



Pilot project in the Green Coastal Shipping Program

Fish Transport: Changing the Preferred Mode from Road to Sea

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Ocean Week 2018
Trondheim, 8 May 2018

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Background and Project Objective

BACKGROUND

- The aquaculture industry needs a sustainable alternative to road transport that reduces the traffic on the road network and reduces the environmental and safety problem

PROJECT OBJECTIVE

- In the short run (2-3 years): Establish a seaborne transport system from Mid Norway to Europe
 - 2017: Establish a feasible commercial and technical concept
 - 2018-19: Test the concept using existing tonnage
- In the longer term: Secure that the growth in transport need is absorbed by seaborne transport

Project partners

- Partners:

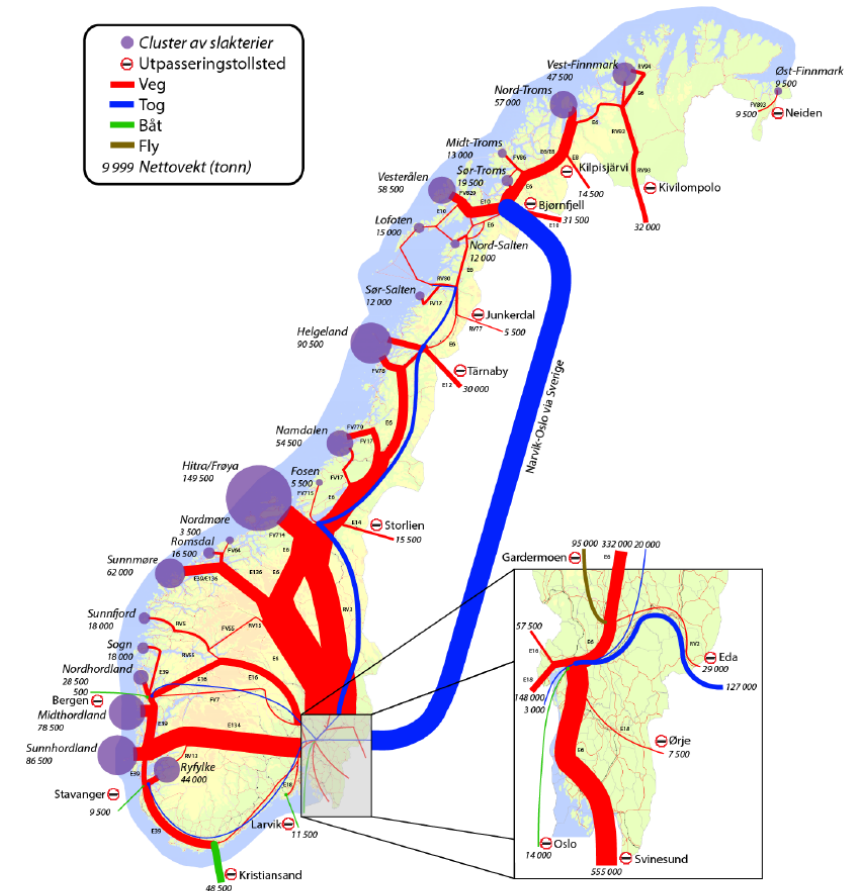
Kystrederiene (Norwegian Coastal Shipowners) (project owner), Eimskip, Egil Ulvan Rederi, ABB, Norwegian Coastal Administration, Norwegian Maritime Authority, Menon Economics and DNV GL

- Contribution from:

Marine Harvest, Salmar, Grieg Seafood, Norges Lastebleierforbund, SINTEF

The Market and the Solution

- Aquaculture is Norway's third largest export industry
 - 1 million tons of value 68 billion kroner (2017)¹
 - 40 - 45 000 truck transports annually – nothing by ships
 - Large production growth expected (5 times?)
- A seaborne transport system for fresh salmon from Mid Norway to Europe has been developed
- Lead time is a challenge – super chill is the solution
 - Increased durability, delivery without the use of ice, better carbon footprint
- Scalable solution
 - Phase 1: Start-up with existing tonnage
 - Phase 2: Establish lines with specialised tonnage



Figur 4-10: Transport av fersk laks og ørret i og ut av Norge i 2013. Tall i tonn.

