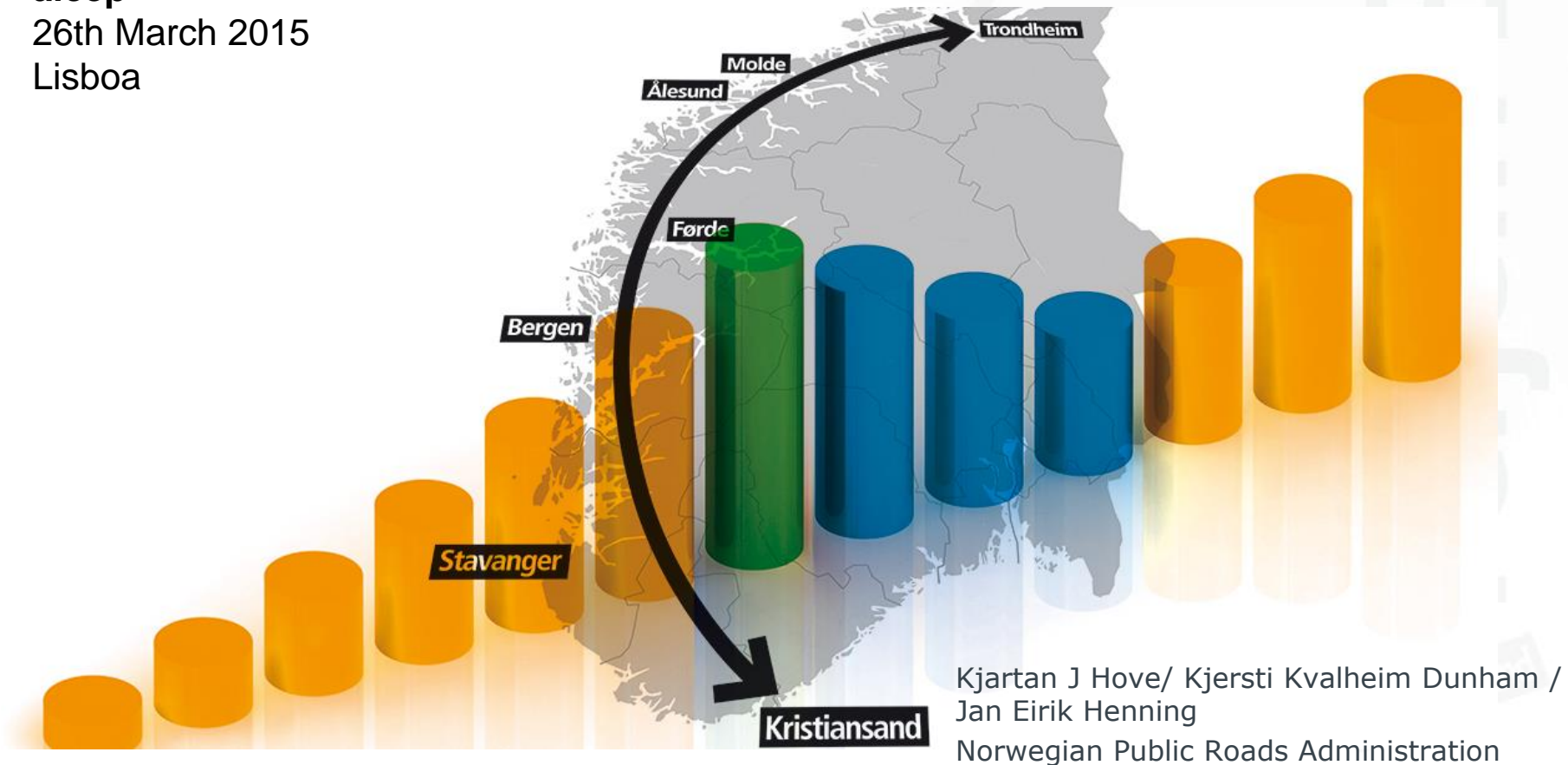


Coastal Highway Route E39 Project

aicep

26th March 2015

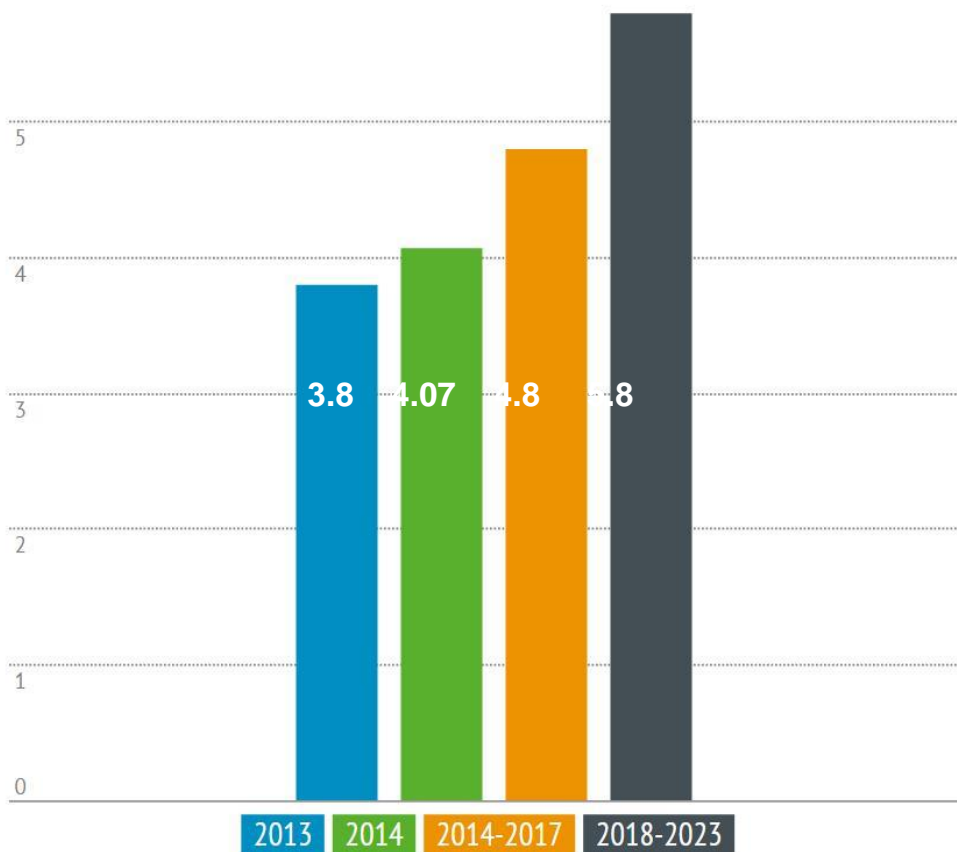
Lisboa



National Transport Plan 2014-2023

Road funding

Total budget - national roads (incl. toll road funding)



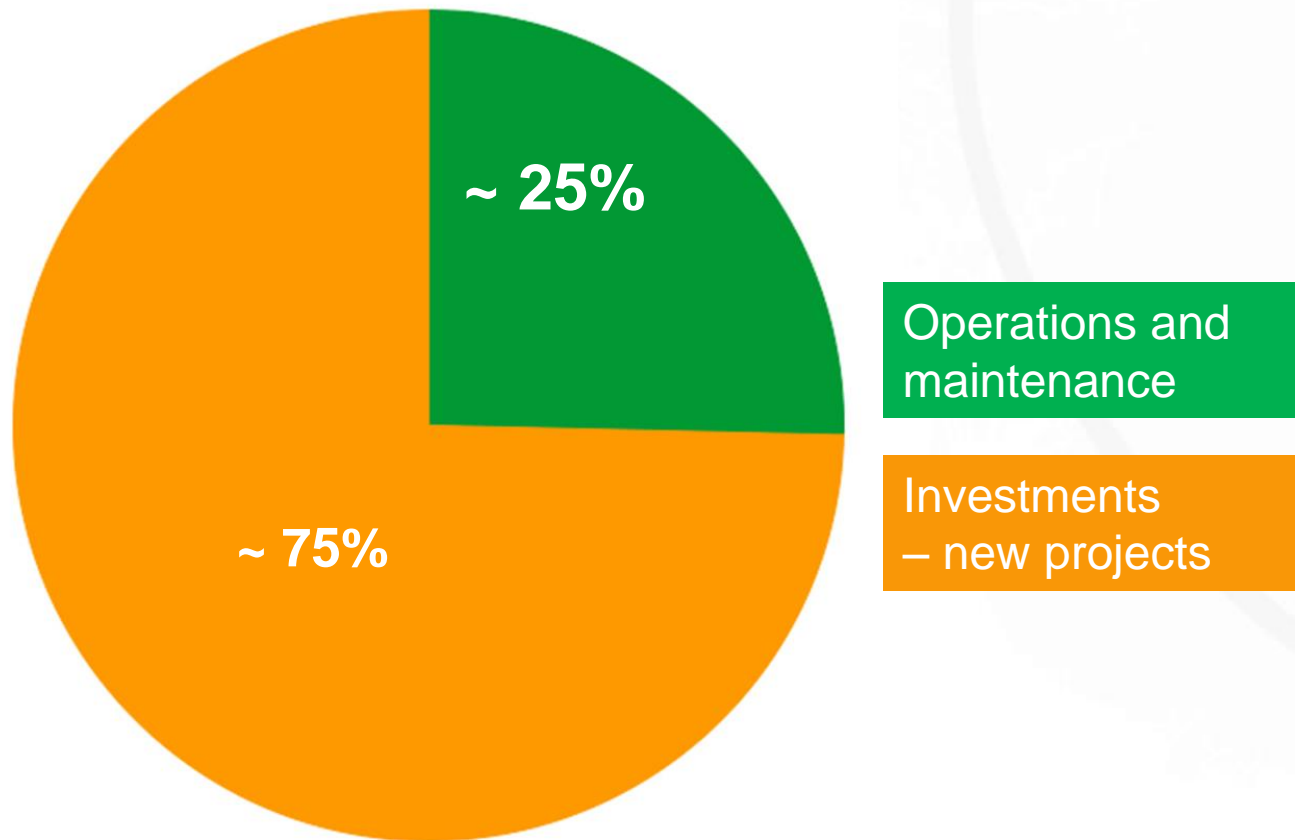
Annual average – billion EUR

Meeting a Growing Market

- More efficient planning
- Faster and less fragmented construction
- Cooperation with the consultant- and construction industries
- National and international competition
- Predictable funding

