

The synergy between bicycles and trains

Bicycles are an important means of transport in Denmark and there is already positive interaction between rail and bicycle traffic. Also, improving the interaction between rail and road transport through initiatives aimed at improving parking facilities is regarded as important.

The Danish Government, in partnership with the City of Copenhagen and the Frederiksberg municipality, have decided to expand the metro system by means of a fully automated, unmanned, tunnel-based metro ring line under the centre of Copenhagen - known as the Cityringen

Other projects

Fehmarnbelt

In September 2008, the Government signed a treaty with Germany for a fixed link across the

Fehmarnbelt with related improvements to the associated landworks. The Fehmarnbelt link will constitute an important improvement to rail transport - particularly in respect of international freight traffic. The Fehmarnbelt link will, however, also mean that the main lines between the eastern and western parts of Denmark will see reduced freight transit transport and thus have more capacity for domestic passenger transport.

Danish high-speed trains

As part of the political transport agreement, it was decided to significantly reduce travel times between Denmark's large cities and towns. The vision is for a rail system which, with scheduled hourly services, will cut travelling time between Denmark's four largest urban communities to one hour. The investments in high-speed trains will also have a number of derivative benefits for other trains. The model anticipates top speeds of 200km per hour and a certain reduction to the line alignment in Jutland.

Øresund

Co-ordinated between the Danish state and

Sweden's Skånetrafiken, cross-border rail traffic across Øresund comprises approximately 15 million train km in Denmark and Sweden. The tender was secured by DSBFirst with start-up in January 2009. The government intends to extend the tendering process. ✓



Lars Barfoed

Lars Barfoed gained a Master of Laws from the University of Copenhagen in 1981. Mr. Barfoed's political career began in 2001 and he has been posted to many different positions including Minister for Family and Consumer Affairs, Member of the Finance Committee, Member of the European Affairs Committee and Member of the Trade and Industry Committee. Throughout his business career, Mr. Barfoed has worked in many organisations including posts as Chief Executive of the Danish Bankers Association, Deputy Managing Director of Danish Commerce and Services and many more.

Light Rail Transit for Aarhus - uniting forces to realise the vision

For some years now there has been great focus on giving high priority to public transport in the area of Aarhus - Denmark's second largest city, situated on the peninsula of Jutland. The population in the area is 690,000, of which 300,000 are living in the Aarhus Municipality. Decisions were made to establish bus lanes on the big radial roads in Aarhus. In some stretches, the bus lanes should be considered as the first steps towards the introduction of light rail transits (LRT). In Aarhus, the planning work for an initial light rail stage, in which two existing railways (Grenaabanen and Odderbanen) are to be connected to a new light rail track, is well under way. Work is currently under way on new stages of rail and light rail extensions to unite the large towns of Eastern Jutland in a high-frequency public traffic system.

The Organisation of Midttrafik

Since 1 January 2007, the transport authority of Midttrafik has been managing and coordinating public bus transportation in Central Jutland. Moreover, Midttrafik is responsible for train services on two local railways via Odderbanen, which connects Aarhus and Odder, and Lemvigbanen connecting the towns of Holstebro, Lemvig and

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Thyborøn in Western Jutland. Regional bus services are ordered and paid by Region Central Jutland which also finances traffic on

the two local railways. The 19 municipalities of the region order and pay services within their own boundaries.

In 2007, a Light Rail Transit Secretariat was established in Midttrafik, whose primary target is to unite forces to realise the vision of one light rail transit system in the Aarhus area.

Background

Public transport in Aarhus has, for some time now, been a priority. This is due to an ever increasing traffic system and large future city development projects, for example:

- ▲ The development of the local harbour areas, by which the northern parts of the Aarhus harbour is to be converted into a new neighbourhood holding dwellings, businesses and public institutions with a floor coverage of 700,000m²
- ▲ The extension of Aarhus University over a period of 10-15 years resulting in a considerable growth in the number of students
- ▲ The establishment of a new neighbourhood at Lisbjerg with 20-25,000 new inhabitants concentrated around the light rail track
- ▲ The plans of an extension of Aarhus University Hospital in Skejby over a period

