The Norwegian High Speed Rail Assessment Project 2010 – 2012

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Stavanger
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Main Objectives

JBV shall assess which of the alternatives that are best
suited to fulfill the main objectives of the Norwegian transport policy in the various corridors:

A - Reference alternativet: A continuation of the current railway policies

B - A more offensive development of the existing infrastructure

C - High Speed concepts which partly are based on existing infrastructure

D - Mainly new high speed lines

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Routes - Assumptions

- Journey time between Oslo and the main cities – not longer than 3 hours
- All trains in northern corridor to stop at Oslo Main Airport station (Gardermoen)
- Parts of lines already in operation or planned for <250 kph should be used if not in conflict with 1)
- New alignments should be as close as possible to towns and junctions in order to facilitate for stations close to existing populations.
- Double track and double tube tunnels

- All lines to be designed for:
  - 330 kph w/freight trains
  - 330 kph wo/freight trains
  - 250 kph w/freight trains

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Markets in 2024

<u>Assumptions:</u>

- Freq. : 1 train per hour

- Ticket price : 60% of average Air Fare
  (equals current Train Fare)

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Routes, Journey Times and Market 2024

Oslo – Trondheim
JT : 2:10 – 2:59
Market : 4,3 M/Yr

Oslo – Bergen
JT : 2:06 – 2:36
Market : 4,3 M/Yr

Oslo – KrS - Stavange
JT : 3:01 – 3:31
Market : 5,0 – 5,5 M/Yr

Bergen - Stavanger
JT : 1:23
Market : 1,9 M/Yr

Oslo – Stockholm
JT : 2:47 – 2:56
Market : 4,3 M/Yr

Oslo – Gothenburg
JT : 1:40 – 2:20
Market : 3,7 - 4,6 M/Yr

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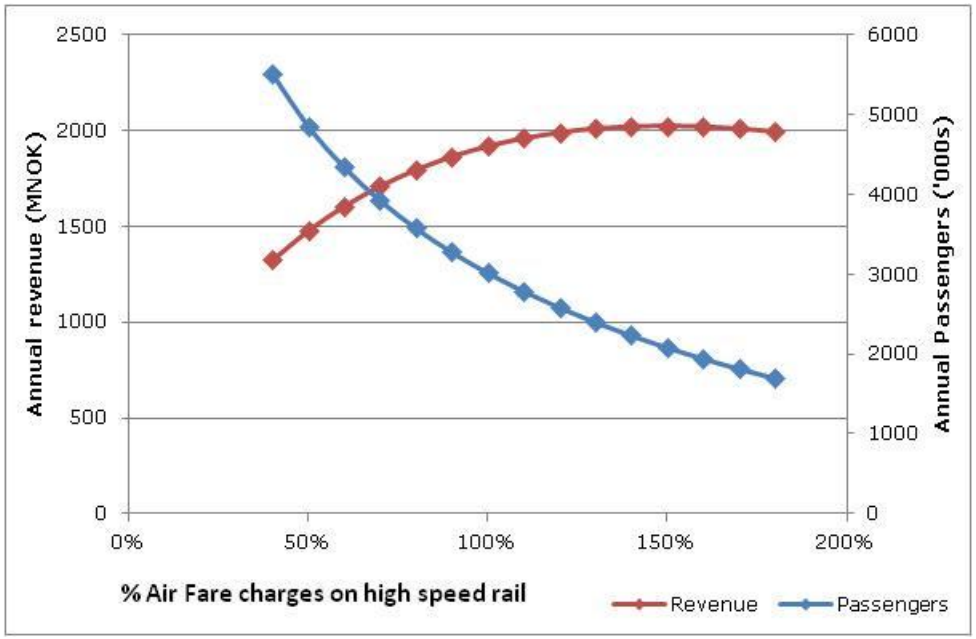
Impact of fare assumptions

Impact of HSR fare assumptions on HSR revenues: Example Oslo – Trondheim Eastern route alternative



- Financial viability improves significantly with higher HSR fares.
- In reality, fares need to be optimised for all journey movements depending on journey length and journey purpose mix.