Source: University in Bodø: Transportstrømmer fersk laks (SIB-report No. 5-2014)

¹) iLaks.no 8 January 2018 – Norwegian Seafood Council

More about the Seaborne Transport System

- Combined cargo, based on existing routes;
 - Fresh salmon 30 - 50 % of the total volume
 - Load carriers; Semi-trailer (Euro-trailer) and 45 feet container
- Ship solutions;
 - Pallet/container ship
 - Container ship (GodsFergen)
- Routes;
 - Hitra/Frøya – Hordaland – UK
 - Hitra/Frøya – Hordaland – North Europe
- Volumes;
 - 30 % in 2020: 90 000 ton
 - 40-50 % in 10 years: 240 000 – 300 000 ton
- Frequency; 2-3 weekly departures
- Increased durability; Use of super chill/durability indicators
(time from production to last day in the supermarket increased from 10 to 20 days)



Super chill



Durability indicator

Transport Concept

1. Today's solution: Road-based transport system

Sandstad

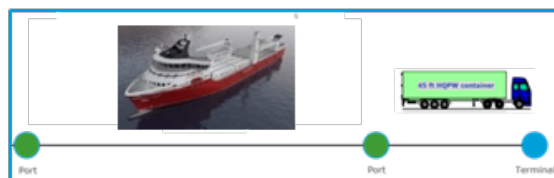


Bergen area

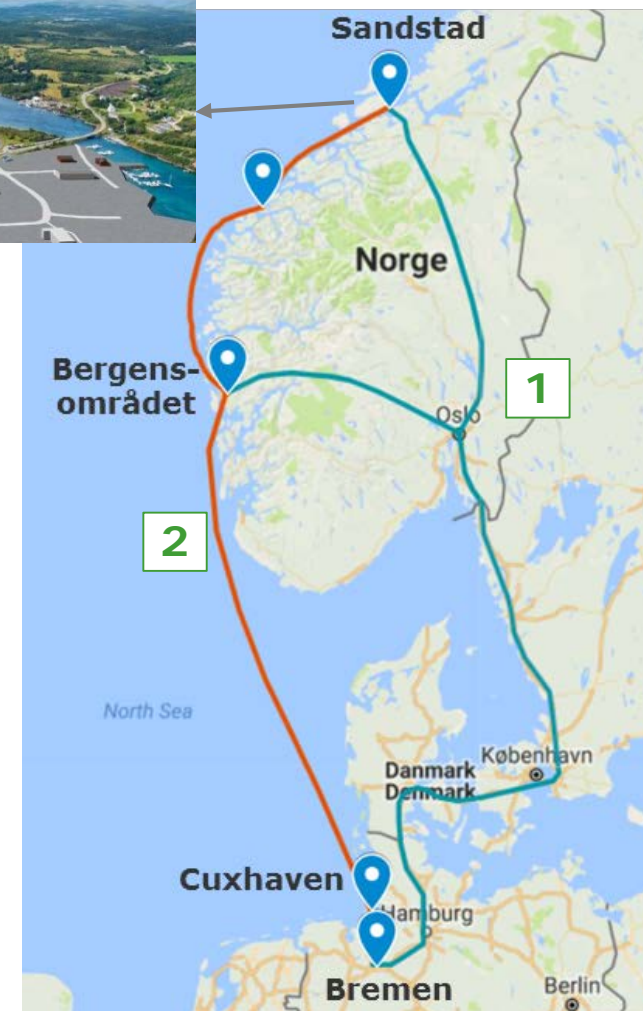


2. New solution: Intermodal seaborne transport system

Sandstad



Bergen area

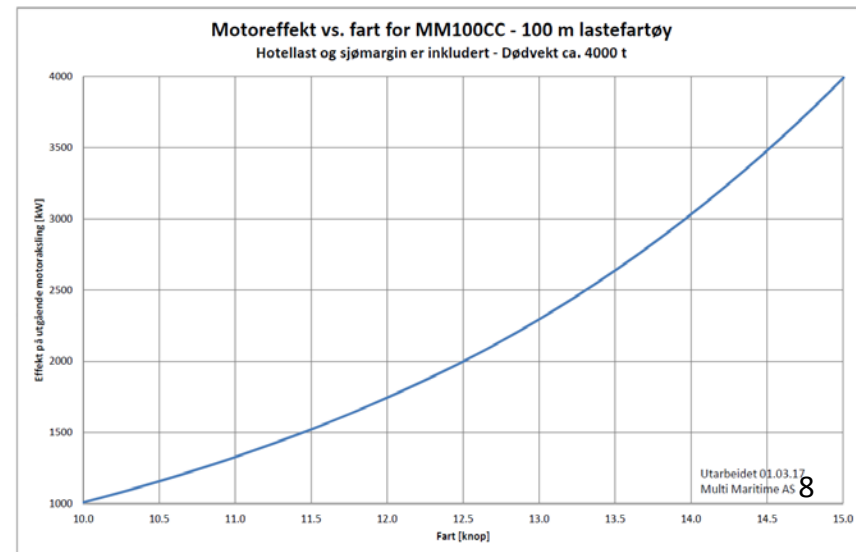


Ship Concepts (1)

