

# Nye Veier

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# Agenda

- Nye veier (what we are, how we work)
- From a highway company to also improving roads
- How we prioritize
- Short brief about Rv 13 and its challenges
- How we work to calculate the overall economy of natura hazards

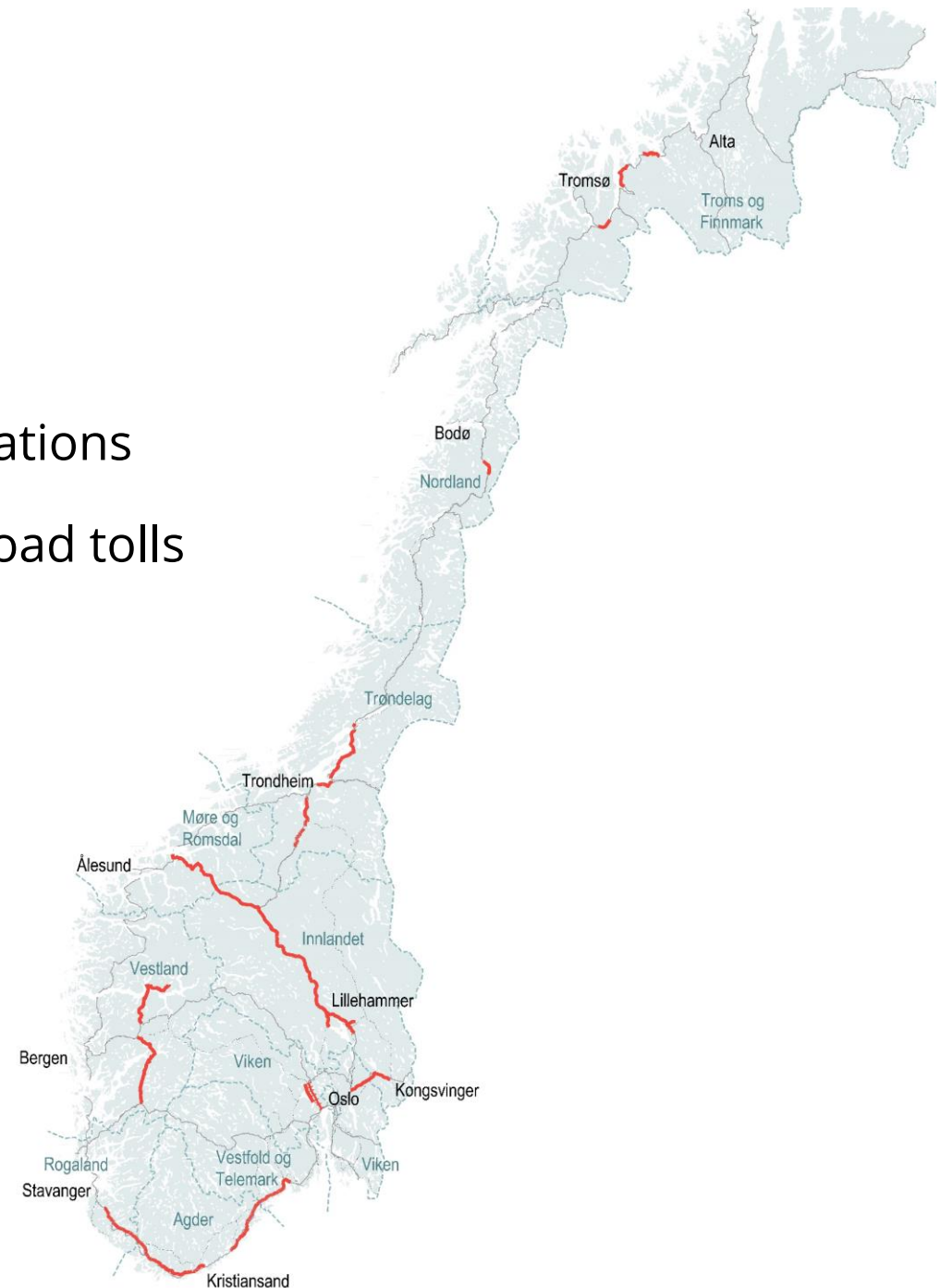
What is Nye Veier?