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Capital Costs

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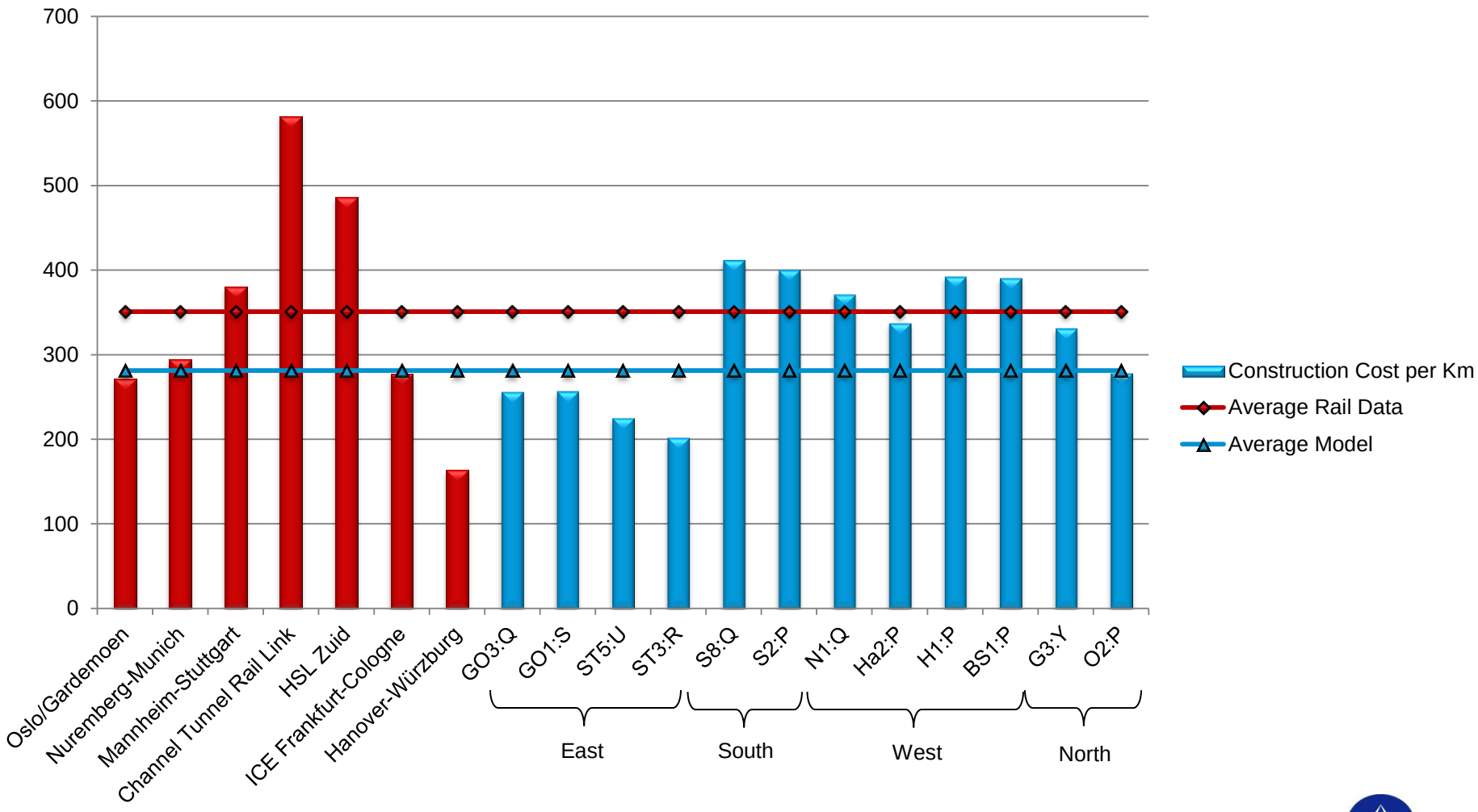
Construction Cost per Km (mNOK) – 2011 values



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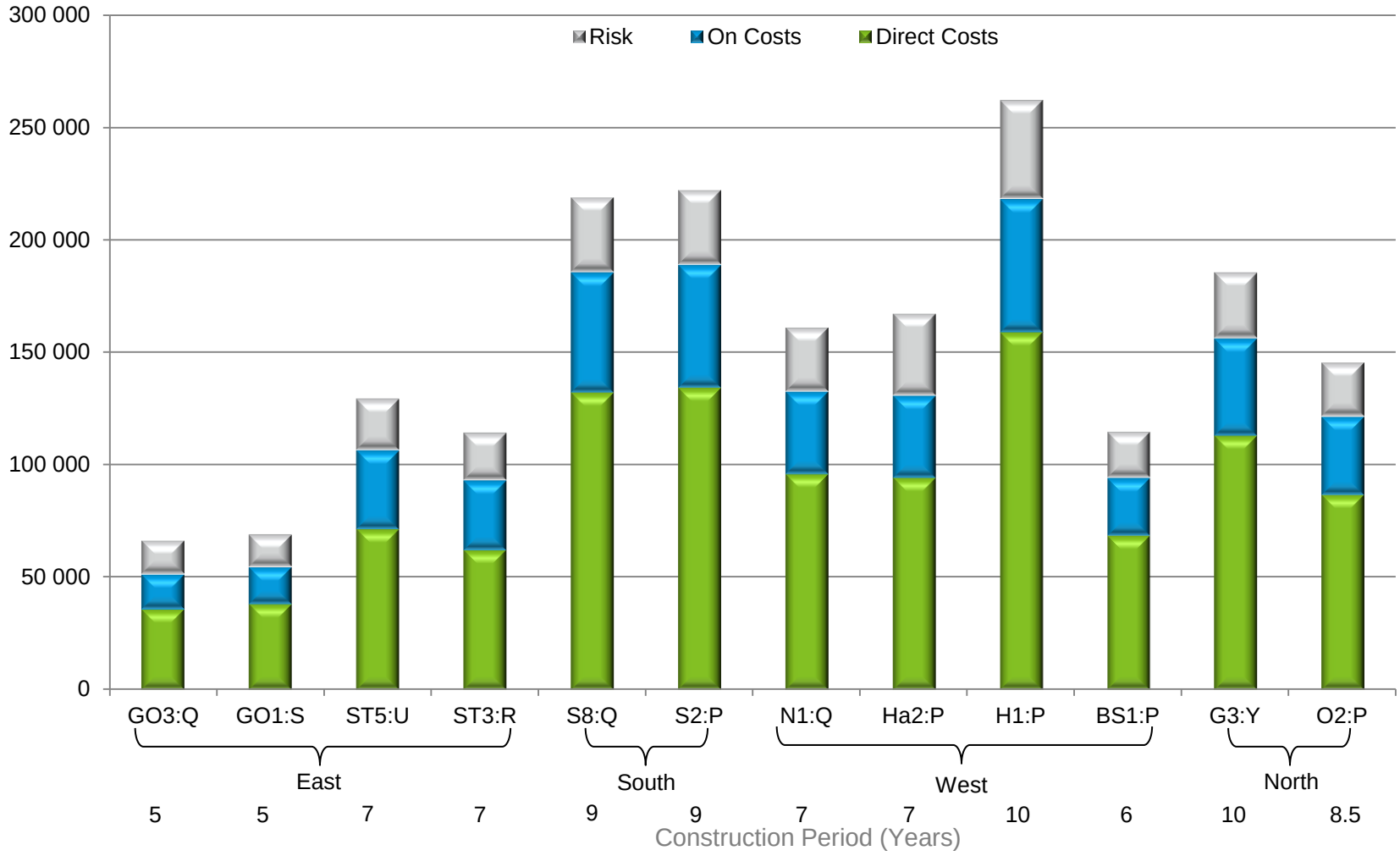
Total Cost per line (mNOK) – 2011 Values



