure activities.
- The Ministry of Transport is working to achieve School Cycling Cities with coherent road safety solutions at schools.
- The Ministry of Transport is tackling risk zones, including with measures to combat right-turn accidents and achieve safer railway level crossings

Other recommendations:

- Further development of tools for teaching better cycling culture

4.1 "Children in the saddle": Safer cycling routes to schools and leisure activities



Photo: Odense municipality

More children and young people should be able to cycle to school and find that it is both safe and secure.

There must be special consideration for children and young people in traffic, because they are some of the most vulnerable road-users. A safe and secure bicycle route for children and young people to school and leisure activities will help to form future cyclists and thus contribute to more bicycle traffic in the long-term.

It is easier to keep cycling in adult life if you get a comfortable and easy introduction to cycling as a child and teenager by encountering good, secure and safe cycling routes to school and leisure activities. According to the School Cycling Handbook issued by the Danish Cyclists' Federation (2013), experience shows that the earlier children learn to cycle, the easier it is for them to become safe cyclists. This also means, therefore, that they quickly obtain an understanding of what it means to be part of a good traffic culture in interaction with other road users.

Cycling also gives children and young people access to the freedom that comes with individual transport. On a bicycle, children and young people achieve this freedom much earlier than they could take their first driving license for a moped or car.

Despite the various measures implemented, the longer-term trend over the past several years is unfortunately clear: The number of children cycling to school has decreased. It is therefore necessary to examine what can be done in order to reverse this trend.

Box 4.1 | More children safe and secure on their bicycle to school - how?

The School Cycling Handbook issued by the Danish Cyclists' Federation (2013) identifies a wide range of intervention tools to promote more school cycling:

- Initiatives aimed at practice: Bicycle play, cycling tests and campaigns.
- Measures designed specifically for education: Road traffic education, including "See my bicycle", promotional materials that can be used in teaching and "Find your safest way to school."
- Initiatives aimed at the bicycle: Workshop and maintenance course.
- Behavioural adjustment, including through traffic regulation: Speed control, traffic separation, limitation of cars at schools, traffic policy, including helmet policy and adult school crossing guards.
- Physical changes, signage and generally marking to indicate that "this is a school road". Infrastructure in the form of bicycle paths, crossings, bicycle parking and maintenance.

The School Cycling Handbook was published with funding from the Bicycle Fund and TrygFonden.

Part of having a good traffic culture also consists of considering your own safety. For example, many children and young people choose to cycle with a helmet.

According to the Road Safety Council, 82% of children under 11 used bicycle helmets in 2012, and 40% of young people aged 11-15 used bicycle helmets. Naturally, it's a personal choice whether to use a helmet, but in the event of an accident, the risk of head injury is reduced by 44%, if you use a helmet.

Nevertheless, it is obviously important that the roads and bicycle paths are arranged as safely as possible, so that the infrastructure helps to create a safe environment for cyclists.

4.1.1 More bicycle paths at schools and leisure activities

Bicycle paths at schools and recreational activities should be developed to ensure that the bicycle is a natural and safe means of transport for the majority of children and young people, both for school and leisure.

It is important to provide safe junctions with intersecting roads and to separate cycle paths from the road. This applies to both urban and rural areas.

Measures are also being implemented on national roads that can contribute to more secure and safer routes to school by giving priority to so-called "missing links" and cases where national roads can be a barrier to a safe and secure school cycling route.

The Bicycle Fund has focused on cycling to school and leisure as one of the areas that have been prioritized, in relation to both the grant projects and the national road projects.

Box 4.2 | Cycling Fund Project - "Safe routes to school in Ringkøbing-Skjern"

For many years, Ringkøbing-Skjern municipality has needed to secure two sections that are connected to three schools in the municipality - Højmark School, Lem School and Bork School.

There was especially a need for a bicycle path between Højmark and Lem, because pupils from Højmark School switched to Lem School when they reach seventh grade. At the same time, many children also travel back and forth between Lem and Højmark outside of school hours, when they participate in leisure activities in the two small towns.

The police have classified the section as a "dangerous school road" and the children have therefore been largely forced to take the bus or be driven by their parents.