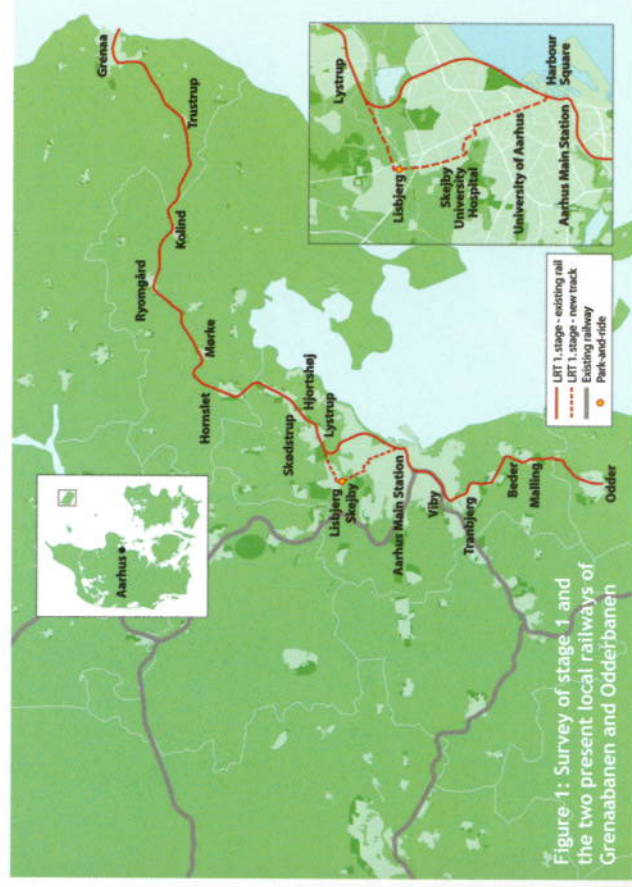


Figure 1: Survey of stage 1 and the two present local railways of Grenaabanen and Odderbanen

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Figure 2: Example of the duo-LRT Regio Cardis from Kassel, which can switch between electric and diesel operation

between 2008 and 2010, bus lanes will be made on the stretch on which the first LRT stage is going to be built.

In 2005, Aarhus City Council, together with the then 'Aarhus County', decided to carry on the work with a general plan for a network of light rail transits to serve the Aarhus area. Since then, the Ministry of Transportation has shown increased interest in enhancing the quality of public transport in Aarhus by means of a LTR-solution. So, in connection with the Budget for 2007, it was decided that the state should contribute to planning the LRT-development in Aarhus, and in 2009, a majority of the Folketing (the Danish Parliament) decided to allocate DKK 500 million to the first light rail stage in Aarhus - the first LRT in Denmark. The total construction cost budget has been assessed at approximately DKK one thousand million.

In continuation of this, Region Central Jutland, Midttrafik and the municipalities of Odder, Skanderborg, Favrskov, Randers, Norddjurs, Syddjurs, Silkeborg and Aarhus decided in 2007 to join forces to realise the vision of a united eastern Jutland light rail transit system.

As a result of this cooperation, a Light Rail Transit Secretariat was established at Midttrafik with the following two main purposes:

- ▶ To join forces in order to realise the vision of a light rail transit in Eastern Jutland and to strengthen the potentialities in the area by boosting the quality of public transport, resulting in more passengers and reduced

of 10-15 years with a floor coverage of 250,000m², which will make this hospital the largest in Denmark with approximately 9,000 employees, 600,000 annual out-patient treatments as well as guests and visitors

All of the future city development projects mentioned above are located along the first stage of the light rail transit.



Figure 3: Visualisation of the LRT in Aarhus on the section Olof Palmes Alle. Prepared by the firm of architects C. F. Møller A/S



Figure 4: Light rail transit track in open country surroundings. Prepared by the firm of architects C. F. Møller A/S

traffic density in the road system, as well as improving the environment

- ▶ To ensure the implementation of an Environment Impact Assessment (EIA) for the first stage of the LRT

The first stage of the Light Rail Transit

The basic idea of the first stage of the LRT in Aarhus is to take a large customer base as a starting point and integrate two existing local

COWI A/S holds the position as consultant to the builder in this project and assists the Light Rail Transit Secretariat in preparing the vision and coordinating the EIA review for the first stage of the LRT.

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Figure 5: Extension stages of the Light Rail Transit

for which reason a local authority plan supplement with appurtenant EIA for the project must be prepared. The first stage has been through the initial public comment period. The ideas and proposals received have been treated and preparation of the EIA review is well underway. Ahead of the first public comment period, much attention was given to the technical project, codes of practice, the section along the harbour and the updating of traffic model etc. so that these issues are in place and can be used to prepare the EIA.

The EIA review for the first stage has been in public tender and was divided into the following three categories:

- ▶ Technical construction pilot project for light rail, road, bridges including supplementary geotechnical investigations, light rail technique and safety
- ▶ Environmental investigations and assessment including land use
- ▶ Landscape aesthetic consultancy

In connection with the EIA review, visualisations will be prepared to show how the light rail will fit into the surroundings. The LRT will pass through the present city, occupational areas and open country. Figure 3 on page 20 shows an example of how the LRT will fit into an existing occupational area. Furthermore, the light rail is going to cross the Egå valley where a wide range of nature interests must be taken into consideration. In this section, an approximately 400 metre-long valley bridge will be established. Figure 4 on page 21 shows the LRT in open country surroundings.