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Environment

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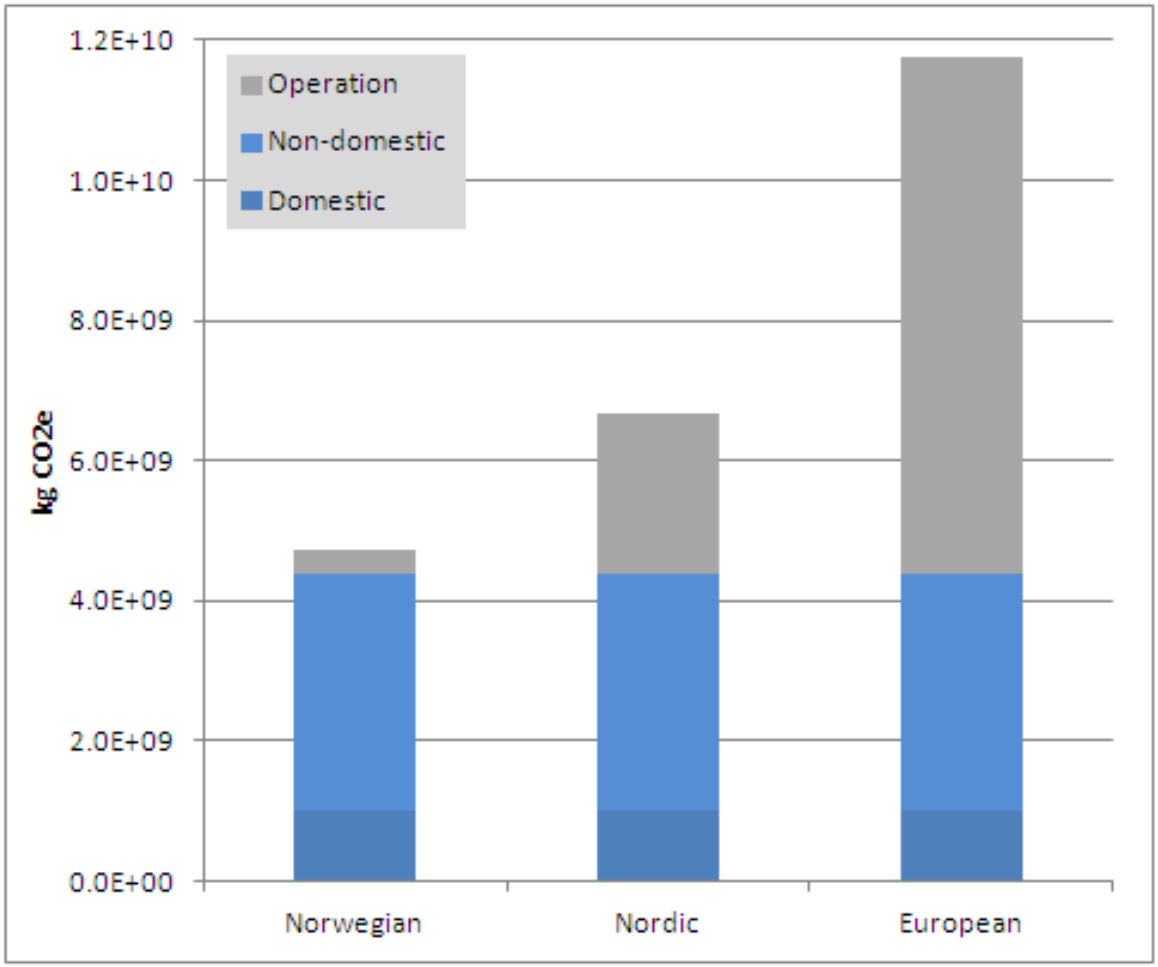
CO2e emissions - 60 years – various sources of energy