# Nye Veier AS

- Established 1<sup>st</sup> of January 2016
- Owned by the Ministry of Transport and Communications
- Financed - 6 billion from government and 4 billion road tolls
- HQ in Kristiansand
- Project offices where we build/ plan to build
- 175 employees
- Planning, building operating and maintaining state roads all over Norway





## BUSINESS STRATEGY

1. INCREASE COST-BENEFIT AND SOCIOECONOMIC PROFITABILITY IN ALL PROJECTS
2. EFFECTIVE ORGANISATION FOR PLANNING, CONSTRUCTION AND OPERATION OF INFRASTRUCTURE
3. CLEARLY SOCIAL RESPONSIBILITY, STRENGTHEN HSE WORK
4. LEADERSHIP ROLE IN ENVIRONMENTAL AND CLIMATE IN INFRASTRUCTURE



RENEW

We **renew** by thinking new and challenge



IMPROVE

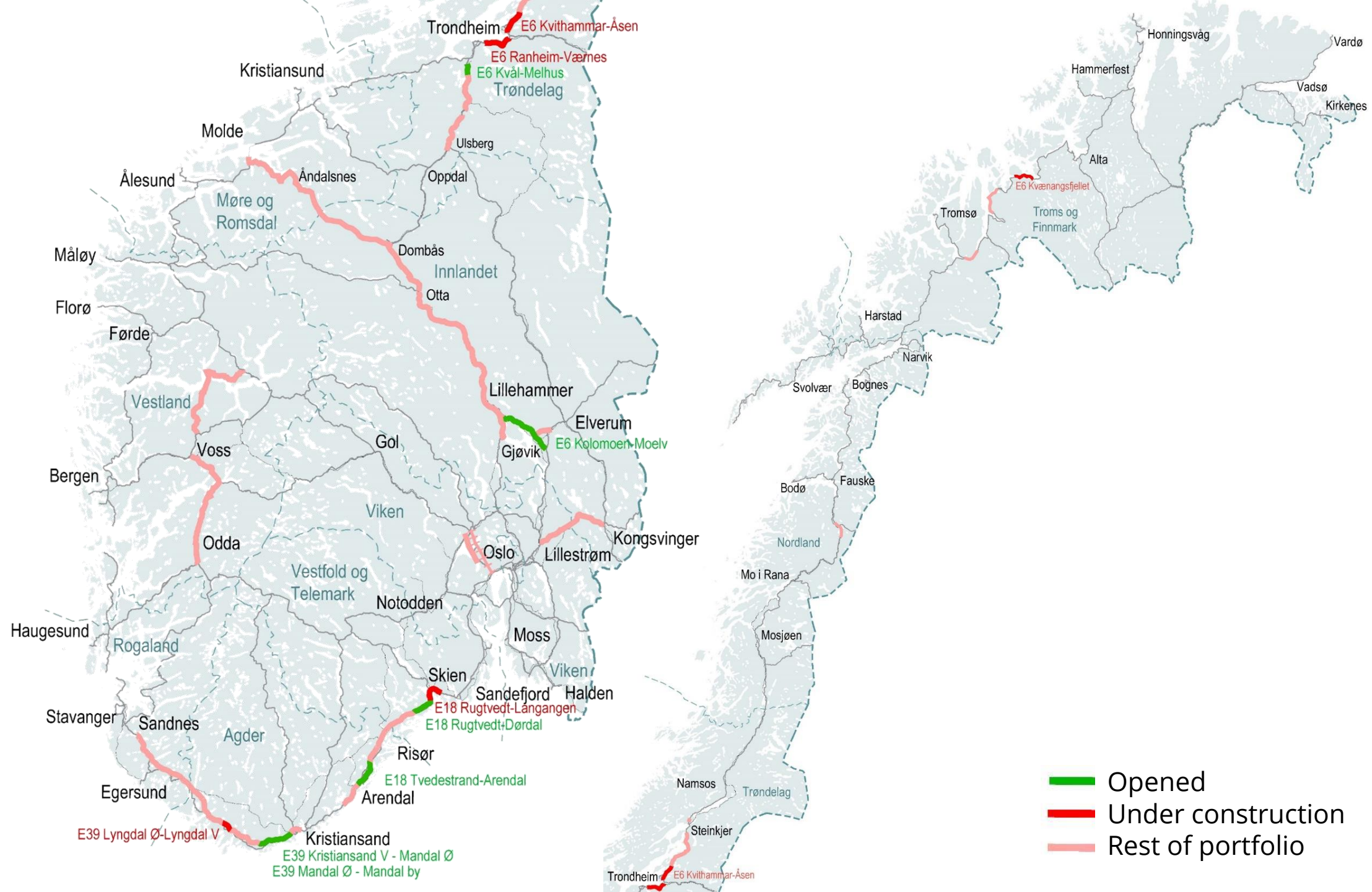
We **improve** by bringing value to work every day