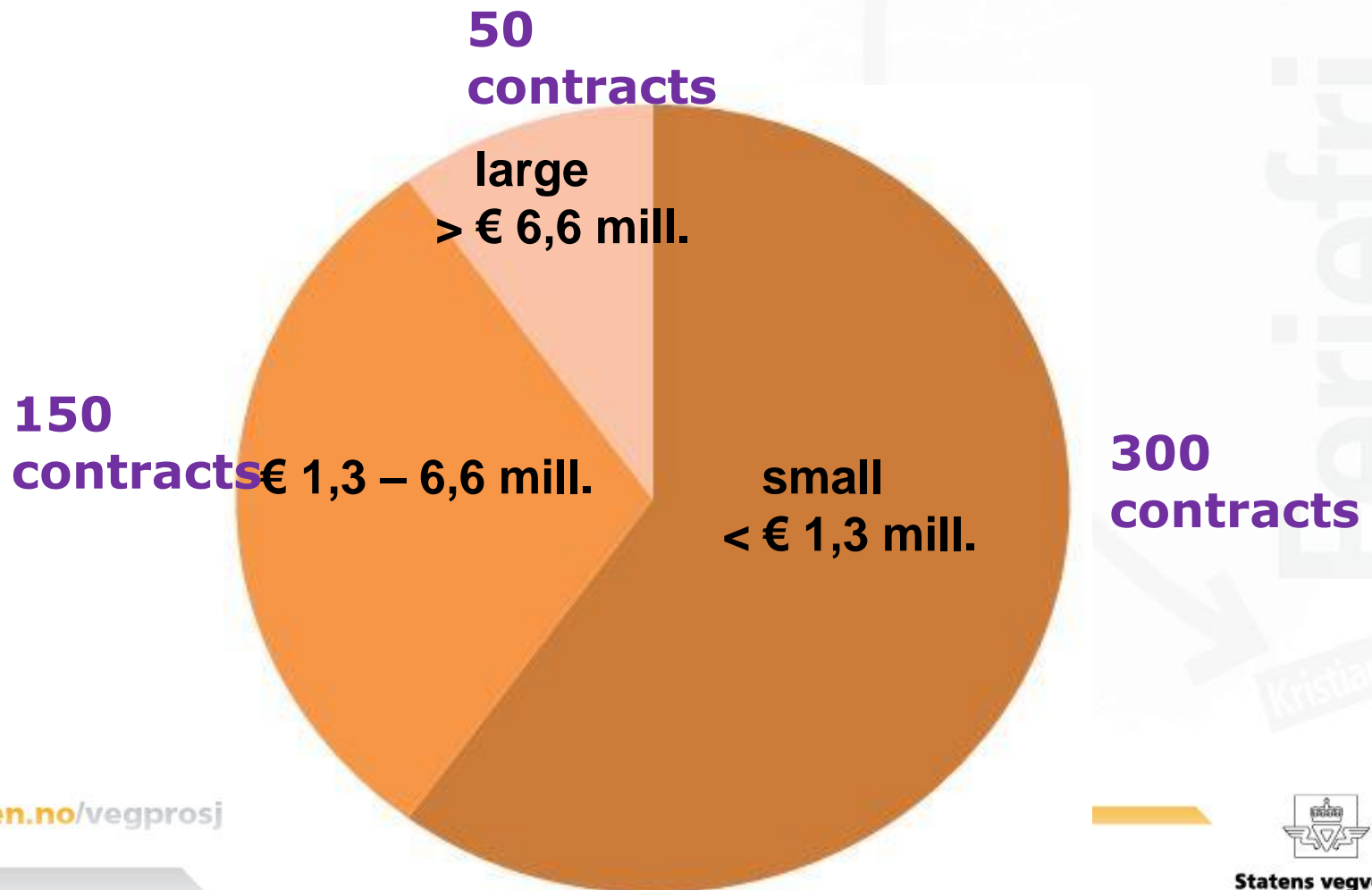


National public road fundings 2014 – 2017 annualy average



Investments: NPRA's contract portfolio

Distribution of roughly 500 contracts



Our aims as project portfolio owners

Diversity and competition in the market

Make it possible also for small and medium sized contractors to compete.

Occupational health, safety and environment (HSE)

We want to be exemplary within HSE.

We want to be a force on improving methods, materials and technical solutions that enhance HSE.

HSE – The staff of the sub-contractors appear to carry the largest risk

39

Measures taken in the contracts:

- Maximum two levels of sub-contractors below the main contractor.
- The contractor's own work force shall carry out at least 25% of the work (man-hours)
- Person(s) with the overall daily administrative responsibility shall be part of the contractor's own staff.
- Sanction clauses

Procurement Procedure, Road sector Governed by EU procurement directive 2004/18/EEC

**Open competition,
announcement in the
EU database (TED)**

**The respective NPRA
Regional office (5) is
the Contracting
Agency**

**Commonly 2 – 5
tenderers on large
contracts**

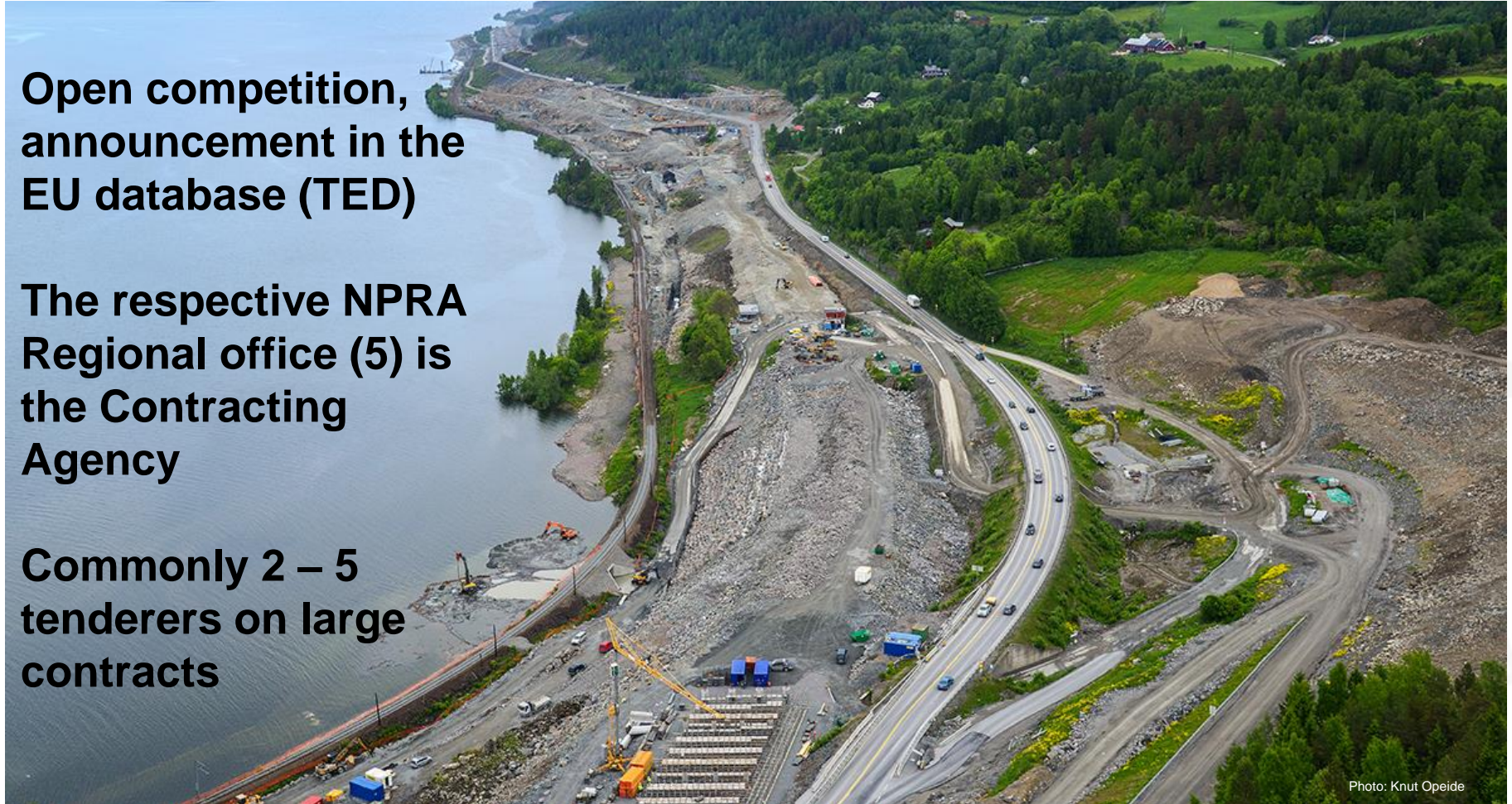


Photo: Knut Opeide

Project delivery and contract types

A professional judgment is made to find the most suitable in each individual case.



Project delivery

- **Bid – Build (BB)**
- **Design – Build (DB)**
- **Design – Build – Operate (DBO)**
- **Design-Build-Finance-Operate (DBFO),
Private Public Partnership (PPP)**

Photo: Knut Opeide

Contracting practice - BB

BB: Bid – Build

- **The detailed design and Bill of Quantities prepared by NPRA (own staff or consultants).**
- **BB in a traditional Unit Price Contract is dominating today: ~95%**
- **Normally:**
 - No prequalification
 - Fixed construction period
 - Fixed quality requirements

Photo: Knut Opeide

Contracting practice - DB

DB: Design – Build

- Major parts of the detailed design is carried out by the contractor.
- Used on a regular basis, however currently comprises less than 5 % of the procurements
- Will increase in light of upcoming challenges

Photo: Knut Opeide

Contracting practice - DBO

DBO: Design – Build – Operate

- Detailed design is carried out by the contractor, incl. responsibility for operations and maintenance for a number of years after construction.
- No experience so far, however ...:
- Development contract in the Northern Region, Trunk road E6 Helgeland

Photo: Knut Opeide

DBO – Design Build Operate/ Competitive dialogue

- **Prequalification of tenderers**
- **Competitive dialogue, qualified tenderers submit proposals**
1-1 dialogue between NPRA and each tenderer
- **Basis for deriving a common platform for the competition**
- **Design – Build - Operate competition**
- **Contract award**

Contracting practice – DBOF (PPP)

DBOF: Design – Build – Operate – Finance (PPP Public Private Partnership)

- **Current experience: 3 project roads are in use, 25 years period of operation and maintenance**
- **More to come**

Photo: Knut Opeide

General Conditions of Contract

NS 8405:2008 Norwegian building and civil engineering contract (for BB, bid an build contracts)

Adopted by the NPRA:

NS 8406:2009 Simplified Norwegian building and civil engineering contract (for BB contracts)

Adopted by the NPRA:

NS 8407:2011 General conditions of contract (for DB/DBO contracts)

All 3 standards are issued in English versions (NS 8405E, NS 8406E and 8407E) and can be purchased on the internet from Standard Norge at www.standard.no

Photo: Knut Opeide

Specifications

Standard Specifications:

Manual R761 for road construction

Manual R762 for bridges and quay structures

Special Specifications are being added as required for the individual project.

