

The Follo Line

LONGEST. URBAN. COMPLEX. FASTER.



The Follo Line Project is the largest transport project in Norway and will include the country's longest railway tunnel. The Follo Line tunnel will be the first twin bore tunnel in Norway and the first to be constructed using tunnel boring machines. The new line is scheduled for completion towards the end of 2019.

The project includes:

- new double track line between Oslo Central Station and the public transport hub at Ski
- 19.5 km long railway tunnel
- extensive works at Oslo Central Station
- construction of a new station at Ski
- necessary realignment of the Østfold Line (on the approach to Oslo Central Station and between the new Ski station and the tunnel)

Efficient transport

The Follo Line will reach speeds of up to 250 km/h through the tunnel, which will be excavated using four large tunnel boring machines.

The whole Follo Line project will comprise around 64 km of new railway track, while the new double track Oslo-Ski line will be 22 km long. The double track line will form the core part of InterCity development southwards from Oslo and will be a safe, efficient and environmentally-friendly transport system. The Follo Line will link residential and working areas together effectively and contribute to development in the region.

The Østfold Line, which currently runs between Oslo and Ski, has reached the limit of its capacity to run additional trains. At the same time, a population growth of at least 30% is anticipated in this region by 2025. The Follo Line Project can also be adapted to include a possible high-speed line to the continent.

Growth and improved passenger satisfaction

The Follo Line will pave the way for:

- more passenger trains and goods trains
- a more predictable service
- decreased journey times – the new tunnel will make it possible to reduce the journey time between Oslo and Ski by 50% (from 22 to 11 mins.)

By 2025* the target is:

- 11,000 more passengers every day
- almost 70% increase in rail passengers to Oslo Central Station during the rush hour
- 43% increase in rail passengers to Oslo Central Station outside the rush hour
- approximately 5,800 fewer car journeys per day
- approximately 750 fewer heavy goods vehicle journeys per day

- less CO2 emission: a reduction of around 39,000 tons of CO2 per year (passenger and goods traffic)

An urban challenge

The Follo Line will comprise four tracks into Oslo Central Station, which is Norway's largest public transport hub. Trains on the new Follo Line will run directly between Oslo and the public transport hub at Ski. In tandem with the Østfold Line, the Follo Line will provide rail passengers with a much better service than they are currently offered.

From a railway engineering perspective, constructing new lines in the densely trafficked metropolitan area around Oslo Central Station is a major challenge. Much of the work will be undertaken without disruption to the daily flow of traffic to and from this busy station. The main works for the Follo Line Project are scheduled to start in 2014. Crucial preliminary works have already commenced.