Two new bicycle paths have therefore been established on the two stretches.

Moreover, as part of the project, a traffic policy was developed for the three schools and was distributed to parents. The policy paper deals with, among other things, the parking conditions at the schools, safe routes to school and school patrols.

The project has received about DKK 1.7 million in co-funding from the Bicycle Fund.



Source: Danish Road Directorate

When planning interventions for safer and more secure school traffic, it is important to involve the schools in order to maximize the impact of the

measures. It is also important to have adequate bicycle parking at schools and leisure facilities.

4.1.2 School Cycling Cities with coherent road safety solutions

The School Cycling Cities concept raises the level of ambition and innovative bicycle solutions around the municipalities in order to encourage more children to cycle to school. School Cycling Cities must focus on coherent road safety solutions and safety for school cycling.

School Cycling Cities can be a target area for municipalities who wish to turn the tide so that more children will feel it is natural to take their bicycle to school.

When children cycle to school, it helps to make them healthier and improve their ability to concentrate. It also promotes their independence. The bicycle can also be used actively in everyday school life, for example when a class goes on an excursion. There are many good reasons therefore to invest in more cycling in the school.

Safety and security must also be prioritised in School Cycling Cities as part of the local traffic policy. Schools are key players therefore.

The key factor is that the specific conditions in each municipality and at the individual school must determine which solutions are best suited to provide safety and security and thereby promote cycling to school.

Given the local conditions, there will be many different good solutions around the country. The vast majority of the country's school and leisure activities are located along the municipal roads. It is therefore also a municipal task to deal with school traffic.

There are many different measures that can be implemented to encourage more children to cycle to school. From promotional campaigns to school activities and physical construction of bicycle paths and access roads.

Campaigns can help to make school children, and their parents, more aware of the many benefits of cycling to school. Local initiatives such as bicycle surveys or participation in national campaigns such as the children's exercise campaign, "All Children Cycle" (Alle Børn Cykler), can also help to change habits and establish a community regarding "here we take our bicycles or scooters to school".

Local trials with pedestrianized zones or zones with reduced speed can also help to identify whether the reduced speed will encourage more people to cycle to school.

Ensuring a better interaction between bicycles and other traffic on school roads can also be accomplished creating separate access routes around schools, where this is possible. Separate access roads that establish a secure and safe environment for children cycling and walking to school, will help to

avoid conflicts between cars and children who are cycling or walking. That in itself will make it easier to choose to cycle to school.

However, far from all schools have a location where it is possible to separate the routes to school between bicycles and other traffic. It is essential, therefore, to constantly consider new ways to create safer conditions for cyclists.

One option that many schools use is to have school patrols. The school patrols increase safety, especially for pedestrians, and help to increase awareness of the road being a school road.

Many municipalities already operate with different initiatives to promote school cycling.

Box 4.3 | Happy Bicycle School in Odense

The main idea behind the Happy Bicycle School (Cykelglad skole) is that the bicycle can be integrated into and enrich the teaching processes and also increase opportunities to go on excursions.

The measures at Ejerslykkeskolen in Odense have included:

- An introductory activity for all teachers and pedagogues about cycling and its integration into the teaching
- Training of 20 teachers as cycling instructors
- Bicycle Play Day for 6th graders to encourage them to maintain their cycling habits
- Pimp my bike - a workshop where the children can give their bicycle a personal touch
- Cycling as an optional subject, with bicycle games, bicycle training and workshops etc.



The effects on Ejerslykkeskolen have been that the number of children who cycle to school has risen from 37% to 40% in two years.

Bicycles are also being used more actively in the class. Before the project started in 2011, only 38% of teachers and pedagogues had tried to involve the bicycle in the teaching, while the figure rose to 67% in 2013. At the same time, 87% of children say that they use their bicycles more often in their classes than before the project.

The pupils' improved cycling skills and improved orientation in traffic also means that many more teachers and pedagogues than previously feel confident about taking the children on cycling trips.

Odense municipality has received DKK 6.3 million in co-funding from the Bicycle Fund for Odense Bicycle City, where Happy Bicycle School is one of nine sub-projects.