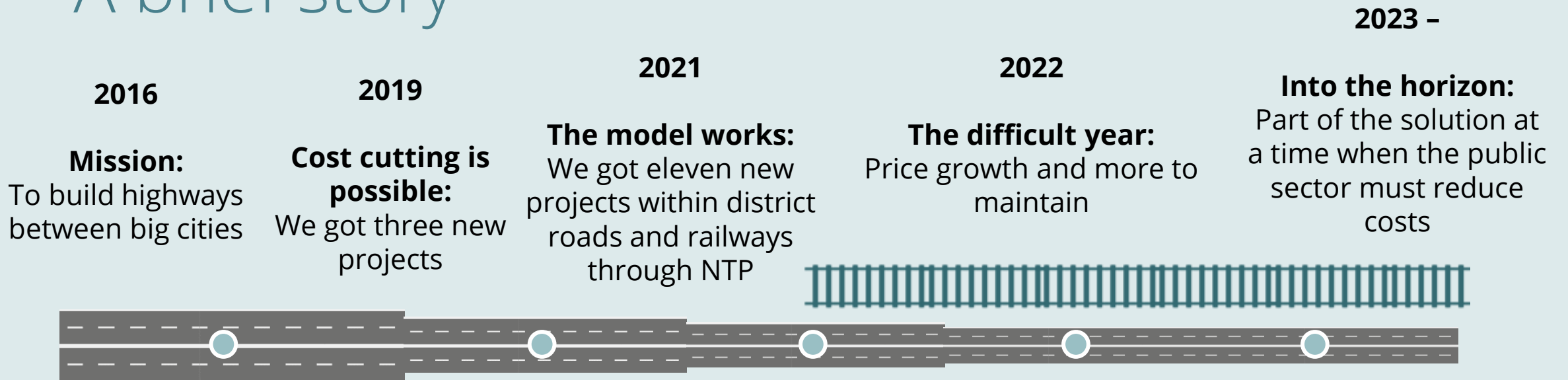
Assure

We **assure** by guaranteeing that we take our social responsibility seriously





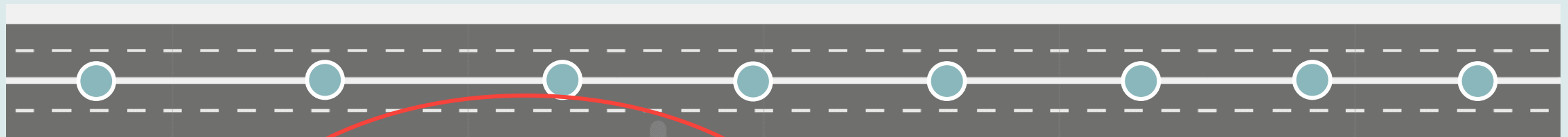
# A brief story



økende oppmerksomhet i samfunnet på klima og natur



# A project in Nye Veier and project organization



Nasjonal transportplan (NTP)