Combination Carrier – Pallet and Container

SPESIFIKASJON PALLE-/CONTAINERSKIPET

Loa	99,95 m
Bredde	22,0 m
Dybde riss	12,5 m
Dypgang	6,25 m
Dødvekt	5 700 tonn
Kapasitet 45'/40' container	40stk åpen celler, 5 i høyden 66 stk værdekk
Areal værdekk (Ikke med celle delen)	910 m ²
Kapasitet 20' Containere	21 stk
Lasterom	Tørrgods Høyde 3,5 m Areal 670 m ² Volum 2 350 m ³
	Fryserom Høyde 3,4 m Areal 450 m ² Volum 1 500 m ³
	Fryserom Høyde 2,2 m Areal 1 230 m ² Volum 2 700 m ³
	Fryserom Høyde 2,7 m Areal 950 m ² Volum 2 550 m ³
	Total Frys 2630 m ² / 6 750 m ³
	Totalt tørr / fryserom 3 300 m ² / 9 100 m ³
Frysecontainere	60 stk
Kraner	34 meter å 40 tonn/ 120 t 12 meter
Hovedmotor	4000 kW
LNG tank	400 m ³
Baug og hekk thruster	2 å 1000 kW
Maksfart	15 knop på 75 % last



Ship Concepts (2)

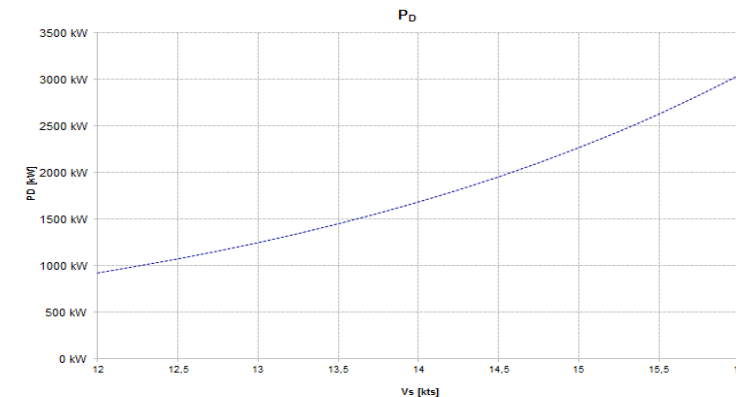
Container Ship

SPESIFIKASJON GODSFERGEN

Loa	103,4 m
Bredde	16,8 m
Dybde riss	10,0 m
Dypgang	5,5 m
Dødvekt	3 450 tonn
Kapasitet	100 stk 45' container
Frysecontainere	50 stk
2 kraner	30 meter å 35 tonn
Hovedmotor	2 440 kW
LNG tank	290 m ³
Baug thruster	500 kw
Maksfart	15 knop