Source: Odense municipality

There are various reasons why some children cannot necessarily cycle to school, but must arrive by bus or car. It is therefore necessary to design school roads so that there is space for the different users, so that everyone can arrive safely, as the example below from Skanderborg shows.

Box 4.4 | The campaign "The Unusual" in Skanderborg municipality

Skanderborg municipality's campaign "The Unusual" focused on the fact that parents who drive their children to school are making the school road unsafe for other children. The campaign instead praised the "unusual children" who transported themselves to school, on foot, bicycle, scooter, bus or similar.

The campaign consisted of two elements:

1. Physical closure of the school roads
2. Communication of messages about children who transport themselves

Skanderborg municipality closed the roads around three schools. The inability to continue with "business as usual" provided an incentive to try something new.

In addition, all parents and children were encouraged to experiment with new transport habits to and from school under the concept of "The Unusual". Messages focusing on the benefits of children using their bodies as a means of transport were communicated through various channels.

A key element was highlighting those who do the right thing - *the unusual*. This avoided criticism of those who, due to a disability or special circumstances, had no other option than to travel by car.

The campaign was constructed around "the unusual". Ordinary children were awarded hero status by the municipality and highlighted as unusual if they transported themselves to school. The graphic style was a cartoon universe, with references to the hero-worship of the old comic books.



The campaign included a bicycle helmet competition, where the older pupils could take a picture of themselves with a helmet on and tag themselves on Instagram. The competition highlighted that it's cool to wear a helmet.

An effect measurement of the campaign showed, among other things, a decrease of 25% for car traffic around the schools involved, 1,500 parents were directly affected by the closure of routes to school, and there were more than 9,000 visitors to the www.deualmindelige.dk during the 4-week campaign period in 2013.

Source: Skanderborg municipality and Local Government Denmark

The campaign in Skanderborg was based on local conditions. This will also be necessary in other locations in order to create better interaction between bicycles, pedestrians and cars.

As part of the School Cycling Cities initiative, emphasis is also placed on innovative bicycle solutions with dissemination of best practices. These could include a focus on the obstacles and barriers that prevent municipalities from developing and implementing initiatives to improve safety on school road traffic.

4.2 "Pay attention to each other": A good cycling culture provides better cycling experiences



Photo: Danish Road Directorate

Road safety for cyclists, especially for children, is an important area. Traffic accidents with injuries have high costs for those affected, their families and society as a whole.

The average cost of every injury caused by a traffic accident amounts to almost DKK 2.7 million (2014 prices) for society. Of this, approximately DKK 700,000 are costs associated with the person for treatment, income transfers and loss of production. The remaining approximately DKK 2.0 million corresponds to the welfare loss for society.

Road safety in Denmark has improved markedly every year for many years, so road safety efforts do really work.

4.2.1 Targeted initiatives to safeguard cyclists

However, continued efforts to improve safety for vulnerable road users such as cyclists remain important in terms of making the bicycle a more attractive and natural means of transport in Danish daily life.

The road safety efforts have mainly occurred under the auspices of the Fund for better road safety, which aims to intensify efforts to reduce the number of deaths and injuries on our roads, including through improvements in road construction, campaign efforts, improved accident statistics and grants for Road Safety Cities of the Year.

Improved safety for cyclists at junctions

The government platform states that improving road safety is a priority in order to maintain the downward trend in the number of fatal accidents.

In the area of cycling specifically, safety for cyclists at junctions has been identified as an important focus area.

Junctions are a particular challenge in many situations because of the shift from cyclists and motorists being separated, to cyclists and motorists using the same area. This influences both the road safety risk and the perceived level of safety in traffic.

The vast majority of bicycle accidents occur in urban areas and often at junctions. The design of junctions, therefore, has a major potential to reduce the number of cyclists killed and injured.

Box 4.5 | When vehicles and vulnerable road users have to share the same space - preconditions that may help to reduce the risk of bicycle accidents at junctions

- The cars' speed must be low at the intersections. Policy measures could include overpasses from side roads, narrow entry roads into crossings and roundabouts, and less dynamic (rounded) corners.
- Cyclists should be as visible as possible in and approaching junctions.
- Motorists and cyclists should be aware of each other, for example, a shortened bicycle path is an opportunity to increase mutual awareness ahead of the real point of conflict. Conversely, it is important to realise that a shortened bicycle path may feel more unsafe for many cyclists.
- Simple and manageable crossings, so that there is minimal distraction from other irrelevant factors.