Concept, project development

Planning: Zoning plan, Optimization

Contracting

Engineering plan Construction

Road opening

Operation



# Hvordan vi prioriterer

- NyeVeier AS prioritizes road projects based on socio-economic profitability.
- Sections with high socio-economic profitability are carried out before those with low/negative profitability.
- This includes assessments of net ripple effects, traffic safety, and societal security.
- The Norwegian parliament has given Nye Veier the mandate to determine the order of projects based on these criteria



# We emphasize hard and soft data

Strekning	Sum prissatte virkninger		Sentrale ikke-prissatte virkninger		
	Netto nytte per krone		Samfunnsikkerhet score	Areal som berører naturmangfold dekar per km	Sum jordbruk- og naturareal dekar per km
1 E16 Kongsvinger-E6			6	-4	-452
2 E18 Tvedestrand-Bamble	-0,5		4	-7	-551
3 E18 Arendal-Grimstad	-0,5		3	-5	-428
4 E18 Ytre ringvei	0,2		6	0	-23
5 E39 Lyngdal-Ålgård	0,0		2	-67	-534
6 Rv. 13 Skare-Sogndal			2		
7 Rv. 4 Hunndalen-Mjøsbrua	0,0		4	-26	-395
8 Rv. 25 Hamar-Løten	-0,7		2	0	-429
9 E6 Moelv-Øyer	-0,2		4	-17	-458
10 E6 Øyer-Otta	-0,5		2	-35	-384
11 E6/E136 Otta-Dombås-Vestnes			2		
12 E6 Ulsberg-Melhus	-0,2		4	-36	-479
13 E6 Åsen-Steinkjer	-0,4		4	-10	-315
14 E6 Sørelva-Borkamo	-0,8		4	-26	-531
15 E6 Nordkjosbotn-Hatteng	-0,8		1	-167	-422
16 E6 Olderdalen-Langslett	-0,5		5	-5	-111
17 Ringeriksporteføljen	-0,5		4	-41	-1016





# Challenges of moving from being a highway company to also having improvement sections





An aerial photograph showing a paved road that curves along the edge of a large, calm lake. The road is bordered by a concrete wall on the lake side and a rocky embankment on the forested hillside. Several high-voltage power lines with towers cross the scene diagonally. The surrounding landscape is lush with green trees and large grey rocks. The sky is clear and bright.