Endurance

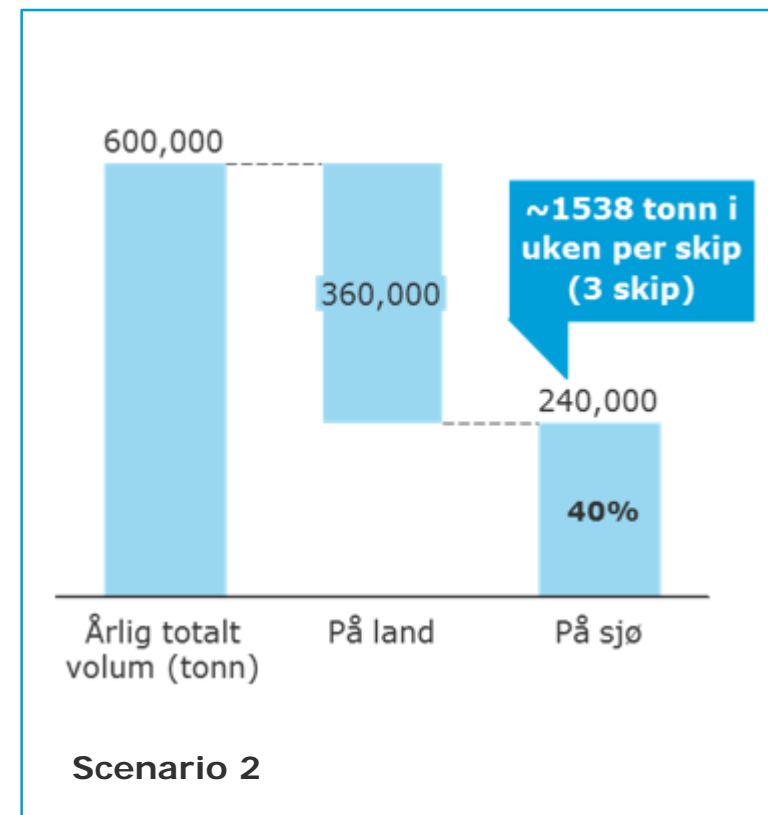


Prosjektmet 09.02.2016

 Rolls-Royce

Scenarios

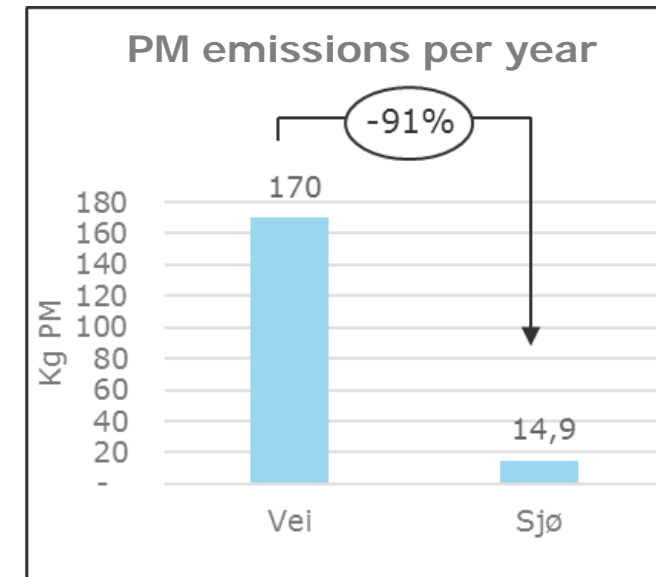
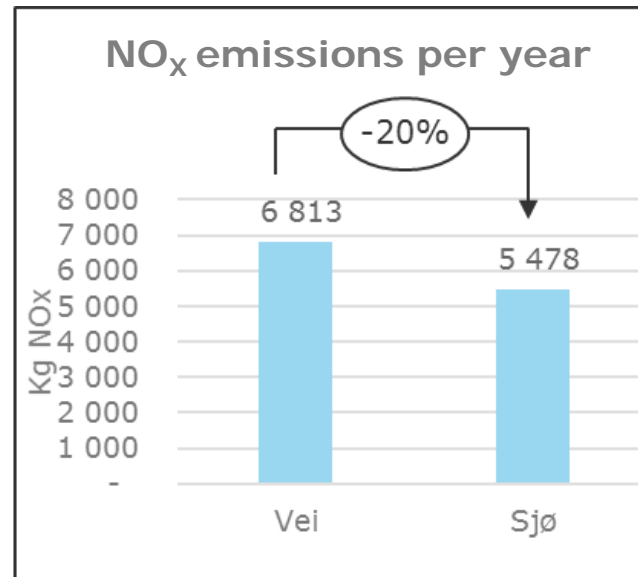
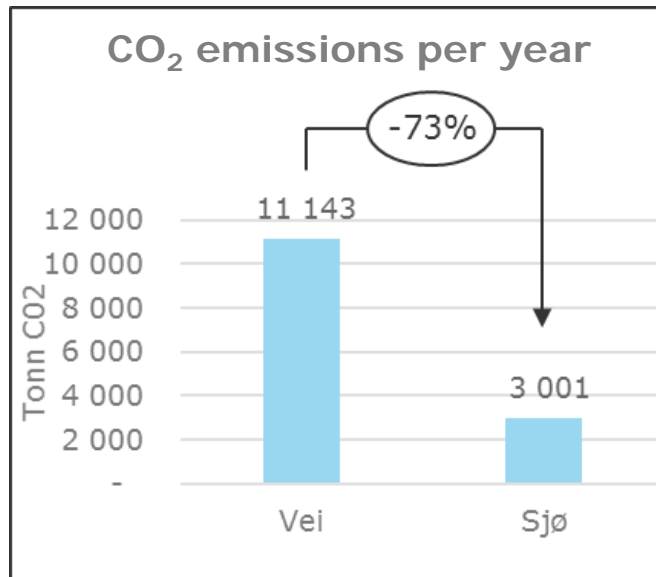
	Scenario 1	Scenario 2
Annual export volumes	Today's production volumes 150,000 tons of salmon from Hitra/Frøya and 150,000 tons from Midt-/Sunnhordaland	Doubled production volumes 300,000 tons of salmon from Hitra/Frøya and 300,000 tons from Midt-/Sunnhordaland
Volume moved to sea	30% of today's volumes Total of 90,000 tons	30% of today's volumes and 50% of expected growth. Total of 240,000 tons
Nos ships	2 ships with weekly departures	3 ships with weekly departures
Volume ships	865 tons per week per ship	1 538 tons per week per ship