Several other NPRA manuals are being referred to, e.g. The Road Design Manual (Manual N200), etc...

European standards for materials apply in certain fields.

Photo: Knut Opeide

Contract language

- **Tender documents and tenders, the official contract language and formal communication on site is in Norwegian.**
- **Some vital manuals/documents are translated into English for information only.**
- **One person in a work team must understand Norwegian. Traffic guards (“flag-men”) must be able to communicate in Norwegian**

Photo: Knut Opeide

Upcoming projects

<http://www.vegvesen.no/Vegprosjekter>

Photo: Måkon Aurlien

Western Norway nearby Stavanger E39 Boknafjorden (ROGFAST)



**World's longest
subsea tunnel:**
25,5 km, 2 tubes

Depth: 385 m
beneath the sea level

Estimated startup:
2015

Larger development projects nearby Oslo

E18 Vestkorridoren Lysaker – Slependen



Project costs
estimated to
€ 2500 million

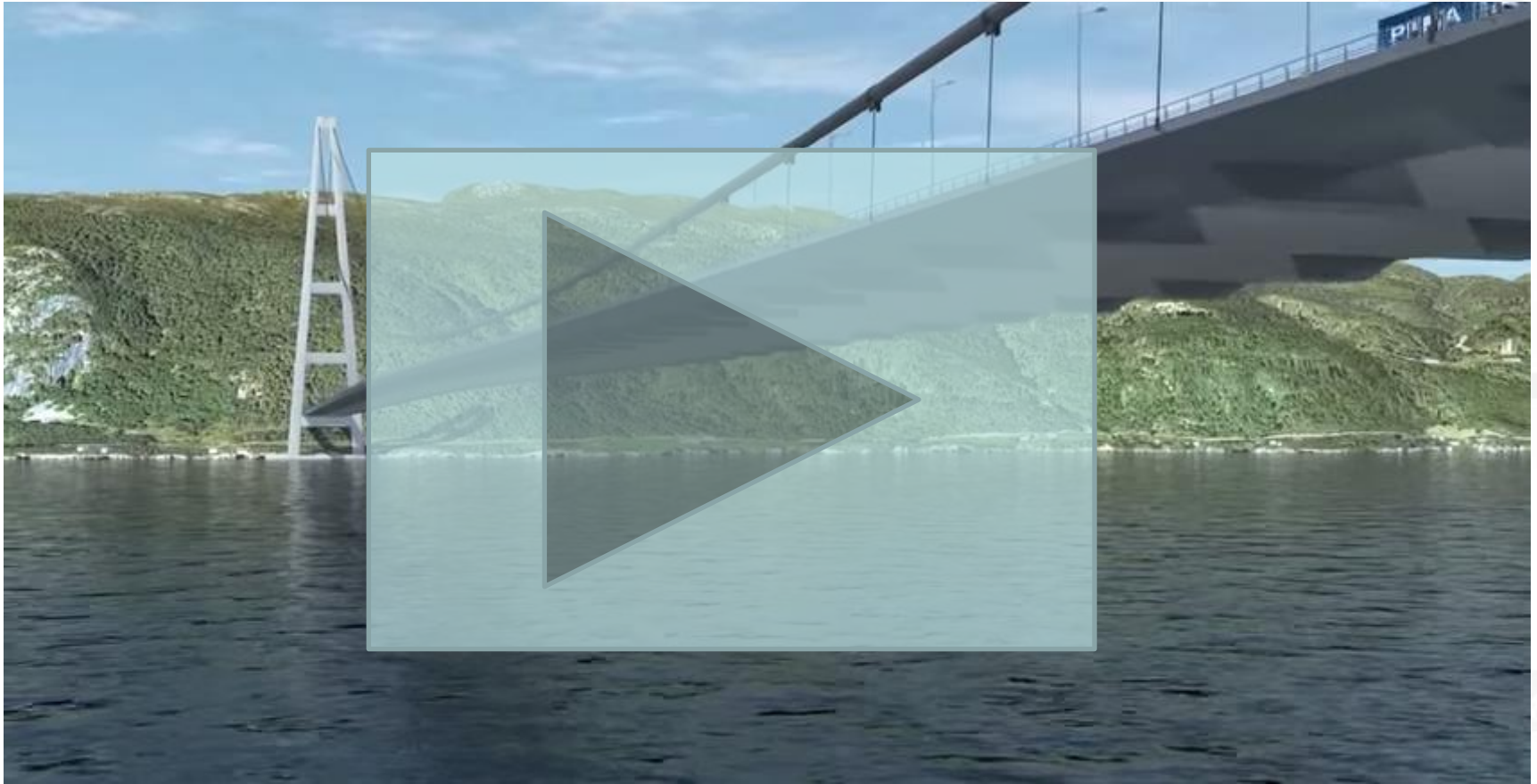
Possible start of
construction: 2018

Coastal Highway Route E39 Kristiansand-Trondheim offers many exciting challenges



3D Animation:

Coastal Highway Route E39



Procurement procedures

- ✦ For this project it is natural and necessary to involve both contractors and consultants in the process of finding optimal and good solutions – based on common expertise and experience.
- ✦ This can best be achieved by means of a design-build contract, preceded by a dialogue among the players in the industry.
- ✦ In the Norwegian Public Procurement Act and appurtenant regulations, this form of procurement is described as competitive dialogue.

The purpose of competitive dialogue...

Develop and optimise solutions, among different solutions from each bidder, based on dialogue in an early stage of the project

Procedures for the implementation of competitive dialogue

- Prequalification
- Qualified contractors are invited to participate in a dialogue
- Confidential dialogues are carried out with contractors, based on their individual concepts
- All aspects of the contract may be discussed
- It is important the the client ensures equal treatment of all bidders
- The client shall not disclose solutions to other bidders
- After the dialogue phase, a normal restricted-bidding competition is held for a design-build contract

Experience from the use of competitive dialogue

- This contracting procedure was used for the contract for work on the E6 in Trondheim
 - Good experience
 - The process and experience are described in a report

Coastal Highway Route E39: what next?

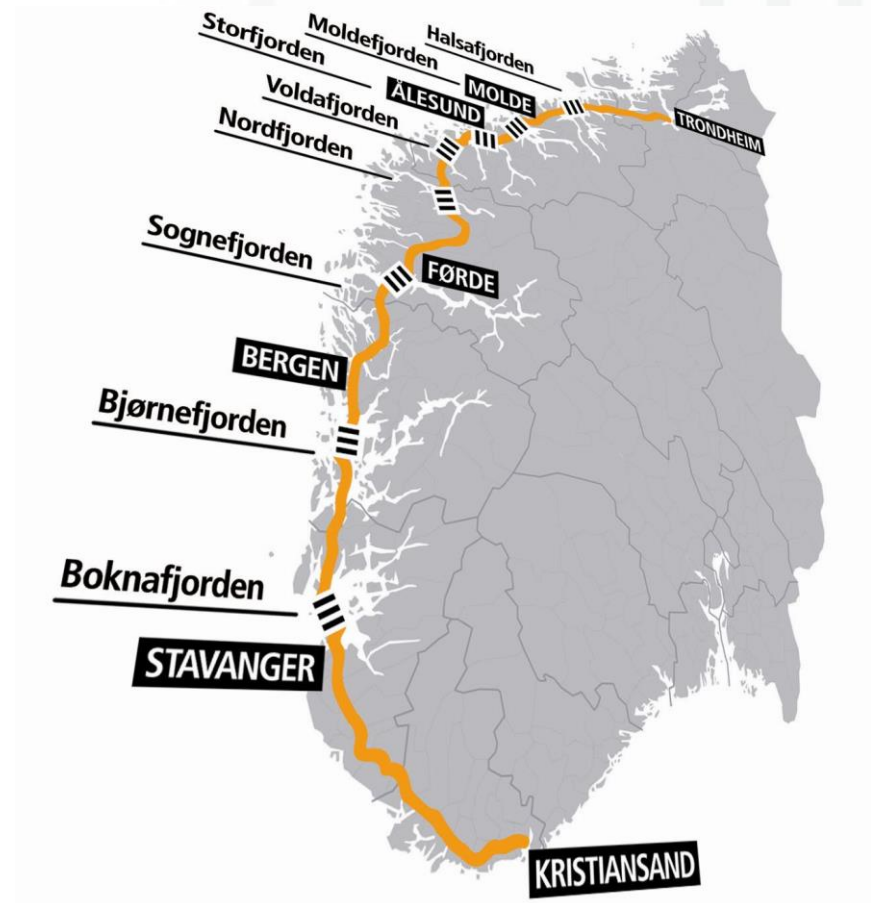
- ✦ In future work in this project we plan a relatively deep involvement of the market.
- ✦ It is the intention that this cooperation may result in important technical advances and stimulate the development of expertise in the market.