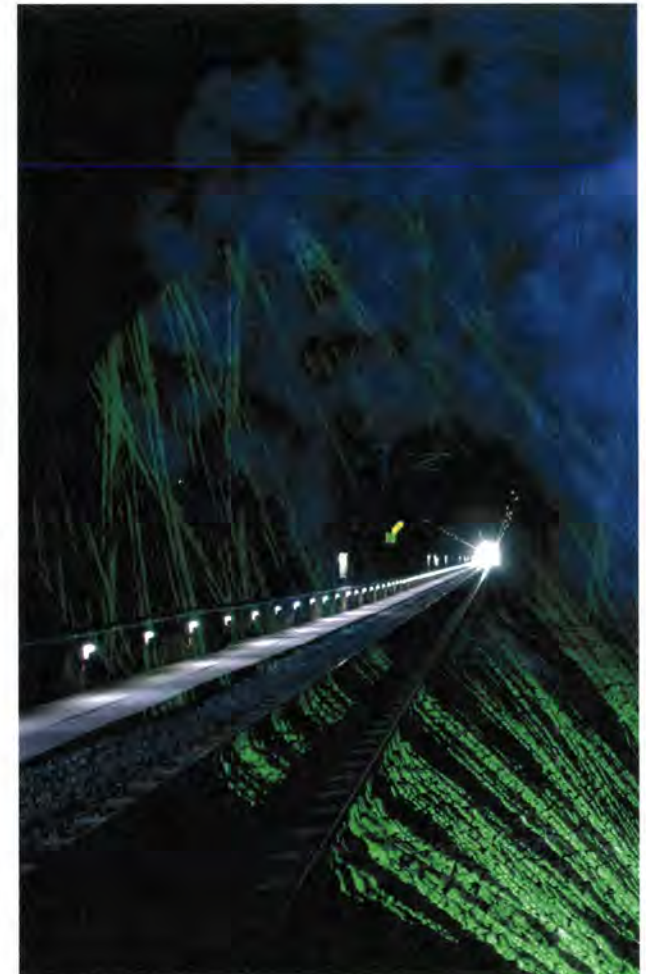
Goods traffic from road to rail

The Follo Line has been designed to handle goods traffic. Around 80% of land-based goods transport in and out of the country passes through the county of Østfold. The bulk of this traffic is currently handled by heavy goods vehicles. One goods train can transport the same volume of goods as around 24 fully laden heavy goods vehicles. The Follo Line will provide capacity for more goods trains. The Follo Line Project also includes the accommodation of a future spur to the Alnabru freight terminal.

High-tech and forward-looking

The Follo Line project is very comprehensive. Many different operations will be undertaken simultaneously, deadlines will need to be met and the project faces exciting challenges in terms of logistics and management.

During the construction phase, a large scale project of this nature can affect people, nature and the environment. Thus, thorough planning is essential in order to restrict the negative impact on the surroundings. At the same time, progress and costs must be closely monitored.



The Follo Line Project comprises three sub-projects:



1. Oslo Central Station

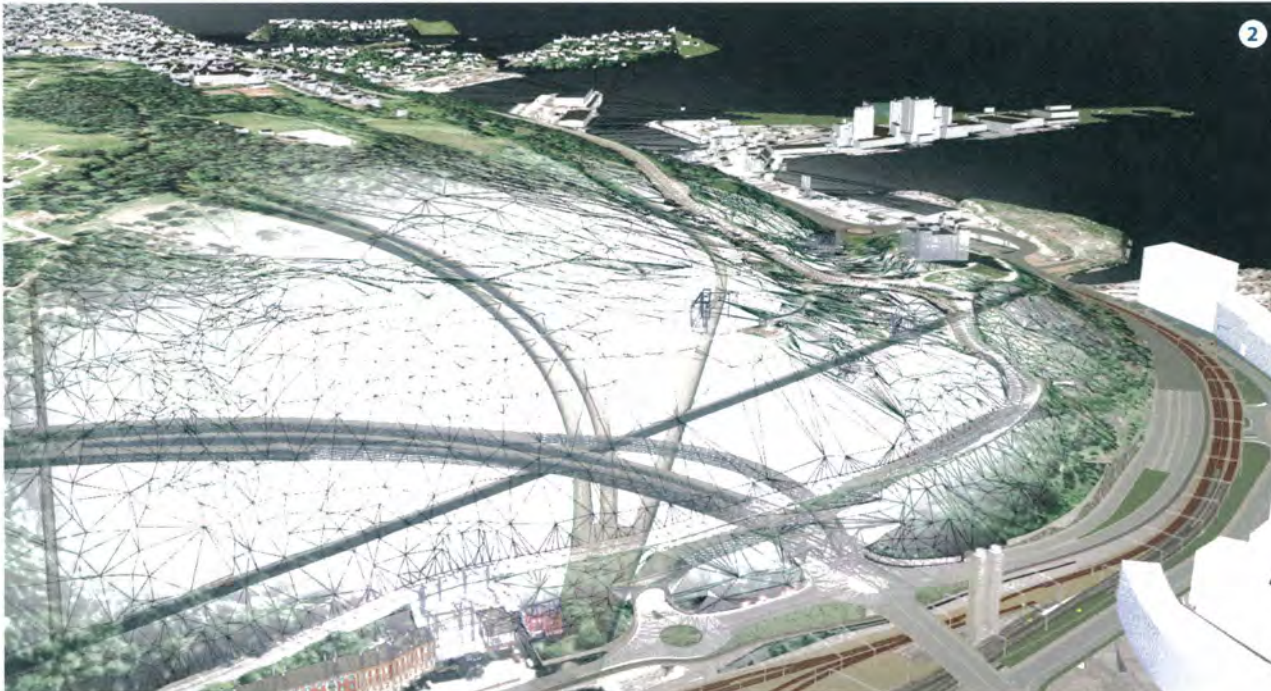
1 Between Oslo Central Station and the long tunnel, construction of the Follo Line must accommodate other rail traffic in and out of Oslo Central Station. The line will be constructed with connections to several platforms without conflicting with other traffic. At the same time, restrictions concerning the Medieval Park in Oslo must be taken into account, as this is of great archaeological and historical significance. The Directorate for Cultural Heritage, Oslo Municipality and the Norwegian National Rail Administration have reached a joint solution for conservation measures regarding both the introduction of the new Follo Line and the new tracks to the Østfold Line through an area known as 'Klypen'. This will provide the option to establish a park area almost twice the current size. This sub-project also comprises construction of a new tunnel for the Østfold Line.