Example – High speed line : Oslo – Trondheim through Østerdalen



12 mill tonnes

6 mill tonnes

4 mill tonnes

Construction

Operation

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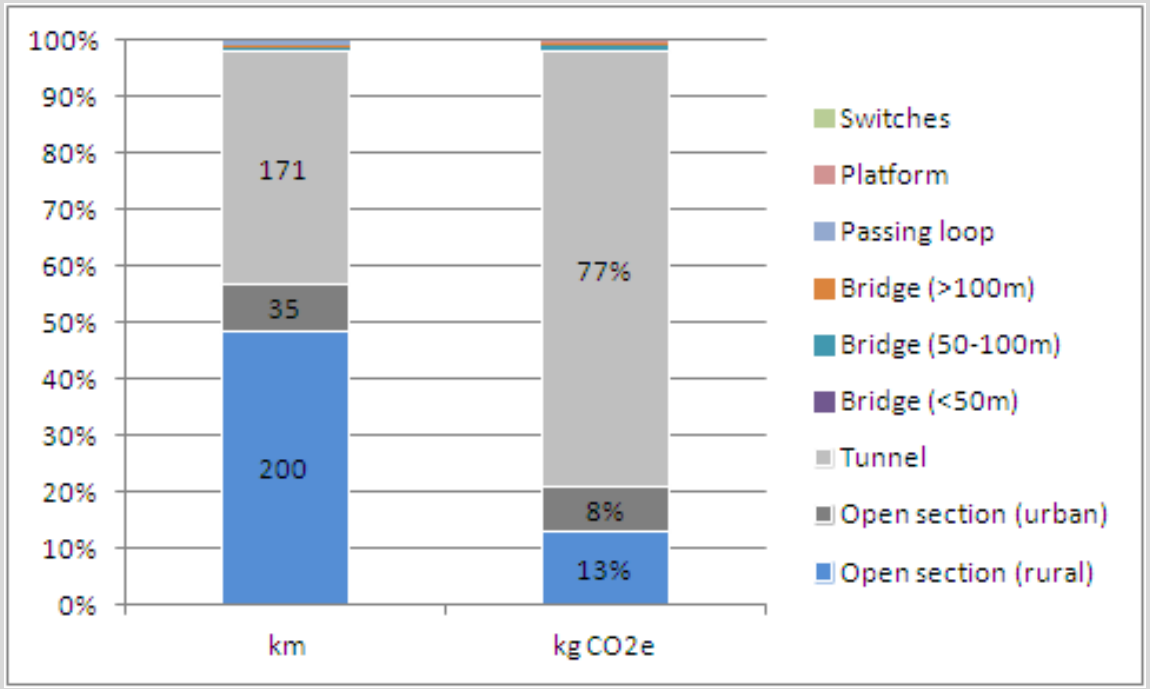
CO2e emissions during construction

Example – High speed line : Oslo – Trondheim through Østerdalen



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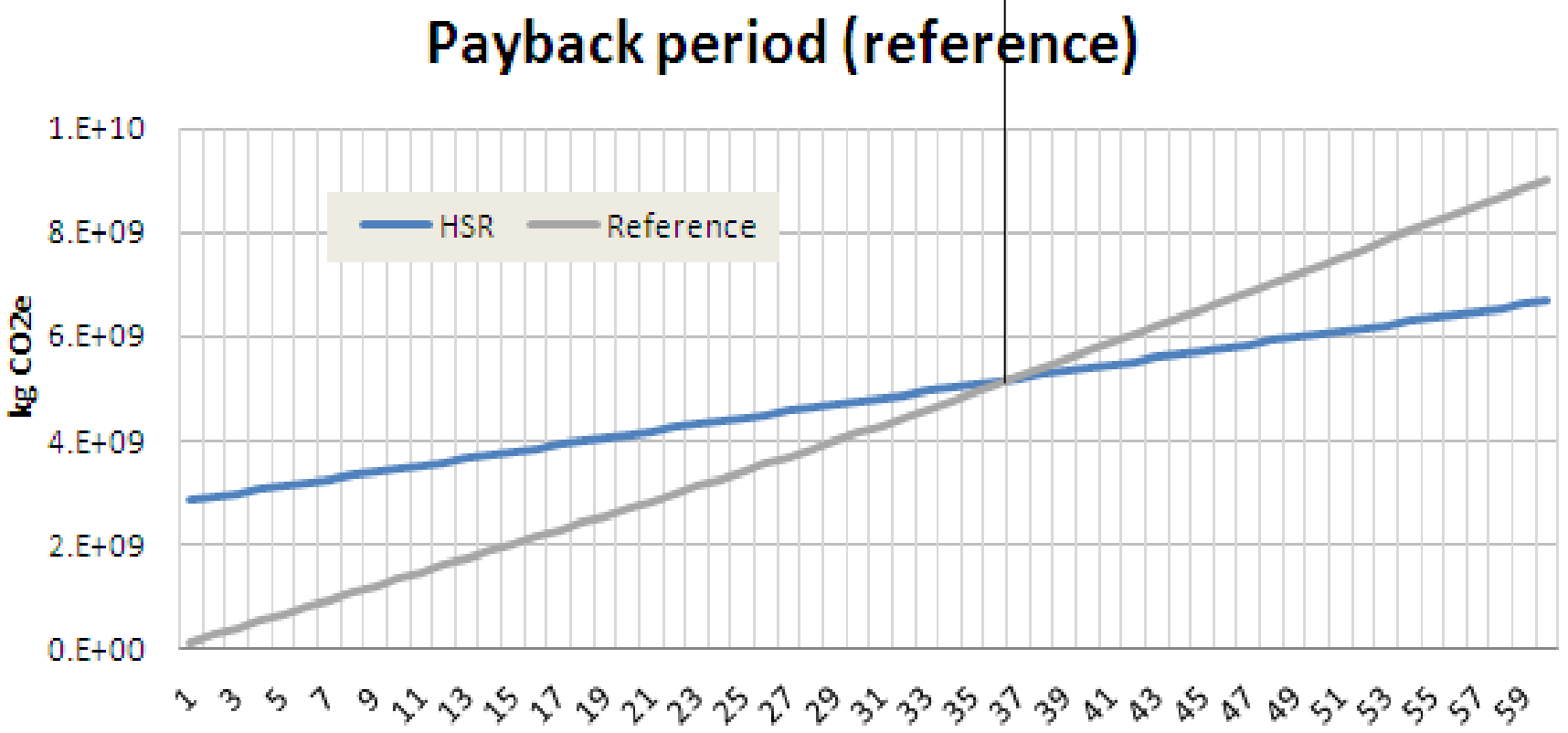
CO2e – years to balance