In addition to the construction and improvement of crossings in order to increase the safety of cyclists, it is also essential to develop and disseminate the latest knowledge about the design of safe intersections etc.

Box 4.6 | Improved road safety at Hammelev in Haderslev municipality

In Hammelev, a simple re-design of a three-forked junction at Hammelev Bygade and Ribevej has had a significant impact on road safety.

The bicycle path has been moved about 15 metres inwards on Hammelev Bygade and there is a right of way for cyclists.



Source: The Danish Road Directorate and Haderslev municipality

In connection with efforts to improve road safety and promote cycling, there must also be a focus on the interactions between safety and feeling secure. What may be regarded as safe, may not necessarily be experienced as safe by the cyclist, or vice versa.

Addressing right-turn accidents

Right-turn accidents between cyclists going straight ahead and trucks turning right often have particularly serious consequences.

The number of right-turn accidents has generally been declining since 2000. This applies both in terms of the number of deaths and the number of injured cyclists. Right-turn accidents between a truck and a cyclist occur mostly in urban areas.

Danish experience shows that the following measures, among others, can help to raise awareness at junctions, so that accidents between cyclists going straight ahead and trucks turning right can be eliminated:

- Stop lines at an earlier point for motorists
- Separate green light for cyclists
- Removing the verge between the road and the bicycle path
- Information campaigns aimed specifically at cyclists and truck drivers

In 2013, there was an increase in the number of cyclists killed in right-turn accidents compared to the previous year. In 2013, the so-called right-turn accidents cost the lives of seven cyclists. 13 cyclists were injured in right-turn accidents and the number of casualties was thus higher than the year before.

A renewed effort was launched, therefore, which resulted in a new strategy for the prevention of right-turn accidents, which was published in March 2014.

The strategy is described in a catalogue that was prepared by the Danish Road Directorate, the Danish Transport Authority and the National Danish Police. The catalogue contains a number of behavioural, driving and road design measures and initiatives that can be disseminated and launched in cooperation with local authorities and industry.

The Minister of Transport has initially decided to proceed with especially three of the proposals from the strategy:

1. Bicycle boxes
2. Education packs for the driver training programme
3. Knowledge-sharing with municipalities

Box 4.7 | Bicycle boxes on the road to prevent right-turn accidents

A bicycle box is an additional waiting area for bicycles placed in front of the vehicles' stop line in the right-turn lane. It is marked with a white bicycle symbol and a stop line.



The box makes cyclists who are stopped at the red light more visible to cars and trucks, and it also ensures that cyclists can cross the intersection before the other traffic and trucks begin to turn right.

Today there are only a few bicycle boxes in Denmark, but there are many on the streets in Holland and in larger cities like Stockholm and London.

Source: Danish Road Directorate

While the Ministry of Transport is intensifying efforts in its area, the police have also intensified their efforts.

Continuous improvement of safety at railway level crossings

Work is also ongoing to improve safety at railway level crossings.

Better safety around railway level crossings benefits both cyclists and other road users. This can have major importance for level crossings where there is commuter traffic or on roads that serve as school roads. Securing crossings also help to make e.g. cycle holidays or leisure outings in the countryside a better and safer experience.

The effort is aimed particularly at reducing the number of level crossings by either securing or completely abolishing unsecured level crossings. Unsecured level crossings means a level crossing where there is no form of electronic warning or safety light.

Box 4.8 | Measures to improve safety and confidence at railway level crossings

Rail Net Denmark has approximately 700 level crossings. Approximately 440 of these are secured by a full level crossing barrier, half level crossing barrier or warning systems. More than 260 level crossings are not secured with automatic safety devices.

- When Rail Net Denmark secures or dismantles a level crossing, it is achieved in one of two ways:
- The level crossing is closed and road-users are referred to another existing road.
- The level crossing is secured with a full or half barrier system.
- The level crossing is closed and another road access is established, i.e. a replacement installation, usually another road along the track, but in some cases with a new level-free crossing.