2. The tunnel

Virtually the whole Follo Line will run through a tunnel. The tunnel is the 17th longest railway tunnel in the world**. The twin bore tunnel will pass beneath Ekebergåsen in Oslo where there are already road tunnels and a river course. The Follo Line tunnel complies with inter-European safety requirements for long tunnels and has, for example, escape routes every 500 metres.

The Follo Line tunnel will have an effective life of 100 years. It will be constructed using four tunnel boring machines from a construction site at Åsland outside Oslo. The use of tunnel boring machines will make this an industrialised process. In addition, a good 1/3 of tunnel work on the Follo Line Project will utilise traditional blasting methods (drill & blast).

Blasting is the most common method used in tunnel construction in Norway. In the 80s and 90s, tunnel boring machines were also

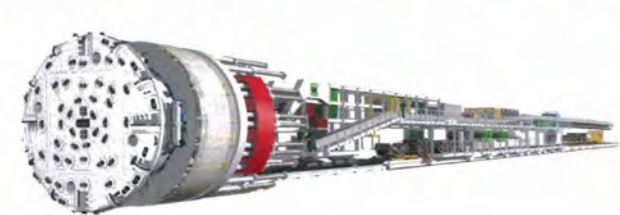


utilised although these were simpler and were mainly used to excavate hydro-electric power tunnels. The Follo Line tunnel will be the first railway tunnel in Norway to be excavated with tunnel boring machines, a process that is otherwise common in the excavation of long tunnels in Europe.

The Norwegian National Rail Administration's decision paves the way for both national and international participation in the project and provides the basis for alliance-building, skills upgrading and innovation.

3.Surface section and the new Ski station

The Follo Line will run along a ca. 1.5 km surface section south of the tunnel before reaching the public transport hub at Ski. Retaining walls and culverts (concrete tunnels) will be built along this section and it will be necessary to realign the Østfold Line in order to achieve efficient train operation. Within the station area itself, the new Ski station will be built with six tracks and three central platforms, new subway, new road bridge, bus terminal and enlarged car park. Accessibility, efficient transport and integration into the urban landscape are important factors to the Norwegian National Rail Administration.



Exampel TBM
(Herrenknecht AG)



Exampel TBM (Swedish
Transport Administration)