Oslo - Trondheim via Østerdalen – 37 years



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Appraisals

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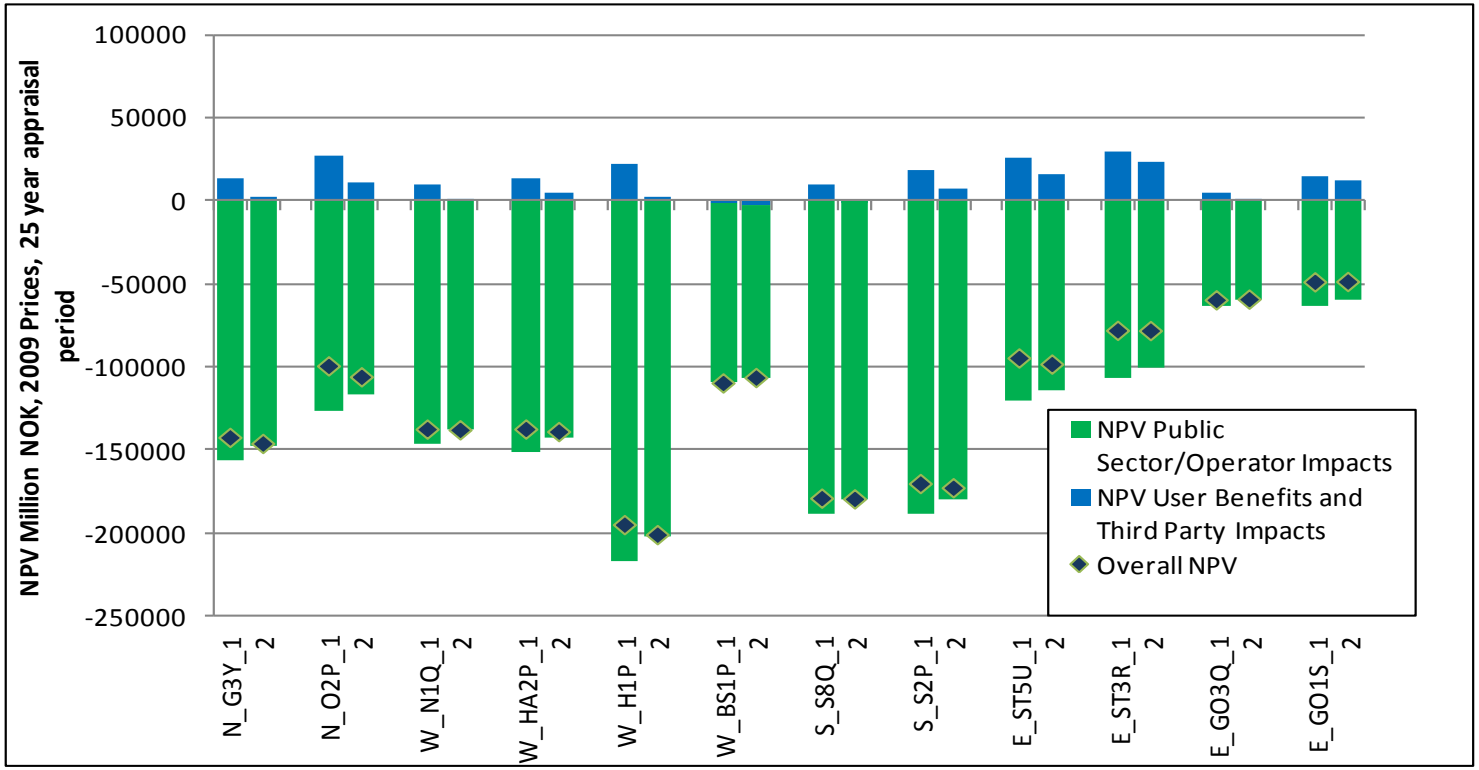
Appraisal