Improved Environmental Performance

Reduced emissions door-to-door (scenario 2):

- From road (Euro 5 trucks)
- To sea (intermodal with LNG-hybrid ships and Euro 5 trucks)
- Incl. effect from super chill



Ship Concepts (3)

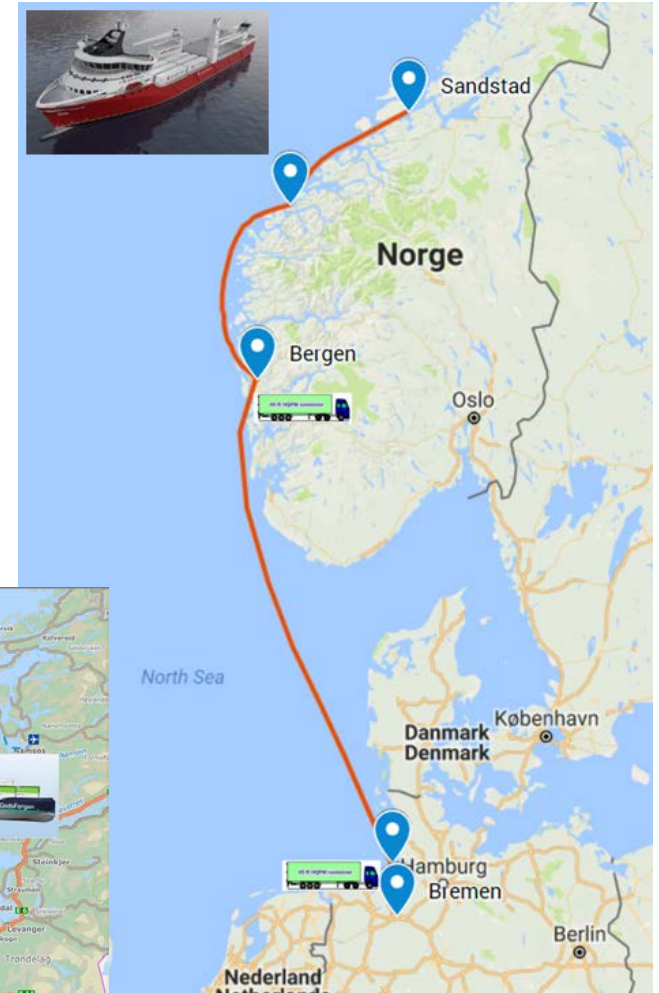
Autonomous Fish Feeders

- A possible next phase – Autonomous Fish Feeders?
 - Local autonomous seaborne network consolidating fresh salmon and distributing other cargo
 - Transshipment to/from lines to Europe and deep sea
- Autonomy – low cost and efficient?
 - Transport to quayside
 - Cargo handling
 - Seaborne feeders to transshipment ports
 - Regional distribution
- Many initiatives – many innovative concepts



Summary

- The seaborne concept is profitable both for salmon exporters and shipowners
 - 20-30 % lower transport cost from production site to market
- Substantial positive social profitability of moving from road to sea
- The aquaculture industry is interested
 - Transfer potential 30-50 %
 - Seaborne transport may absorb a large proportion of expected growth
- Environmental effect
 - Scenario 1 and 2 will eliminate respectively 4 700 and 12 600 road transports per year
 - Carbon footprint door-to-door is reduced by 73 %
- Lead time is a challenge – super chill is the solution
 - Experience from Iceland, Grieg Seafood installed first facility 2017
- Seaborne concept to be tested full scale 2018-19
- Autonomous feeder concept next step?



Green Coastal Shipping Program

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