# RV 13 Skare – Sogndal

A short brief

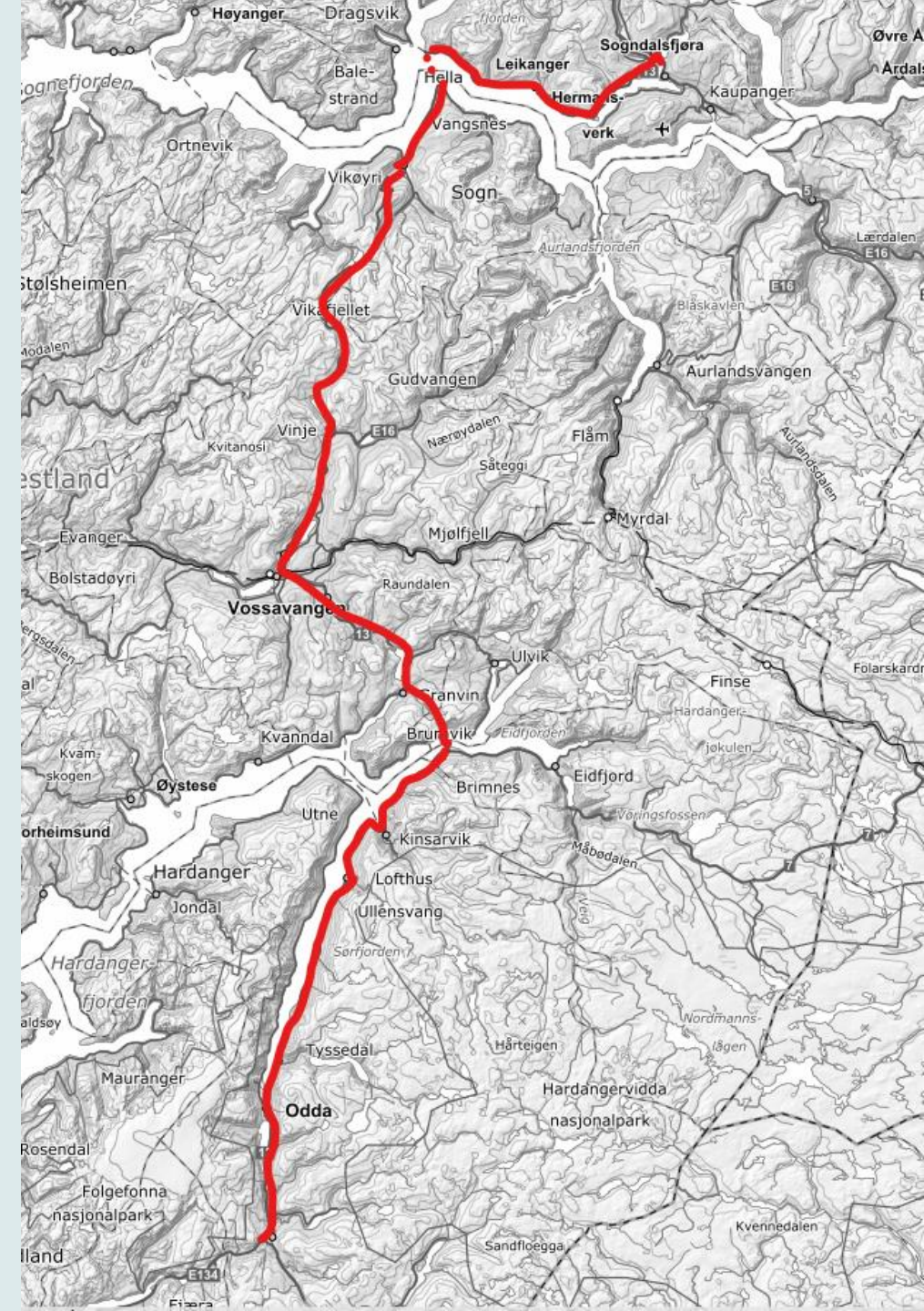






# RV 13

- Approximately 220 kilometers
- Diverse challenges – from fjords to mountains
- Large variations in standards
- Significant variations in Annual Average Daily Traffic (AADT)
- Many avalanche challenges
- AADT ranging from 600 to 6000 on different stretches

































# The approach

- Based on a "top - down" approach
- Overall route assessment
- Detailed route assessment
- Assessment of relevant measures within the sections
- Prioritization of the various measures



# Route analysis Rv. 13

## Overall route assessment:

Divided into five main sections

Skare-Odda

Odda-Hardangerbrua

Hardangerbrua-Voss

Vinje-Vangsnes

Hella-Sogndal

The rough analysis has provided an overall prioritization of sections as well as an indication of areas that require more detailed assessments





# The detailed route assessment

- The detailed route assessment has been based on the needs identified in the overall route assessment.
- Smaller sections and points on sections have been assessed at a more detailed level.
- Solutions and further processes are identified
- The detailed route assessments, together with the overall route assessment, provide a basis for prioritizing measures

A portfolio list has been drawn up



# Assessment of individual measures

- Individual measures have been assessed in order to prioritize between the various measures in the portfolio list
- The measures that have been given the highest preliminary priority are those that have been assessed
- A new iteration of assessments will be carried out once the first measures have been launched
- Measures are assessed based on:
  - Investment cost and NPV (if relevant)
  - Type of solution
  - Permanent or temporary
  - Compliant with requirements or is there a need for deviating solutions
  - Land acquisition - need for and uncertainty related to land acquisition
  - Status in relation to PBL - regulation, building permits and remediation measures
  - Implementation - potential start-up and the possibility of simultaneous implementation

Based on the assessment of the individual measures, we can prepare prioritized implementation lists for different scenarios with different prioritization criteria.