Norwegian standard

MNOK



North	**G3Y**	Oslo – Trondheim (Hamar & Gudbrandsdalen) - 250kph	**South**	**S8Q**	Oslo – Stavanger (via Vestfold) - 250kph
	O2P	Oslo – Trondheim (Østerdalen) - 330kph		**S2P**	Oslo – Stavanger (direct) - 330kph
West	**N1Q**	Oslo – Bergen (Numedal) - 250kph	**East**	**ST5U**	Oslo – Stockholm (via Ski) - 250kph
	Ha2P	Oslo – Bergen (Hallingdal) - 330kph		**ST3R**	Oslo – Stockholm (via Lillestrøm) - 330kph
	H1P	Oslo–Bergen (Haukeli)/Oslo–Stavanger/Bergen–Stavanger - 330kph		**GO3Q**	Oslo – Gothenburg (via Moss) - 250kph
	BS1P	Bergen – Stavanger (coastal route) - 250kph		**GO1S**	Oslo – Gothenburg (direct) - 250kph

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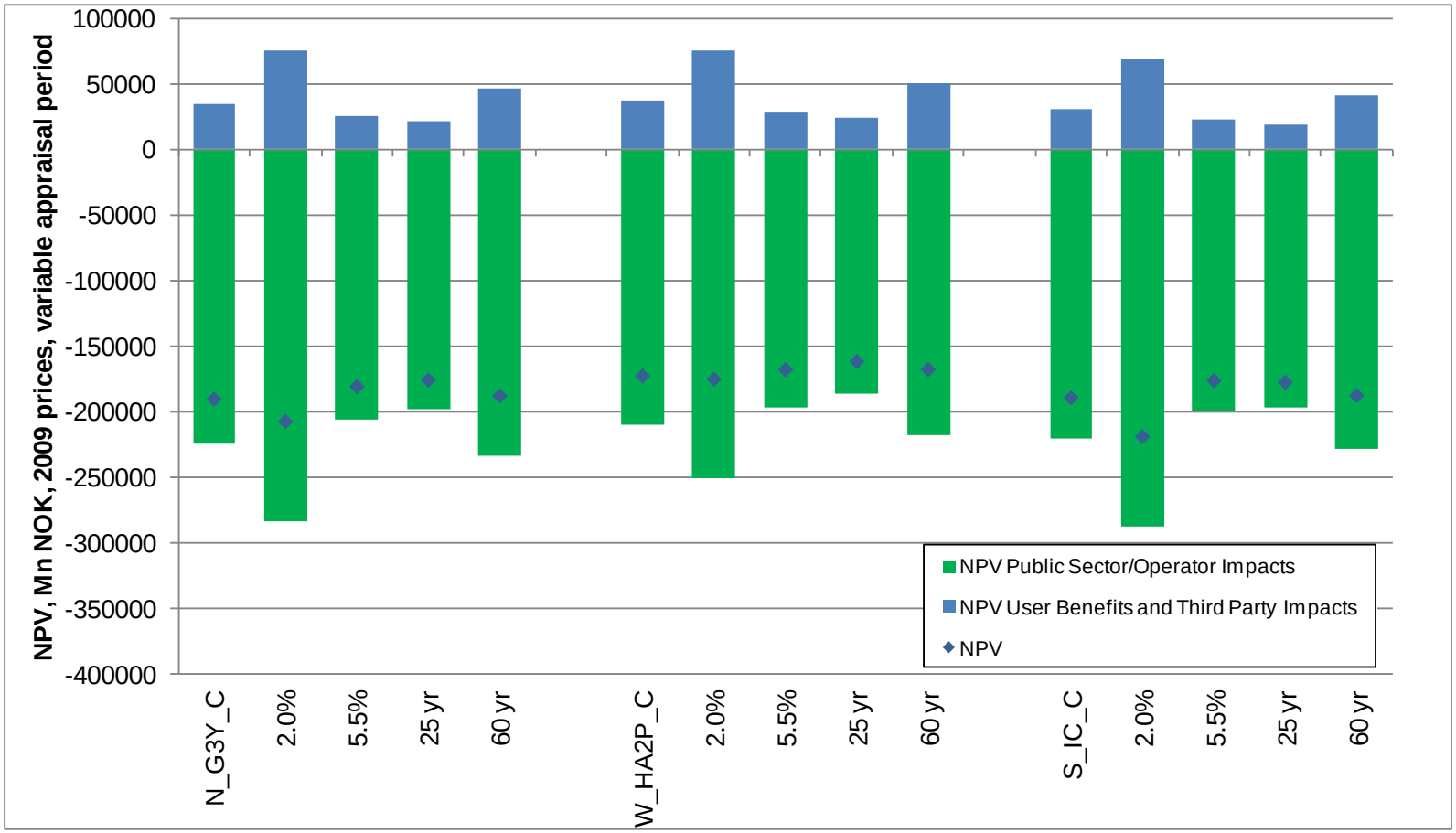
Appraisal
Sensitivities