Spoil handling and possible uses

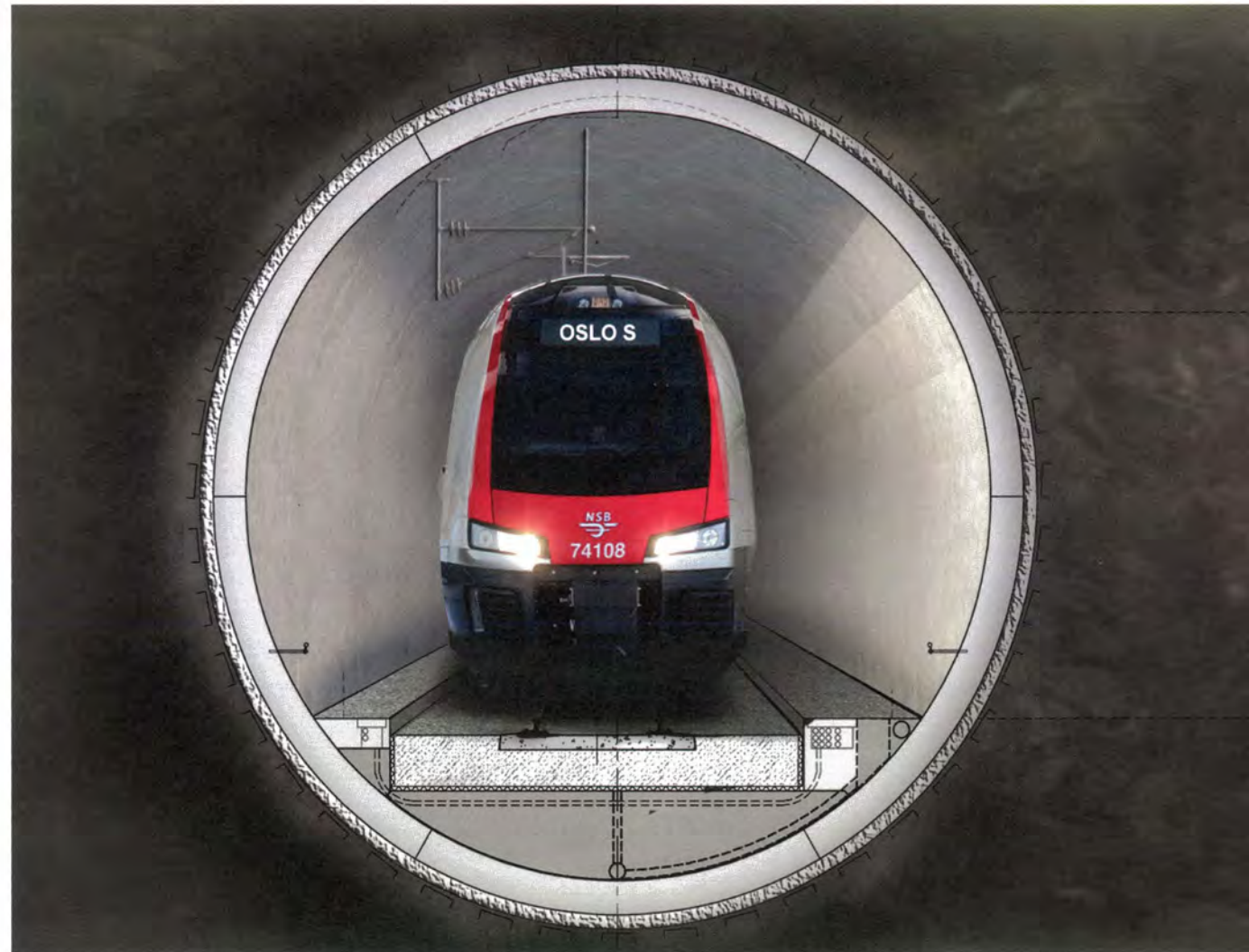
During construction of the Follo Line tunnel, around 10-11 million tons of rock spoil will be removed within a period of 3.5 years. The Norwegian National Rail Administration has approached public and private sector parties that may be able to utilise all or part of the spoil. From an environmental and social perspective, it is important to the Norwegian National Rail Administration to achieve the most effective utilisation of resources, and contribute to optimum recycling.