# Kommende tiltak

- Djupevik – Kviturtunnelen (Ras/fremkommelighet)
- Kyrkjenes - Berget ved Kinsarvik (fremkommelighet)
- Osgjelet ved Vinje (Ras)
- Aurskreda/Midtskreda ved Odda (Ras)
- Freim-Djupevik ved Odda (Fremkommelighet)
- Skarvabjørg nord for Tyssedal (Ras)
- Oddadalen



# How to prioritize natura hazard mitigations

- We have extensive experience with cost-benefit analyses for new road stretches
- Less experience to natura hazard mitigation
- So we startet cooperation with **The Institute of Transport Economics (TØI)**





# What we want to achieve

- More realistic calculations on the benefit side
- Be able to assess different project alternatives against each other
- Be able to assess different projects against each other in a portfolio
- Include welfare benefits related to reduced landslide risk

**Vikafjellet**



# Case Sandvinvatnet

- From 0 m - 1450 m
- Deep lake at the bottom
- Little space for significant improvment between water and mountain





## Probability of personal injury incidents

What are reasonable default values for severity and accident probability related to landslides?

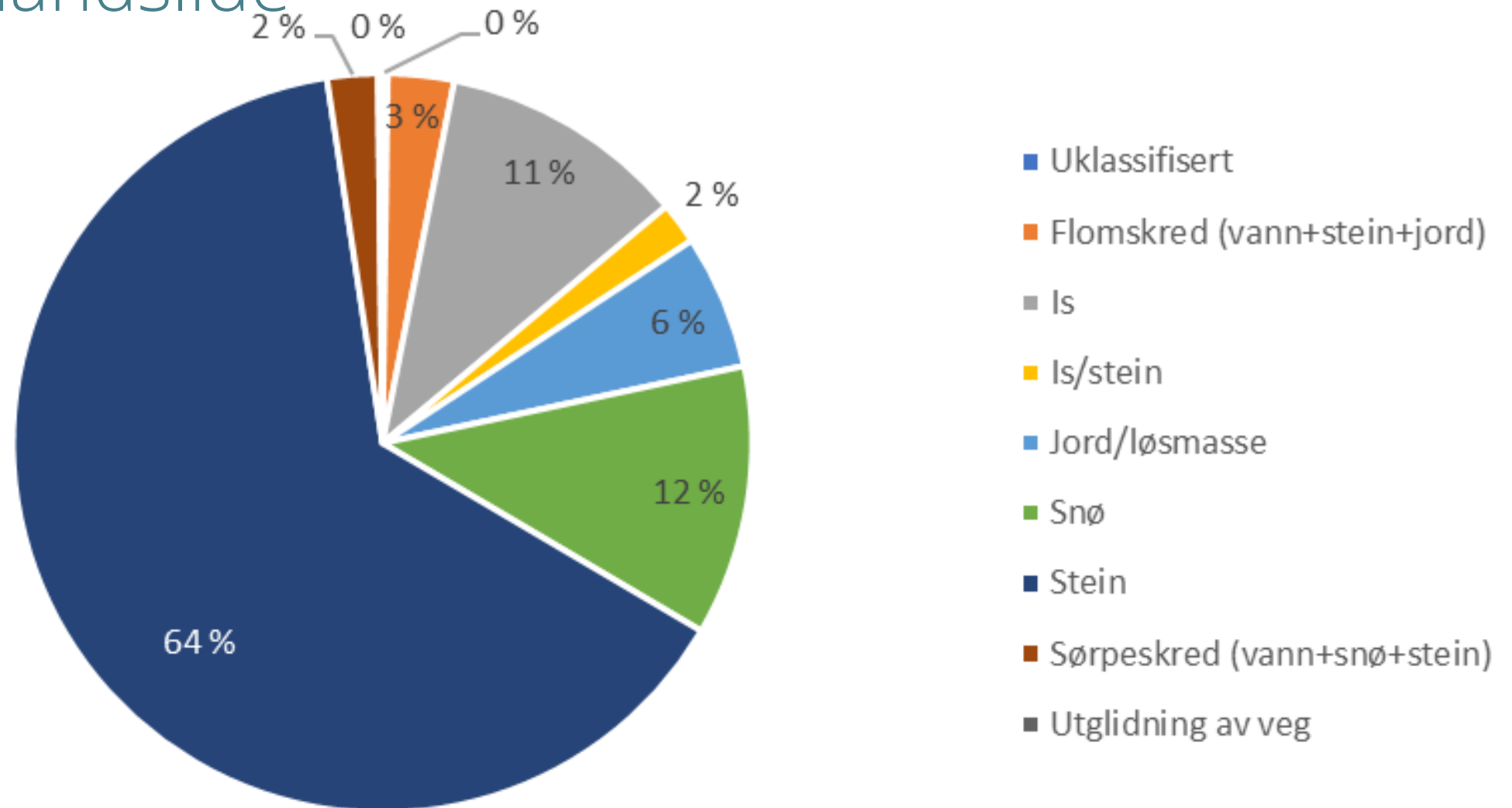


# Probability of personal injury incidents

- More than **53,000** landslides hitting road infrastructure (2000-2023)
- A total of 674 (1,2%) incidents of damage to vehicles due to landslides
- Of the cases of damage to vehicles, 62 cases of bodily injury have been identified
- Probability of bodily injury incidents due to avalanches on roads is relatively low, with less than 3 cases per year on average
- **Of the 62 cases of bodily injury, it resulted in a total of 18 deaths and 2 seriously injured**
- **With the recommended valuation of life and health for use in cost-benefit analysis, we find an expected accident cost of NOK 11-21 million (2020-NOK) per bodily injury case**



# Landslides on roads for the period 2000-2023 by type of landslide



# Willingness to pay for reducing frequency and volume of landslides

- Nye Veier took the initiative to include the benefits of reducing perceived insecurity experienced by road users when driving along roads with a high risk of landslides
- Nye Veier AS believes there is potential value in improving landslide-prone stretches, especially on Rv. 13
- A study conducted in 2022 (Menon 2022) explored how welfare gains related to landslide risk reduction could be included in socio-economic analyses of improvement measures
- The study revealed significant socio-economic benefits associated with reducing or eliminating landslide risk on road stretches.



# Willingness to pay for reducing frequency and volume of landslides

- Nye Veier continues to incorporate these benefits into our socio-economic analyses for prioritization
- We recognize the positive impact and believe it should be factored in when assessing the cost-effectiveness of our measures
- This work is conducted in close collaboration with both **Sintef** and **the Institute of Transport Economics**, ensuring that our models are robust enough to actively apply this approach to National Road 13 and other improvement projects