MNOK



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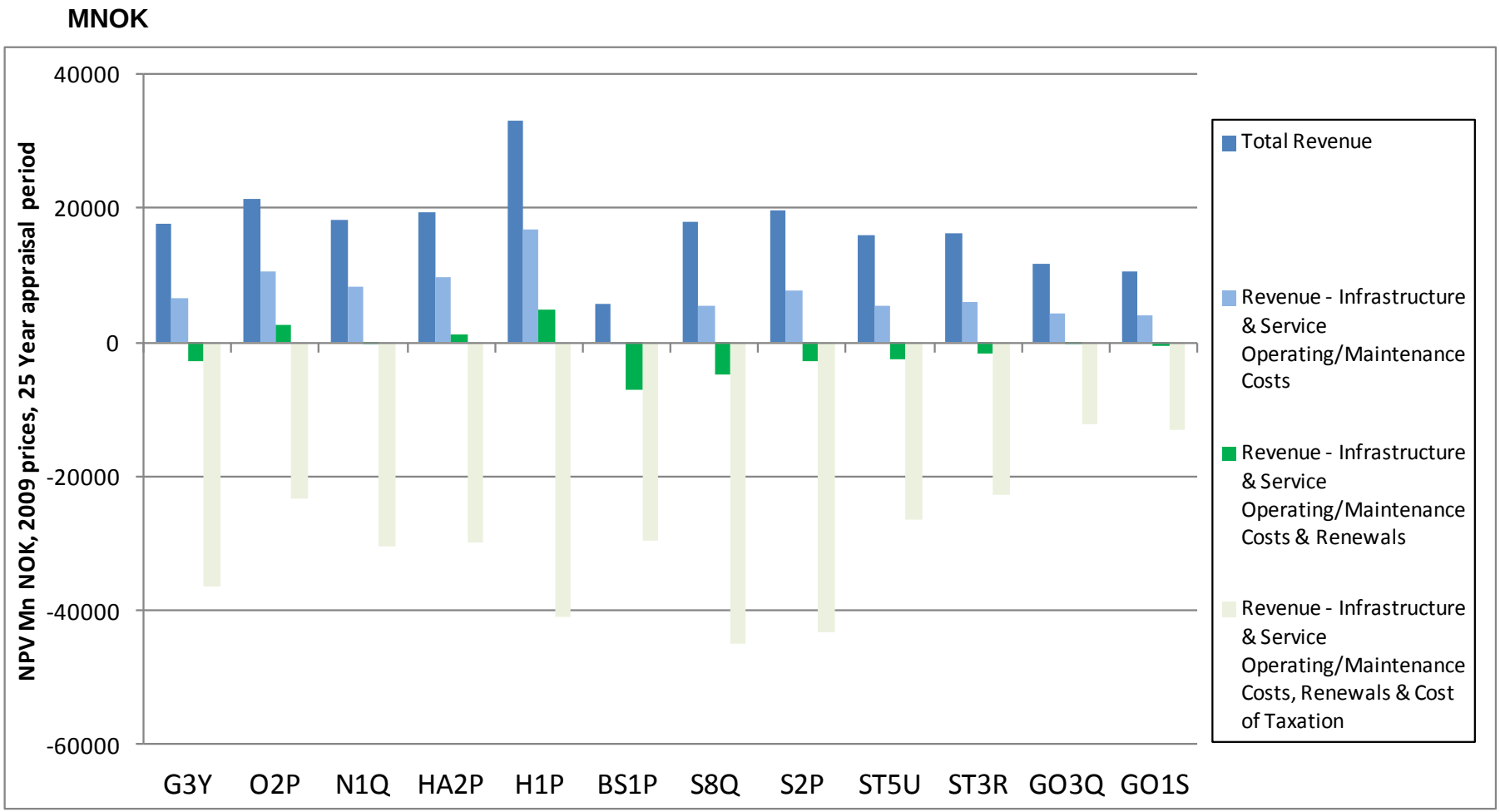
Financial Analyses



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Summary

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Overview – High Speed Rail

Lines description	JT	# Passengers 2024	Capital Cost	Capital cost / km	Net benefits FI stndr	Net benefit/cap costs	Financial Analyses	CO2e Balance
	t:min	´1000	BNOK	MNOK / km	BNOK	ratio	BNOK	years
Oslo - Lillehammer - Trondheim	02:59	4420	185,5	414,0	-142,2	-0,77	2,1	>60
Oslo - Tynset - Trondheim	02:11	4340	145,4	355,4	-99,1	-0,68	4,8	37
Oslo - Kongsberg -Bergen	02:37	4470	158,9	438,9	-137,2	-0,86	4,2	35
Oslo - Hønefoss -Bergen	02:06	4210	167,8	457,2	-137,1	-0,82	5,6	50
Oslo - Bergen Oslo-Stvgr Stvgr - Bergen	02:16 02:27 01:29	7470	262,1	493,5	-194,7	-0,74	8,2	>60
Bergen - Stord - Stavanger	01:22	1910	114,7	498,7	-109,4	-0,95	-2,5	
Oslo - Tønsberg - Kr.Sand - Stavanger	03:31	5060	218,9	519,9	-178,7	-0,82	0,8	>60
Oslo - Porsgrunn - Kr.Sand - Stavanger	03:02	5550	222,1	504,7	-169,9	-0,77	3,0	>60
Oslo - Askim - Stockholm	02:56	4230	129,3	390,7	-94,4	-0,73	0,9	47
Oslo - Lillestrøm - Stockholm	02:47	4400	114,2	358,1	-77,7	-0,68	1,3	39
Oslo - Fredrikstad - Gøteborg	02:18	4670	66,3	360,4	-59,4	-0,90	1,1	>60
Oslo - Sarpsborg - Gøteborg	01:40	3720	69,0	353,9	-48,5	-0,70	1,0	>60
Oslo - Bergen - Stavanger - Kristiansand - Oslo		11930	495,7	480,3	-416,5	-0,84	4,7	