Coastal Highway Route E39

E39 Kristiansand - Trondheim

1100 km

7 Ferry links
Remaining on
E39



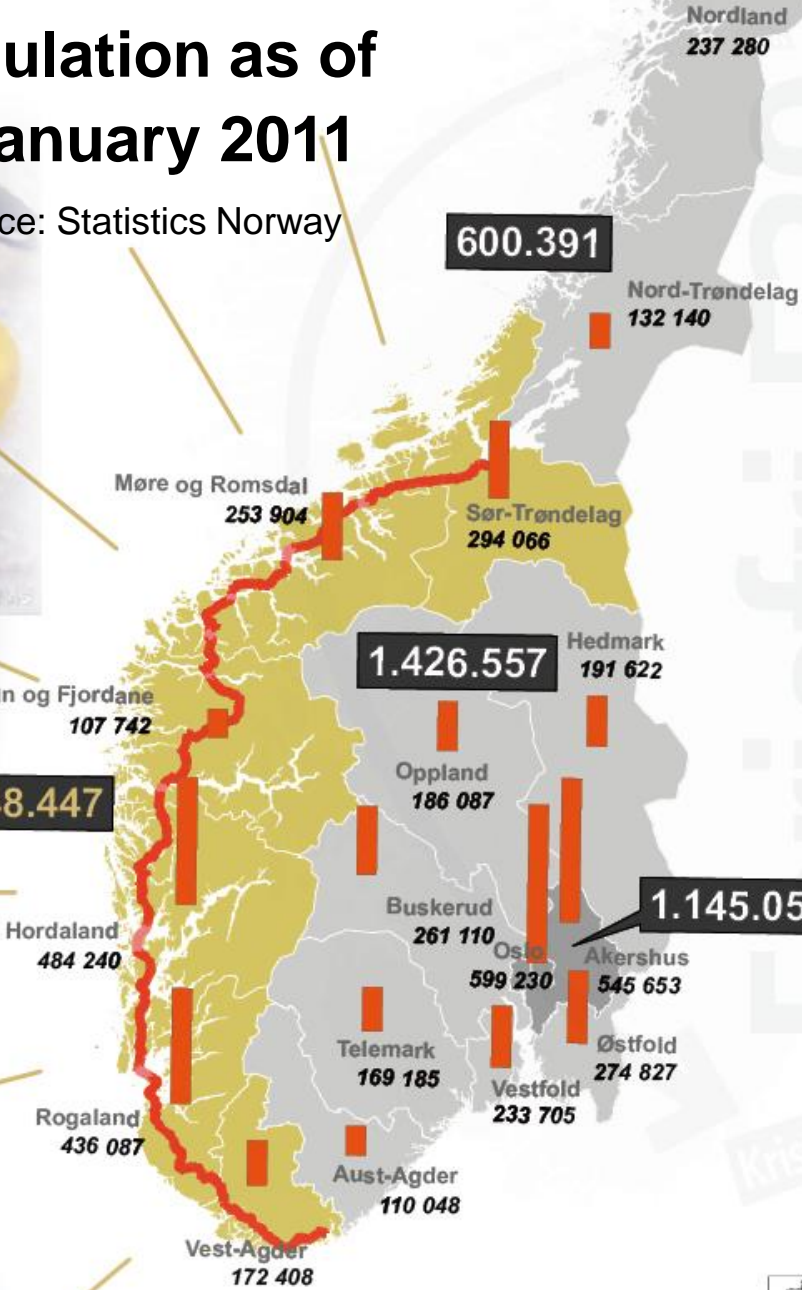
Population as of 1 January 2011

Source: Statistics Norway

50% of Norwegian Traditional Export Value from this area (2010)



50% of Norwegian Traditional Export Value from this area (2010)



National Transport Plan (NTP) 2014-23

Governments Proposal for E39

- NTP is updated every 4 years
- This period is 2014-23
- E39 ambition:
 - Replace all ferries and upgrade corridor within 20 years
 - Cost frame of NOK 270 billion (US\$ 29 billion)
- Proposal pass The Stortinget on 18th June 2013
- Transport Committee agrees except one political party (SV)

Coastal Highway Route E39 Project

A ferry-free Coastal Highway Route E39,
Kristiansand-Trondheim

- Tunnels (sub sea)
- Fjord Crossings (bridges)

There are still 7 ferry connections remaining along the 1100 km route from Kristiansand to Trondheim

Fjord Crossings Characteristics

(Width, Depth)

Halsafjorden, 2 km, 5-600 m

Moldefjorden, 13 km Subsea tunnel
330 MBSL + 1,6 km bridge, 5-600 m

Sulafjorden, 3,8 km, 500 m

Vartdalsfjorden, 2,1 km, 600 m

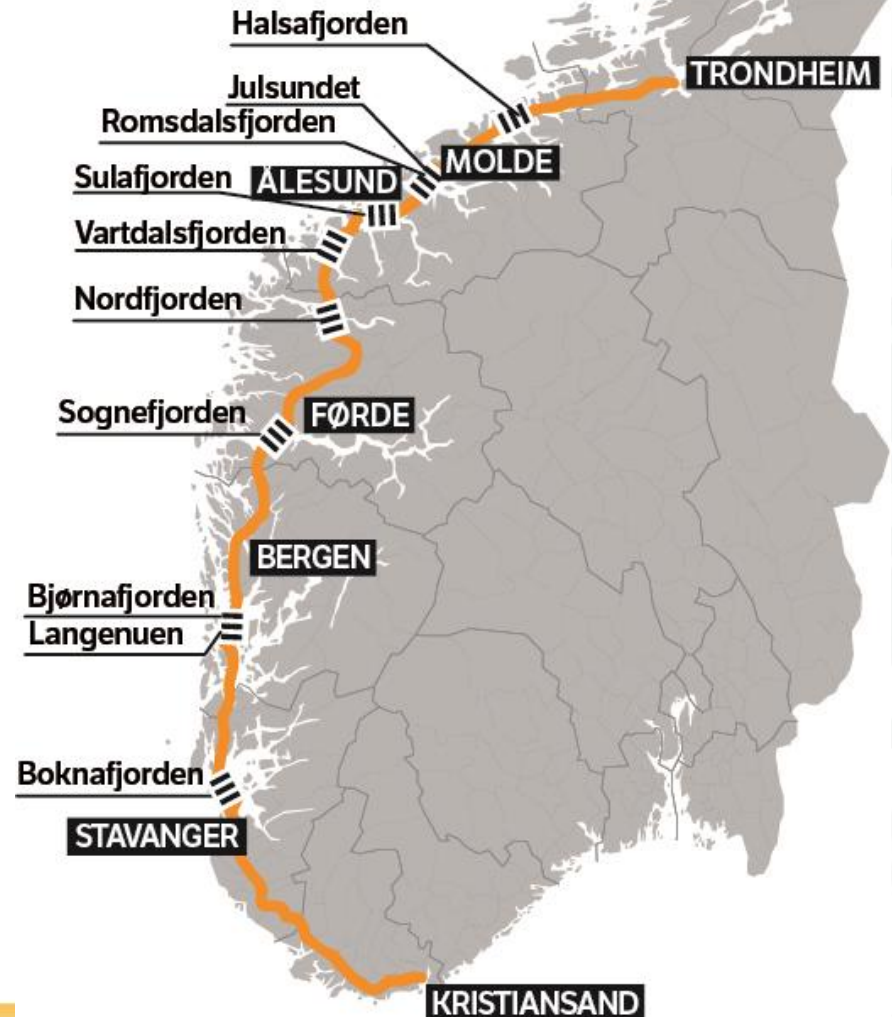
Nordfjorden, 1,4 km, 500 m

Sognefjorden, 3,7 km, 1250 m

Bjørnafjorden, 5 km, 5-600 m

Langenuen, 1,3 km, 500 m

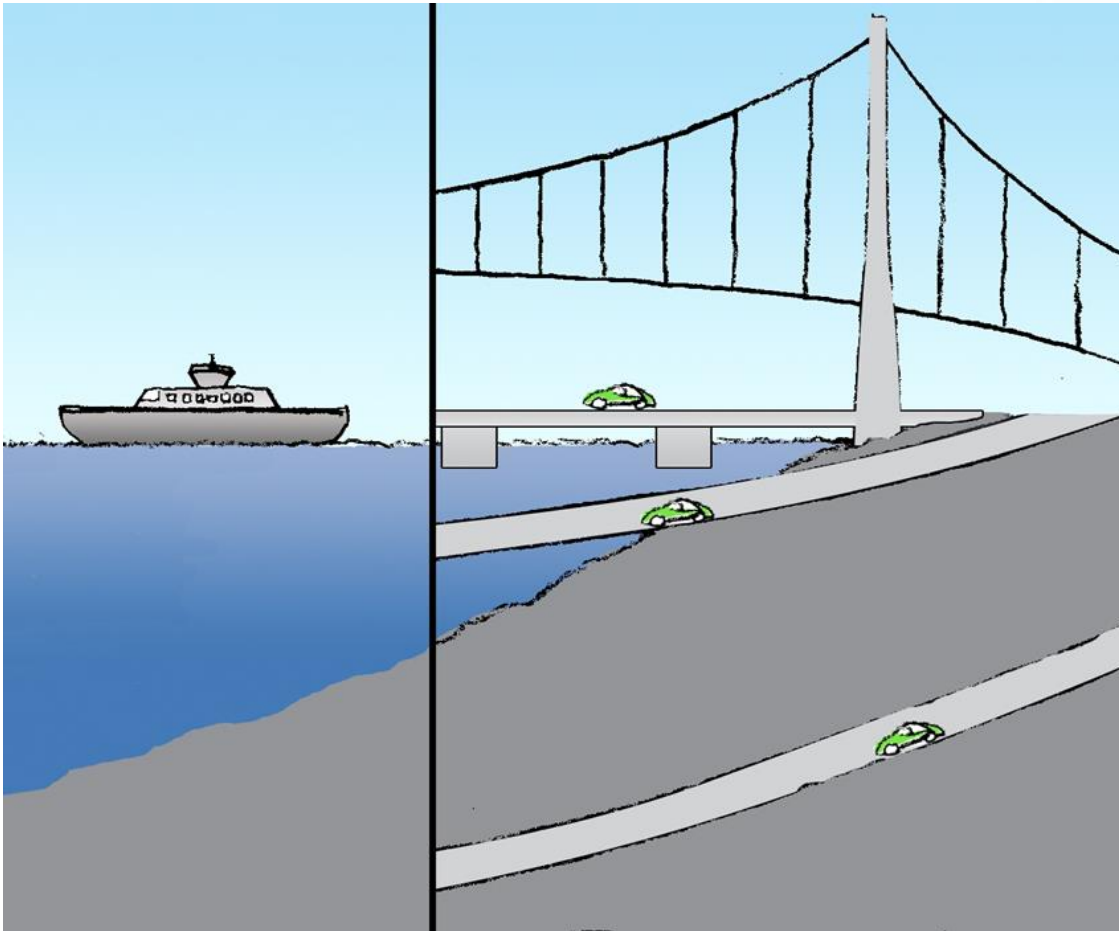
Boknafjorden, Rogfast Subsea
Tunnels 27 km, 390 MBSL



Characteristic features of the "extreme" fjords:

- Width: 2-7,5 km
- Depth: 300-1300 m
- Varying degree of exposure to natural loads (waves, current, wind)
- Considerable amount of shipping
- Low traffic volumes (normally two-lane highway)