The second public consultation of the EIA review will be held at the beginning of 2010 and is expected to be approved in the first half of 2010. Afterwards, detail planning can begin. Construction work will begin during the course of 2011. A society to build the LRT is expected to be established in 2010, and the first stage of the light rail will be put into operation in 2015.

Extension stages

Concurrently with the first stage of the LRT, the Light Rail Transit Secretariat is working on a vision of a complete LRT system in Eastern Jutland where the LRT is intended to support development in the area and serve more towns around Aarhus, Skanderborg, Silkeborg and Randers among others. In this connection - and in close cooperation with municipalities involved - various investigations of passenger basis, scope of service, layout, construction

Environmental Impact Assessment (EIA) and timetable

The first stage of the LRT is subject to an EIA

railways (Odderbanen and Grenaa) into the LRT. In this way, the costs of the first stage of the LRT can be established at a considerably smaller amount compared to the construction costs of a completely new LRT.

The first stage of the LRT comprises a connection of the local railways of Odderbanen and Grenaa and the construction of approximately 12km of new light rails. The new light rail trains are intended to run on the existing rails of both the Odderbanen and Grenaa, and the two railways will have common timetables. The new rails will go from the harbour in Aarhus City to the north of Randersvej past Aarhus University via Aarhus University Hospital in Skejby and further on to Lisbjerg where a new large urban area for dwellings and businesses is being built. From Lisbjerg, the track will continue eastwards and connect to Grenaa at Lystrup. In this way, the light rail transit system will serve one of the most intensive transport corridors in the whole Aarhus area. The first stage of the LRT can be seen in Figure 1 on page 19.

The first stage will ensure good coverage of the many dwellings and workplaces in Aarhus North and Aarhus City. The new track will be connected to the local railways of Grenaa and Odderbanen, and this will create good direct conveyance possibilities from the surrounding areas to the workplaces in Aarhus.

In the first stage, it will be necessary to relay tracks at Aarhus Main Station. Light rail stops and some passing points must be established as well as depot and

and operating economics etc. are being carried out. In addition, the investigations are being supplemented by a description of the socio-economic elements that may have an impact on the light rail stages. The future LRT stages will be prioritised on the basis of these investigations.

Interplay with a new national infrastructure plan for Eastern Jutland

Eastern Jutland and the Copenhagen area have been selected as special focus areas in the future national traffic planning of Denmark. In the next three years, an overall strategic plan for town development and investments in road and railway infrastructure in Eastern Jutland will be prepared.

This work will primarily focus on upgrading of the overall road and railway infrastructure in the Eastern Jutland ribbon development between Kolding south and Randers north. This work includes upgrading of the present north-south mainline with higher speed and more capacity in Eastern Jutland and a new railway line between Aarhus and Silkeborg. Extension of the overall railway infrastructure is important with respect to the organisation of

railway and LRT service of the Aarhus area, and consequently the future extension of LRT stages must be made in accordance with these strategies.

The work of the Light Rail Transit Secretariat of the extension stages is to result in a proposal for the rate of extension for the



Lisa Bak Jensen

Ms. Lisa Bak Jensen has a MSc (Eng.), Civil Engineering, in physical planning from Aalborg University, Denmark, and has been working with EIA (Environmental Impact Assessments) for 10 years. For the past few years, Lisa has been working as a process consultant responsible for the EIA process, project coordination and planning, and involvement of citizens in a number of large infrastructure projects in Denmark, including, among others, the Light Rail Transit (LRT) project in Aarhus, a new ring connection south of Aarhus and a harbour tunnel under Marselis Boulevard in Aarhus.



Ole Sørensen

Mr. Ole Sørensen has a MSc in geography. Mr. Sørensen has been working with planning of public transport in Aarhus, Denmark, for 12 years. Previously, Mr. Sørensen was the Manager of the Planning Department of the organisation Midtrafik, Aarhus, and in connection with the Light Rail Transit (LRT) plans he is now Project Manager in the Light Rail Secretariat and Project Manager for the work dealing with a new public transport plan for the town of Aarhus.

More information can be found at: www.lrtbanerimidtrafik.dk

next stages of the LRT in the Aarhus area. This work is well under way, and the extension stages being evaluated for the time being can be seen in Figure 5 on page 22. ✓



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