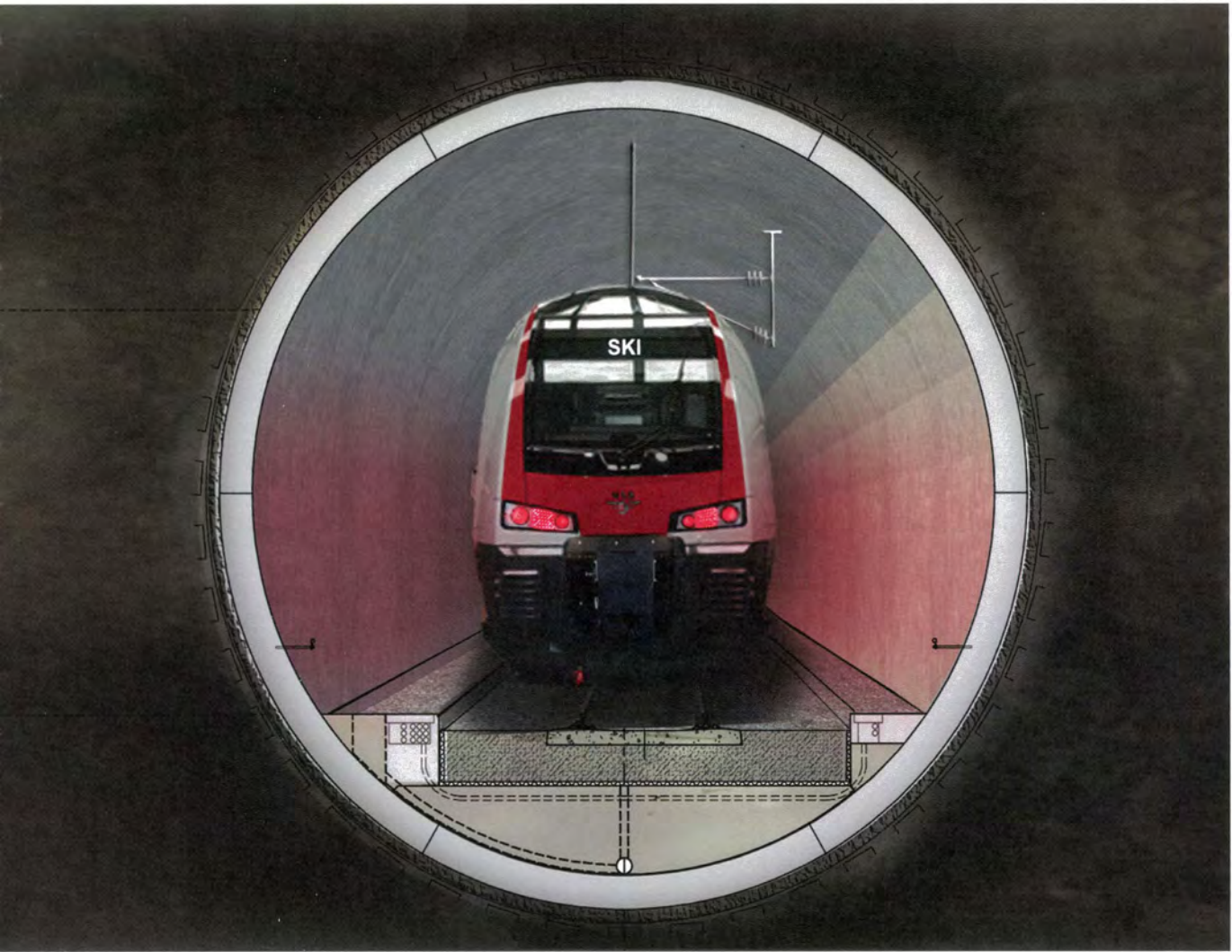
More sustainable railway development

The Norwegian National Rail Administration/Follo Line Project is the first organisation in Norway to prepare an environmental budget, i.e. a method for environmentally optimum design of development projects. During the 2012 conference of the International Union of Railways, the Follo Line Project received recognition for developing this method. An environmental budget includes, for example, direct and indirect emission of greenhouse gases from materials, and energy use during construction, as well as operation and maintenance of railway infrastructure. Regarding the environment, the Follo Line Project will be a pilot project for the Norwegian National Rail Administration.

The construction client's organisation and the market

During 2013, the Follo Line Project will be put out to tender both nationally and internationally. In accordance with the Norwegian National Rail Administration's construction contract strategy, general contractors will be used as much as possible. At the same time, the Norwegian National Rail Administration's expertise will be tapped and its role as construction client will be cultivated. English will be the project's contractual language.





The Follo Line Project is being developed by the Norwegian National Rail Administration under commission from the Ministry of Transport and Communications.

Schedule

- ▲ 2019: Completion of technical system
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- 2014: Commencement of primary works
- 2013: Preliminary works
 - Approval of zoning plans
 - Public contract tendering
- 2012: Approval of impact study
 - Approval of technical plans
 - Contract strategy made public

* Source: "New double track line Oslo-Ski, Socio-geographical perspectives", Social and industrial study AS (SNF) 30.5 2008
** Source: lotsberg.net

Facts about the Follo Line Project:

- Norway's largest transport project
- 22 km double track line from Oslo Central Station to the public transport hub at Ski
- At 19.5 km, it is Norway's longest railway tunnel to date
- The first railway tunnel in Norway with two separate bores for efficient traffic handling
- The first railway tunnel in Norway to be excavated with tunnel boring machines
- Includes the construction of a new station at Ski and extensive works at Oslo Central Station
- Includes the necessary realignment of tracks to the Østfold Line on the approach to Oslo Central Station and between the tunnel and the new Ski station
- Forms the core part of InterCity development southwards from Oslo
- To be built for speeds of up to 250 km/h
- Will enable a 50% reduction in journey time between Oslo and Ski
- Provides increased traffic capacity to/from Oslo
- First transport project with its own environmental audit method (Pilot project for the Norwegian National Rail Administration in terms of the environment.)
- The new line is scheduled for completion towards the end of 2019
- May be combined with a possible high-speed line to the continent

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