Rail Net Denmark does not close level crossings before providing access elsewhere.

Following the closing of the unsecured level crossings, traffic will be directed through a nearby overpass, which will thus experience an increase in traffic. Such facilities will therefore usually be upgraded to either a full or half barrier system.

In recent years, Rail Net Denmark has also increased safety in 10 existing barrier systems by supplementing with trestle pole barriers or upgrading from half to full barriers.

Box 4.9 | Securing the railway level crossing at Alken

Path and half barriers help to clarify for cyclists and other road users that a train is approaching the level crossing.



Source: Rail Net Denmark

The agreement for a Green Transport Policy of 29 January 2009 earmarked DKK 36 million annually in the period 2014-2018 for this work to reduce the number of unsecured crossings. As early as October the same year, however, it was decided to bring forward initiatives and the objective is now that all unsecured level crossings on Rail Net Denmark's network will either be closed or secured by the end of 2018.

There will continue to be a focus on making the secured level crossings safer.

4.2.2 Good tools for teaching a better cycling culture

To further encourage more children and young people to start to cycle to school again, it is important to continue developing tools for teaching road safety and good cycling culture.

This could be to develop new materials, interactive tools, etc. which promote good cycling culture. It is essential that the tools are up-to-date and help to improve the understanding and knowledge of how to travel safely and securely on a bicycle in traffic.

The Ministry of Transport will enter into a constructive partnership with relevant stakeholders and will make knowledge available for the further development of tools for teaching better cycling culture.

It is important to gain greater knowledge of e.g. the benefits of helmet use, the importance of lights and reflectors, as well as the difficulty for truck drivers to see cyclists on the street.

Box 4.10 | Teaching road safety in school

Road safety classes teach the pupils how to negotiate traffic safely. In relation to cycling, the pupils are trained in techniques and skills and about their own awareness in relation to dealing with traffic. The classes deal with issues such as giving hand signals at the right time, comply with the right of way and appraising the traffic situation thoroughly before acting. Finally, the classes train the pupils' awareness of how much responsibility they have for their own and others' safety when they travel around in traffic on foot or by bicycle. Older pupils are also taught about the dangers of mixing drugs and traffic.

A number of schools organise a "cyclist test" for grades 3 and 6 to test the pupils' skills and knowledge at this stage. The pupils are sent out on a bicycle route, where they must deal with a number of challenges. In addition, there may be a small, theoretical test that the pupils complete on the internet.

Source: The Ministry of Education

It is also important that the tools for road safety training also help to improve children's understanding of how other road users behave in traffic, so that they get a better understanding of good traffic culture. Interaction comprehension is thus an important element in the tool box.

Annexes

The new national bicycle strategy has been developed in cooperation with a number of municipalities and stakeholders associated with cycling.

The Ministry of Transport has established a working group. The group has exchanged ideas and experiences, which provided inspiration for the preparation of the bicycle strategy.

Participants in the working group:

- The Department of Transport (Centre for Roads and Bridges)
- Danish Road Directorate
- Danish Cyclists' Federation
- VisitDenmark
- Local Government Denmark (represented by Odense municipality)
- The Advisory Bicycle Agency (represented by the Danish Road Safety Council)
- DSB
- The City of Copenhagen
- Aalborg municipality
- Herning municipality
- Svendborg municipality

A series of working papers have also been prepared on the themes that have been central to the bicycle strategy. The working papers serve as explanatory annexes to the new national bicycle strategy.

The working papers can be found on the Ministry of Transport's website: www.trm.dk under the theme New National Bicycle Strategy (Ny national cykelstrategi).

The working papers deal with the following subjects:

- Where are we now - the scope of cycling and ongoing efforts
- Cycling tourism and recreational cycling
- Effects of cycling (health, environment, etc.)
- Bicycle and public transport - clarification of transport connections
- Bicycle promotion in cities and towns of different sizes - what works where?
- Safety and security on the bicycle

Besides the working group, a number of other municipalities, ministries and other actors have also contributed to the work.

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