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Summary

- It is feasable to construct lines and operate high speed trains in all corridors
- **There is a large end-to-end and intermediate market**
- Capital costs are significant for all alternatives. Tunnels are the dominant contributor to the high costs
- Net positive income. However, capital costs have to be funded by the State.
- There will be reduced emission of CO2.
- **High Speed lines may be developed as an extension to the Intercity network around Oslo. There are no conflicts between a IC network with 250 kph and using this as a base for high speed lines to the main cities.**
- Net benefits are all negative
- Oslo – Stavanger has the highest market potential and should be developed first

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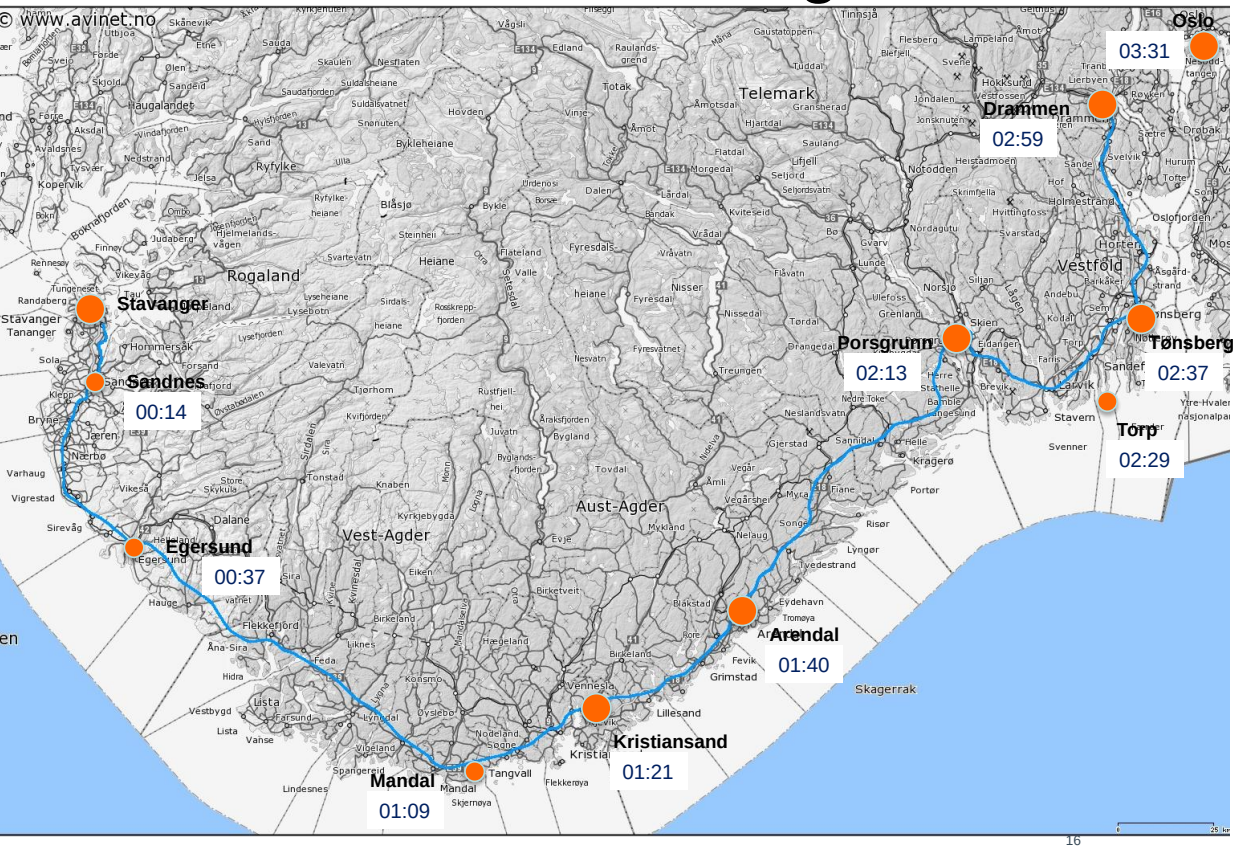
Preferred :
Oslo – Stavanger via Tønsberg



Oslo – Drammen	**Existing line**
Sandnes – Stavanger	**Existing line**

Order of Development:

1. **Drammen – Tønsberg**
2. **Egersund – Sandnes**
3. **Porsgrunn – Kristiansand**
4. **Kristiansand - Egersund**

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http://www.jernbaneverket.no/no/Prosjekter/Hoyhastighetsutredningen/

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