Alternative fjord crossings methods



- Suspension Bridge
- Floating bridges
- Submerged floating tunnel

- Immersed tunnel
- Subsea rock tunnel

Feasibility study, The Sognefjord

– how to cross

Beautiful, but difficult to cross with a fixed link



Width: approx. 3.7 km
Depth: 1300 m,
sudden deep waters
approx. 1500 m to rock

Navigation channel required for large cruise ships

Conceptual design, Suspension bridge across the Sognefjord

Norwegian Public Roads Administration, Bridge section

E39



Conceptual design, End-anchored floating bridges across the Sognefjord



Evergreen Point and the Nordhordland floating bridges

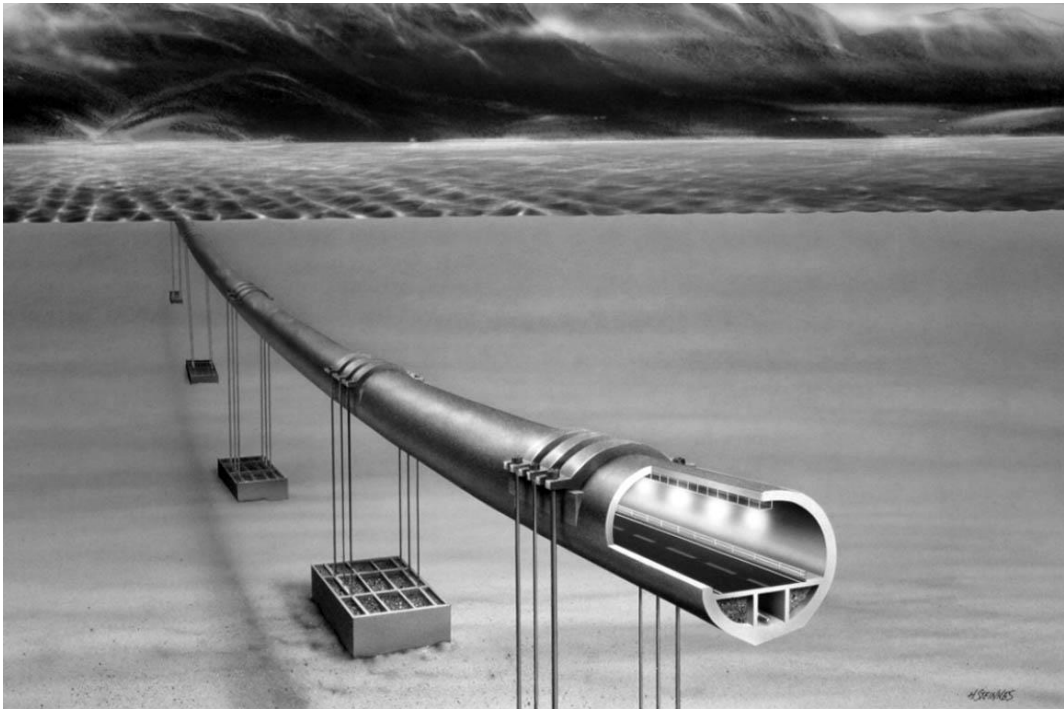


Side-anchored, and end-anchored floating bridges

New technology, yet not built

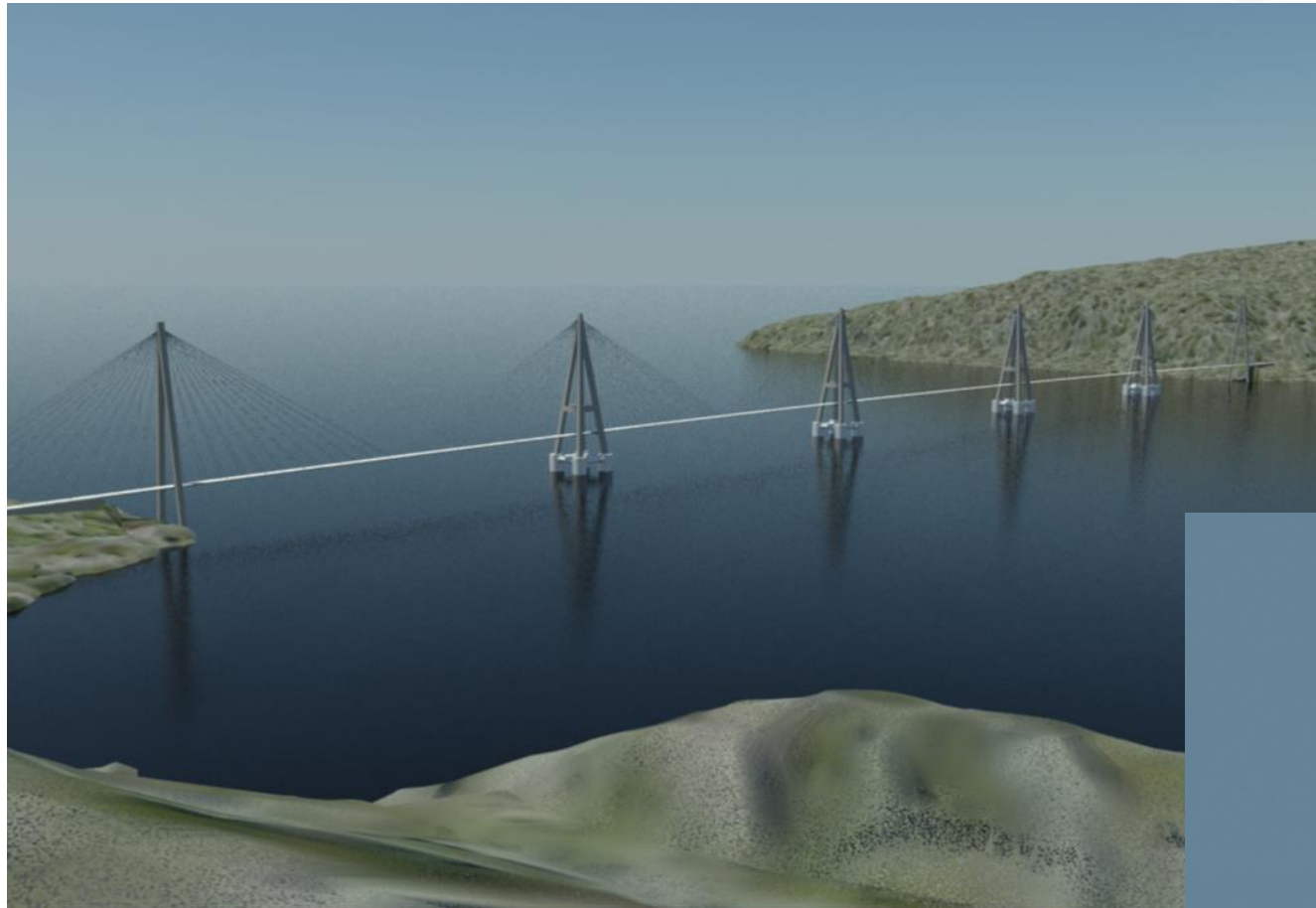
The Høgsfjord submerged floating tunnel (SFT), Norway

Approved as preferred link design (1998), but not built due to political reasons

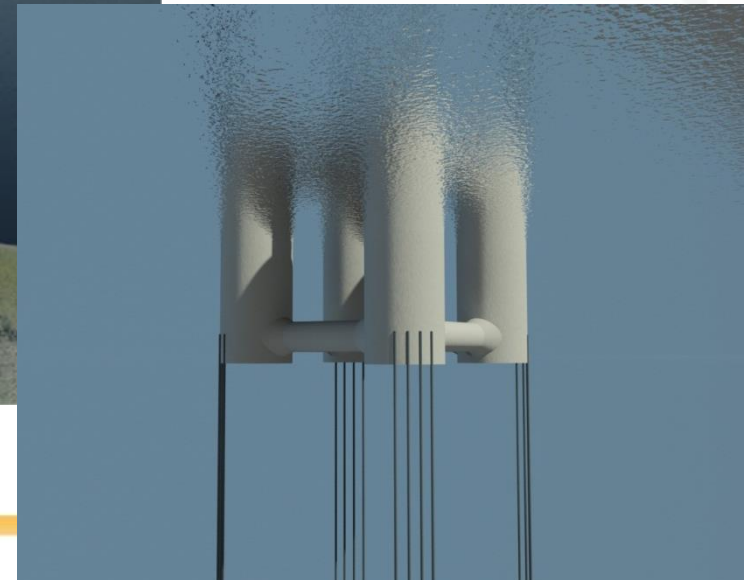


- Length: 1400m
- Fjord depth: 155m
- Anchored to the seabed

Conceptual design, floating bridge: Cable stayed bridges on floating pontoons



Based on
offshore
technology,
tension leg
platforms
(TLP)



Coastal Highway Route E39

Recent Developments-Offshore Structures

Ekofisk tank:
70 m depth (1973)

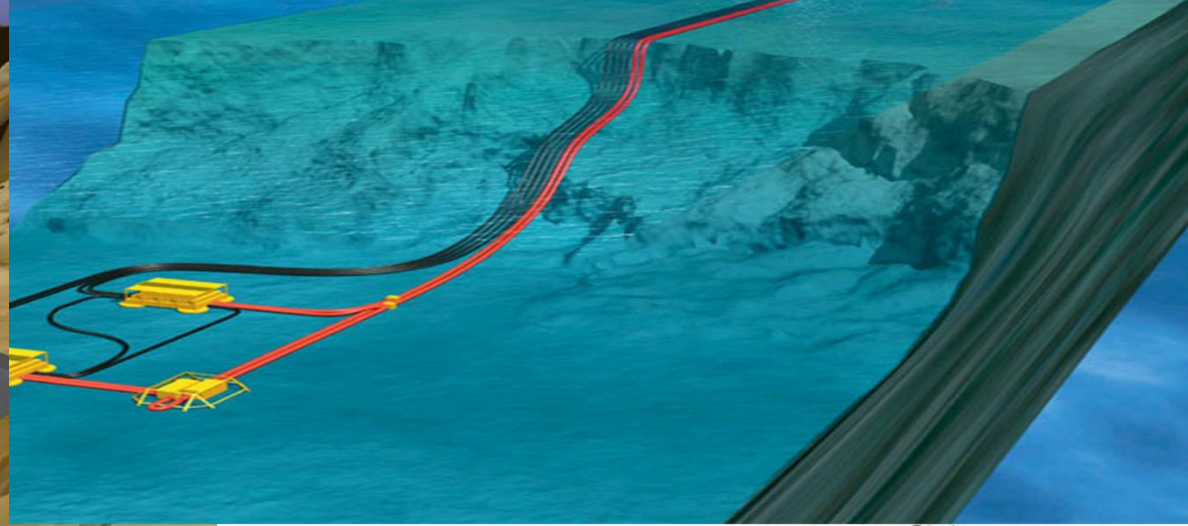
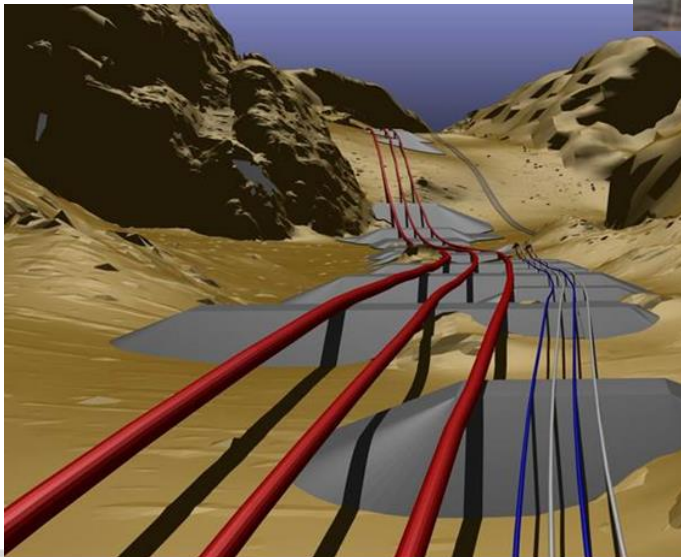
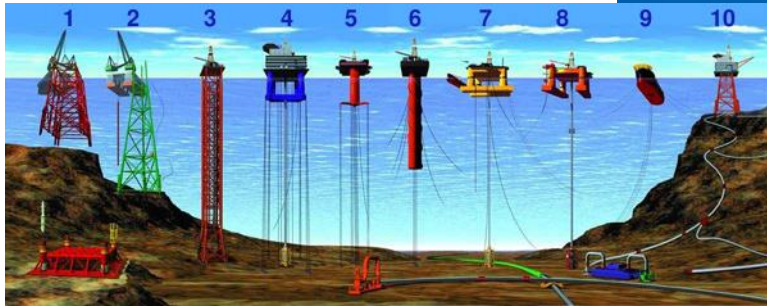
Troll platform:
303 m depth (1995)

Buoyant platforms
(TLP) moored at
depths of more than
1500 m



Research & Development

Technology does not come by its own !