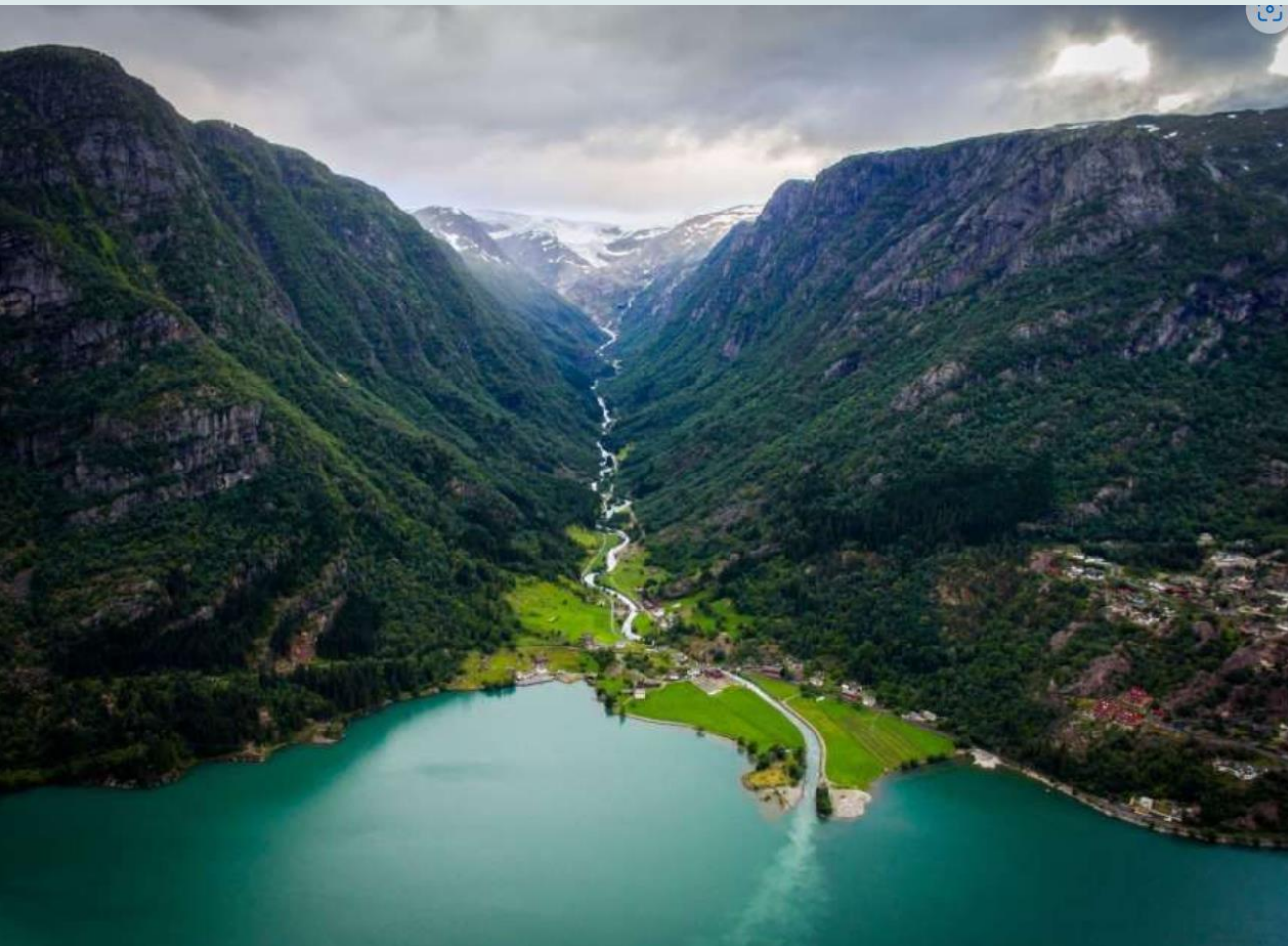


### ***Willingness to pay***

- To what extent does the previously recommended (marginal) default value for reducing avalanche frequency/size on roads (often referred to as “discomfort avalanche risk” at 5 NOK per trip per person) seem reasonable? Input is sought regarding potential adjustments to default values or how analysts can adapt them for local conditions.

- 1 CAD = 8 NOK





### *Willingness to pay*

- TØI propose an expansion from the fixed values per stretch of landslide-prone road
- **The recommend simple linear functions:** NOK 3.70 per landslide hitting the infrastructure per year, and NOK 0.13 per metre avalanche width hitting the infrastructure on average (2019-NOK)
- 1 CAD = 8 NOK

# Recommendations from The Institute of Transport Economics

- By implementing the recommended parameter values in calculating accident costs and "residual willingness to pay for reduced landslide risk", as a function of expected landslide frequency and width, we believe that the CBAs will achieve more realistic calculations on the benefit side.
- This will in turn provide a better basis for decision-making when **evaluating different project alternatives against each other, and different projects against each other in a portfolio**







Transportøkonomisk institutt  
Stiftelsen Norsk senter for samferdselsforskning



## Skredfare i samfunnsøkonomiske analyser

Personskaderisiko og verdsetting av skredfrekvens og  
skredstørrelse

Paal Brevik Wangsness, Knut Veisten, Rune Elvik

2027/2024

[Publikasjoner - Transportøkonomisk institutt \(toi.no\)](https://toi.no)

# Landslide factor model vs CBA

- TØI sees the possibility of translating the input in the prioritization factors that are often used in planning contexts into valuations of landslide measures.
- This could enable a nationwide overview of the benefits of reducing the risk of landslides on avalanche-prone road sections to zero.







NyeVeier