Fjord Crossings Characteristics

(Width, Depth)

Halsafjorden, 2 km, 5-600 m

Moldefjorden, 13 km Subsea tunnel
330 MBSL + 1,6 km bridge, 5-600 m

Sulafjorden, 3,8 km, 500 m

Vartdalsfjorden, 2,1 km, 600 m

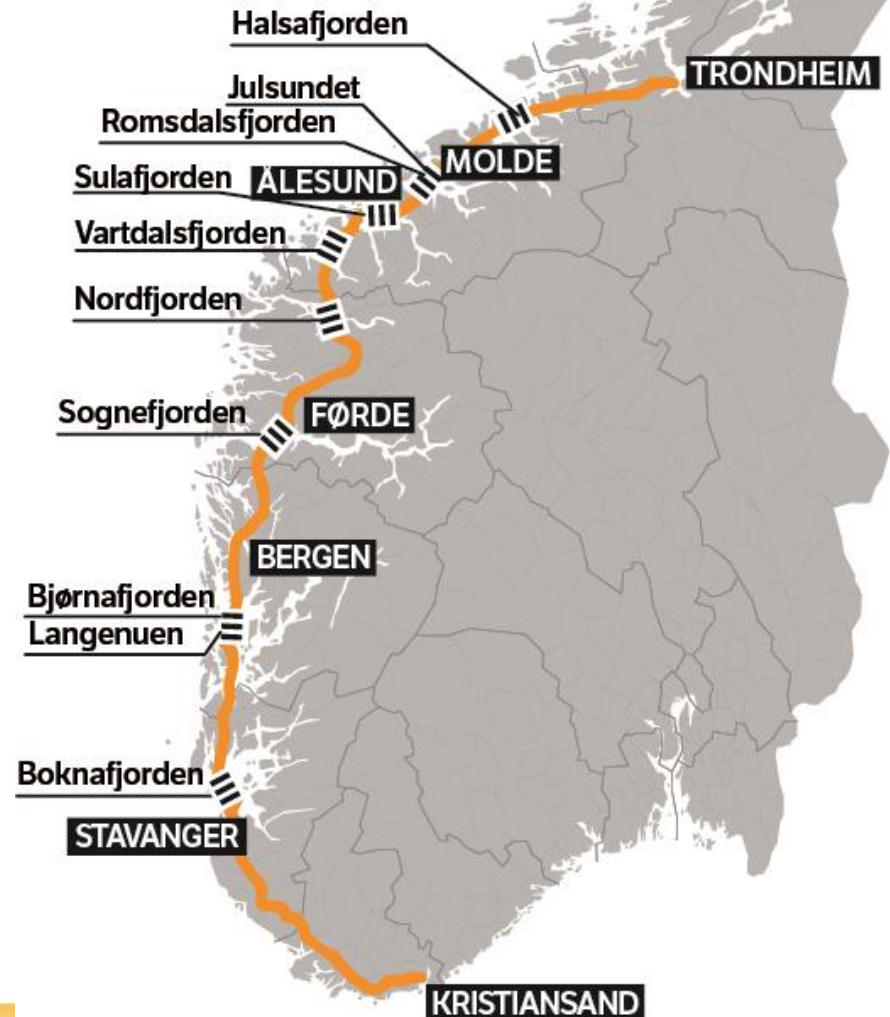
Nordfjorden, 1,4 km, 500 m

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Bjørnafjorden, 5 km, 5-600 m

Langenuen, 1,3 km, 500 m

Boknafjorden, Rogfast Subsea
Tunnels 27 km, 390 MBSL



Boknafjorden, The Rogfast Project



The Tunnel Alignment (Rogfast, Boknafjorden)

- ✦ Twin tunnel with cross-sections of T10,5
- ✦ Design speed 100 km/h
- ✦ Maximum gradient will be 5%
- ✦ Maximum depth is 392 mbsl
- ✦ Total length about 27 km

- ✦ Total cost approx NOK 12,2 billion
- ✦ Financing
 - Toll money NOK 9,5 billion
 - State share NOK 2,7 billion
- ✦ Under design
- ✦ Tender 2018/2019, building 2019/2020

E39 Akrdal-Bergen

- Road (approx 40 – 60 km)
- Bridges
- Tunnels (incl subsea)
- Under planning
- Building 2020



E39, Fixed link across the Bjørnafjord

width: 5000 m, depth: 550 m



Floating bridge in combination with suspension bridge

Conceptual design, the Bjørnafjord

Side-anchored floating bridge in combination with cantilever bridge



E39, Bergen

- ✦ E39 Rådal – Svevatjørn; ongoing tender
- ✦ Sotrasambandet (west of Bergen) will be as PPP
- ✦ Planning and partly design
- ✦ Tender 2016

E39, north of Bergen

- ▶ Ongoing and upcoming tender, road and tunnel
- ▶ Bridges after 2020
- ▶ Moldefjorden, 13 km Subsea tunnel 330 MBSL + 1,6 km bridge, 5-600 m, tender 2019/2020



Norwegian Embassy in Lisboa

- ✦ **Ana Barreto**
- ✦
- ✦ **Responsável EEA Grants / Sector Comercial**
- ✦ **EEA Grants and Commercial Officer**
- ✦ **Embaixada Real da Noruega / Royal Norwegian Embassy**
- ✦
- ✦ Av. Dom Vasco da Gama 1
- ✦ P-1400-127 Lisboa, Portugal
- ✦ Tel: +351 213009100
- ✦ Mobile: +351 912396815
- ✦ Ana.Barreto@mfa.no
- ✦ www.noruega.org.pt
- ✦ www.eeagrants.gov.pt
- ✦ Follow us on [Facebook](#)

Norwegian Tunneling Network

- ✦ www.norwegiantunnelling.com
- ✦ Several companies looking for international cooperation

Norwegian Transportation Network

- ✦ Contact:
- ✦ Ms Marit Due Langaas
- ✦ (NPRA International Cooperations)
- ✦ marit.langaas@vegvesen.no
- ✦ Tel: +47 90530801

- Abrigado and thank you for listening!





Jernbaneverket



Welcoming

Large upcoming projects and new contract strategy

in The Norwegian National Rail Administration

The rail network

- 4 230 km route-km
- 245 km (5,8 %) is double-track
- 704 tunnels
- 2 446 bridges
- 339 stations and stops with passenger traffic
- 11 freight terminals for combined traffic



The National Transport Plan process



The National Transport Plan (NTP) for 2014-2023

- Presented every 4 years, covering overlapping 10-year periods
 - in other words, the previous plan was for 2010-2019, the next one will be for 2018-2027, etc.
- The new plan: more than 50% increase overall, compared to the previous plan
- NOK 508 billion (€ 67 billion) for the entire 10-year period
- Of this, NOK 168 billion (€ 22 billion) goes to the railway sector
- In return, the government expects better efficiency from the sector in planning and carrying out the work

- NOK 92 billion (€ 12 billion) for investments through the 10-year period
- NOK 76 billion (€ 10 billion) for operations and maintenance (a 43 % increase from previous NTP)
- This includes NOK 6 billion (€ 800 million) for ERTMS implementation
- Budget increases will be introduced gradually through the period

Top priority: InterCity Triangle

- Double tracks between Oslo and regional centres in three different directions:
 - Oslo-Skien (south-west)
 - Oslo-Halden (south-east)
 - Oslo-Lillehammer (north)
- 1st stage: "inner triangle" (marked by dotted lines on the map) to be completed by 2024:
 - Oslo-Tønsberg
 - Oslo-Fredrikstad
 - Oslo-Hamar
- Remaining sections by 2030
- The InterCity project will significantly reduce travel time between the cities, link them more closely together and facilitate commuting



Status InterCity



188 km of double track built



43 km under construction

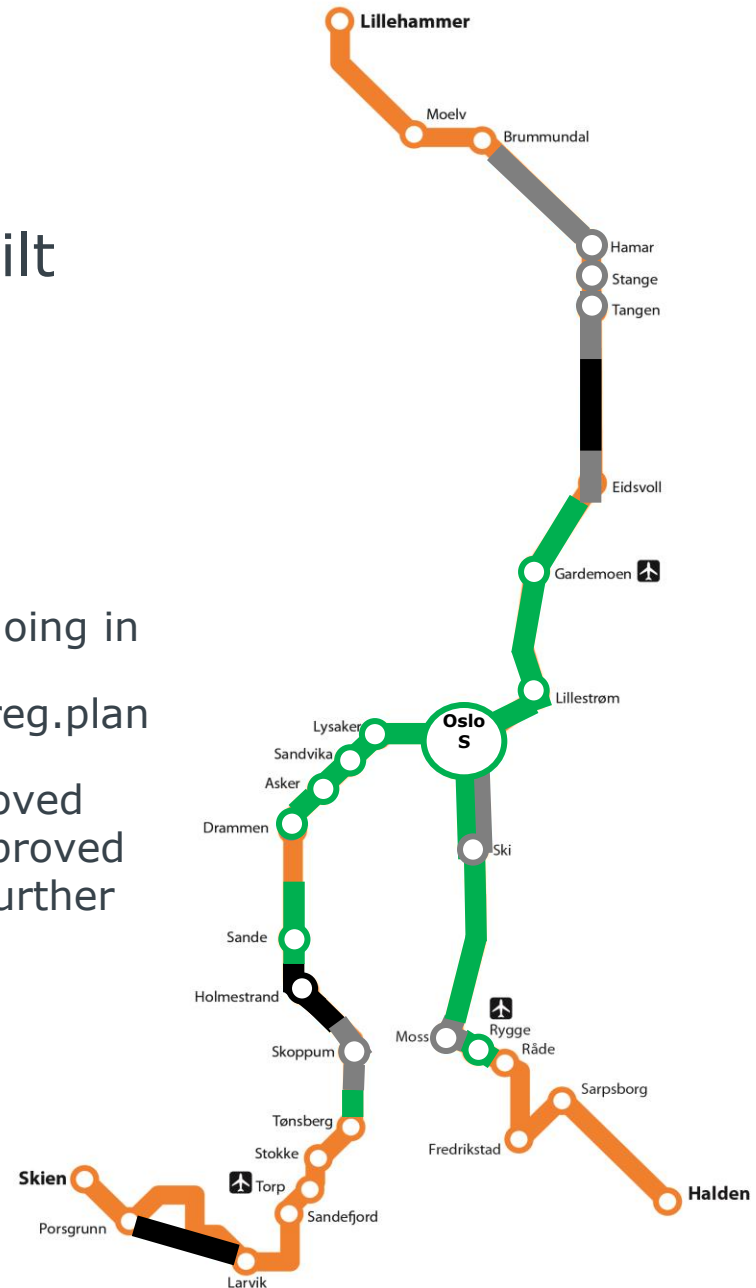


230 km remains:

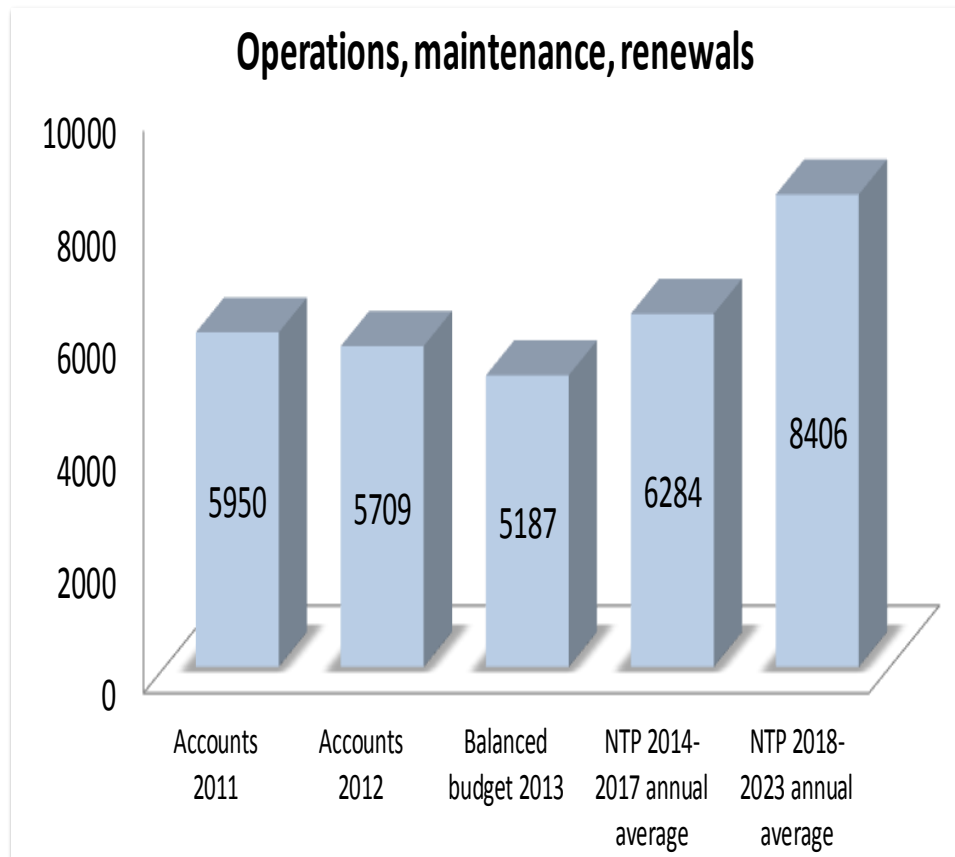


Plan status:

- Oslo–Ski: regulation plan in Ski, ongoing in Oslo
- Sandbukta–Såstad: municipal plan/reg.plan ongoing
- Kleverud–Sørli: municipal plan approved
- Eidsvoll–Langset: municipal plan approved
- Nykirke–Barkåker: municipal plan, further study ongoing
- Sørli–Brumunddal: study ongoing
- Venjar–Eidsvoll: study ongoing



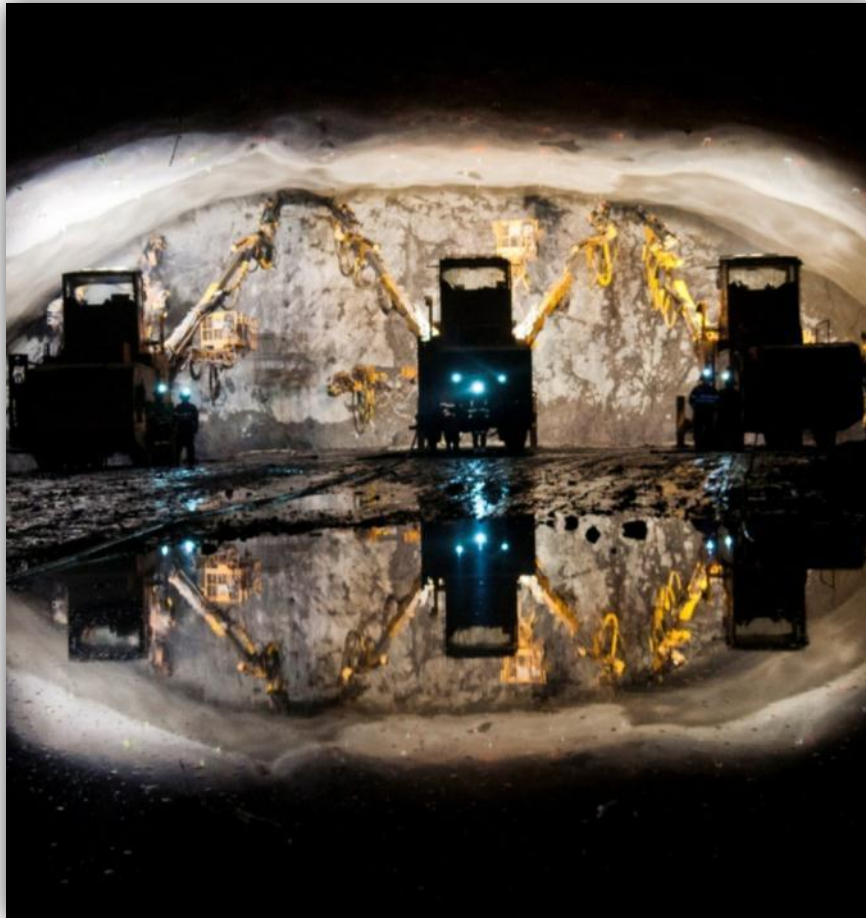
Operations, maintenance, renewals – annual average



Increase in %
compared to 2013
budget:

- 16,3% first four years
- 64% final six years
- 43,8% entire period

Investments Railways



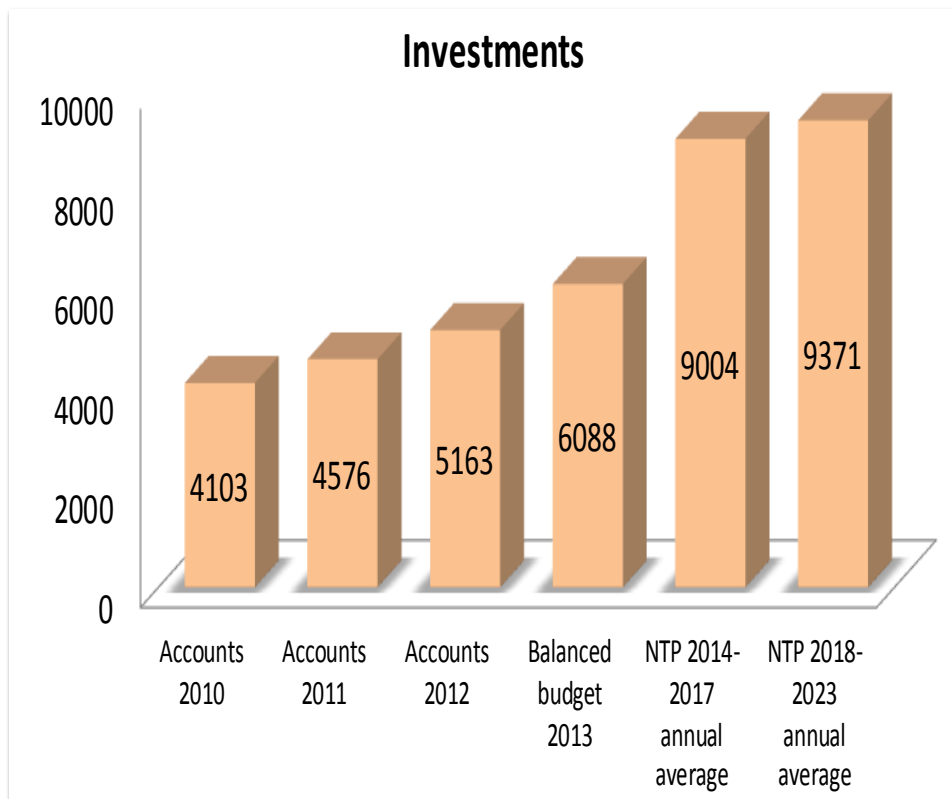
Ensuring progress
in projects

First four years: full
dedication to
planning new
projects

Startup of planned
projects

- ✦ Follo line
- ✦ Bergen-Arna
- ✦ Hell-Værnes

Investments – annual average

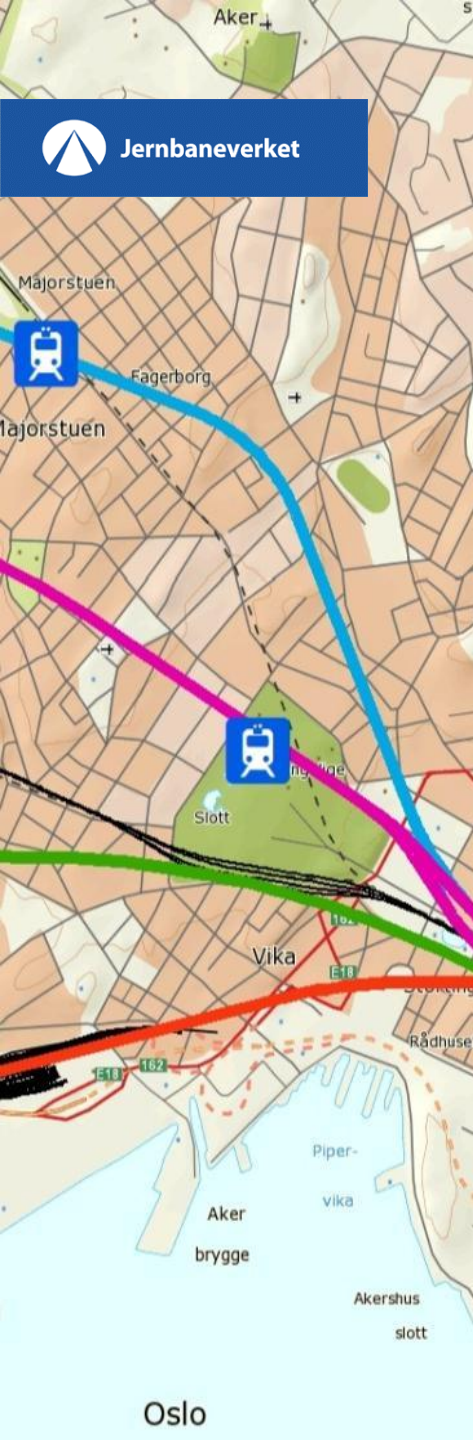


Increase in %
compared to 2013
budget:

- 53,2% entire period

General overview of projects

| NTP Project List, divided - first four years and final six years | 2014-17 | 2018-23 | Total for entire period |
|---|---------------|----------------|-------------------------------|
| Ongoing projects (incl. ongoing IC) | 11 240 | 1 020 | 12 260 |
| New IC projects (except Oslo-Ski) | 1 980 | 26 400 | 28 380 |
| Oslo-Ski (post 31) | 12 155 | 6 205 | 18 360 |
| Bergen projects (incl. Bergen-Fløyen, Voss) | 2 430 | 1 280 | 3 710 |
| Ringerike line | 0 | 1 500 | 1 500 |
| Trønder line (Hell-Værnes, electrification etc.) | 800 | 3 150 | 3 950 |
| Freight (Alnabru, passing loops, Ofoten line, terminals etc.) | 2 125 | 6 155 | 8 280 |
| Programme areas (Clock-face scheduling, Oslo Project, safety, traffic nodes, technical measures etc.) | 5 285 | 10 515 | 15 800 |
| Operations and maintenance incl. ERTMS | 25 135 | 50 435 | 75 570 |
| Total railways (except post 25 Gardermoen line) | 61 150 | 106 660 | 167 810 |



Extensive reports to be undertaken

- ✦ Sandnes-Egersund
- ✦ Oslo capacity
- ✦ Ringerike line
- ✦ Broad socio-economic analysis, freight
- ✦ Non-electrified lines
- ✦ Kongsberg, Gjøvik, Kongsvinger
- ✦ Phasing in new rolling stock
- ✦ Track access charges nationwide
- ✦ Grenland line



More efficient planning

- Aim: to reduce total planning time for major transport projects by half
- State authorities to get involved early in the planning process
- More homogenous practice for filing objections – experimental scheme where the County Governor is responsible for coordinating state transport agencies
- Coordination of measures on longer sections of network
- More active coordination and involvement in the early stages
- Aims and deadlines in the planning process to be considered
- KVV/KS1 to lay down provisions and be better coordinated with subsequent planning process in accordance with the Planning and Building Act
- More use of state-level planning
- Revision of national guidelines for coordinated planning of land use, housing and transport

Effective implementation demands ...

- Predictable finance
- Effective regulation processes
- Consistent overall development
- Defined finish date for new projects





We are facilitating ...

- New forms of contract
- Larger contracts
- Attracting foreign companies
- Attracting new competence
- Log-term view of the supplier market
- Increased effectiveness
- More railway for the money!





Development strategies

Funding for railways expected to keep increasing. To handle this, there must be a major change in both the National Rail Administration and the market:

- ▣ To create the conditions for large-scale operation, exploitation of competence and specialisation
- ▣ Focus on products, product development and production in the supplier market, so as to provide the National Rail Administration's requirement for functionality, properties and price.
- ▣ Effective exploitation of resources and reduced building time
- ▣ More responsibility for results in the supplier market



Our role as construction client

- ▶ Represent owner as a professional multiple construction client
- ▶ Focus on control and management of projects
- ▶ Organise developments according to project characteristics
- ▶ Use contract forms that give the best project implementation
- ▶ Increased use of turnkey contracts and collaboration contracts
- ▶ Individual project planning reduced to a minimum
- ▶ Maintain sector responsibility for capacity and competence



Pure construction client role

- ▣ Represent owner as a professional multiple construction client:
 - Develop function specifications for the market
 - Long-term supplier and market development
 - Increase effectiveness and innovation in the supplier industry
 - Integration with operation and lifetime analyses
 - Technological qualification and standardisation
 - Implementation models suited to the projects' own characteristics



Action

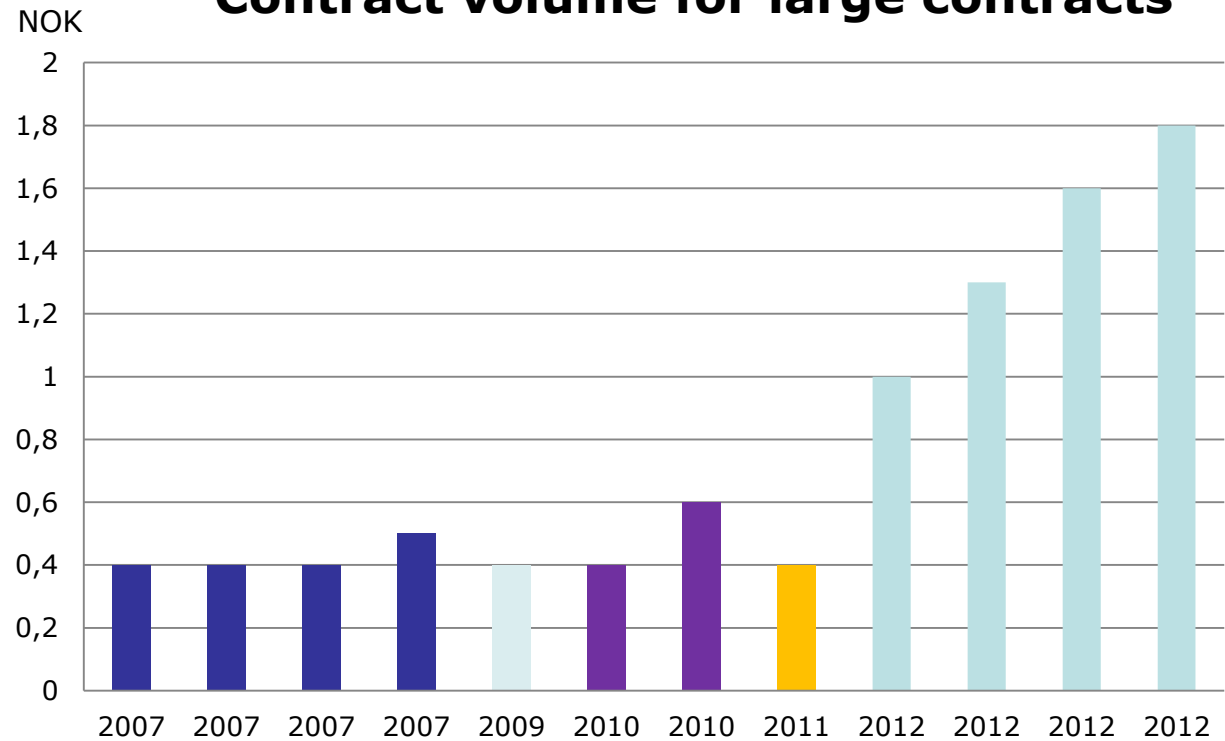
- ✦ Increasing contract size
- ✦ Increased focus on functionality => Turnkey contracts
- ✦ Increased standardisation
- ✦ "Bundling" of trades in railway
- ✦ Consistent technical contracts
- ✦ Exercise of the construction client role higher in the value chain
 - Reduce the construction client's interface
 - Fewer tasks for





Towards bigger contracts

Contract volume for large contracts





Market situation

Ground work

- Good competition for larger assignments
- The biggest contracts give alliances/consortia
- Increasing interest from foreign companies

Railway engineering trades

- Number of new parties is increasing, unevenly distributed across trades
- Some disappear (bankruptcy/winding



Competitive tendering from the market

- Target of 80% of investment budget to be used in the external market
- In 2013, 93% of the budget spent on competitive tendering
- About 7% spent on land acquisition, client management costs and in-house project planning (signal)
- Percentage will vary from year to year depending on amount of land bought, which will be greater when big projects are started



Contract strategy development

- ▶ Because of history and external conditions our contract strategy has been based on:
 - phased strategy: planning and implementation with a great deal of our own planning in railway engineering
 - Much railway engineering divided into trades in both planning and building
 - Parallel, client-controlled contracts for ground work, with relatively small contracts (?) NOK 250-400 million
- ▶ Ground work and railway engineering two different markets
- ▶ Few have credible turnkey contract experience or will or ability to risk

Contract strategy development

New external conditions mean new opportunities

- The National Rail Administration shall streamline its construction client role
- Planning shall be done in the supplier market
- More active use of turnkey contracts and other contract models
- Larger, more connected contracts where appropriate
- Facilitation of increased international competition
- Own development companies is a relevant model if regulations and external conditions permit this





Contract strategy development

Experience:

Construction:

- Good competition
- Large contracts
- Foreign involvement

Railway engineering:

- The industry is downsizing
- Downsizing 2013 (less renewal)
- Bundling of trades tried early 2013
- Increased activity on investment side



Jernbaneverket

The Norwegian National Rail Administration's priorities

- Punctuality and regularity
- Maintain existing infrastructure
- New investment

prosjekter



Statens vegvesen

5 successfactors in construction

Safety

- All activity acknowledged by the highest safety standards.
- Compliant to requirements for RAMS, environment and HES.

Quality

- Project delivery shall be in accordance with the project order and LCC

Execution

- Milestones and timeframes shall be respected.

Economy

- Budget kept through cost efficient project execution.

Reputation

- Our project are carried out in a way that safeguards JBV a good reputation at the train operators, municipalities, neighbours, suppliers and society in general



Jernbaneverket

**Thank you for your
attention**