‘NET ZERO VISION HIGH SPEED FERRY’

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Color Line

A leading North Europe cruise & ferry operator

Quality cruise and efficient transportation

Key company facts 2022

O·N SUNDE INVESTMENTS

100% owner

HQ Oslo, Norway

2,000 FTEs

Stable regulatory framework

7 ports

5 vessels

4 routes

3.6 million passengers

926,203 cars

189,658 trucks

Route map

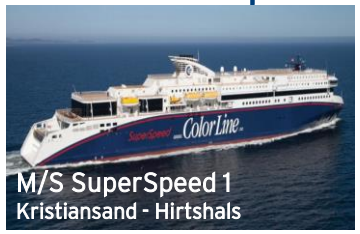
Strategy for higher value creation

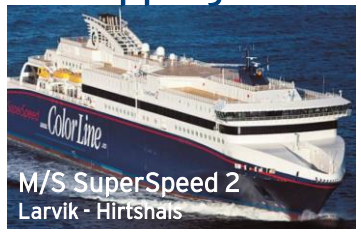
Cruise


M/S Color Fantasy
Oslo - Kiel


M/S Color Magic
Oslo - Kiel

Transport and shopping


M/S SuperSpeed 1
Kristiansand - Hirtshals


M/S SuperSpeed 2
Larvik - Hirtshals


M/S Color Hybrid
Sandefjord - Strømstad

We have already come far in the green transition

Evolution rather than revolution

Ambitions

- 55% reduction in carbon-intensity by 2030, measured from 2000*
- Net zero operations by 2050, pending commercial/technological availability

Progress

- 41% reduction in carbon-intensity 2000-2022*

Examples of further measures towards 2030

- Further energy-efficiency and climate-optimization measures
- Establishment of shore power in Strømstad, Sweden, and Hirtshals, Denmark
- Hydro-dynamics, digitalization and automation
- Exploring increased electrification and other zero-emission alternatives
    - Ammonia, methanol, biofuel, carbon capture, etc.

* Relative emissions of the transport work, measured as carbon-intensity (cgDist/AER)

SuperSpeed 1

Highly efficient transport of passengers and cargo between Norway and Denmark

The ship

- Built: 2008
- Tonnage: 36 822 grt
- Length: 211,3 m
- Width: 26 m
- Draught: 6,7 m
- Service speed: 27 knots
- Engines: 51 408 hp
- Max. capacity: 2 400
- Cars: 750
- Lane meters: 1 990
- No. of decks: 11

The route

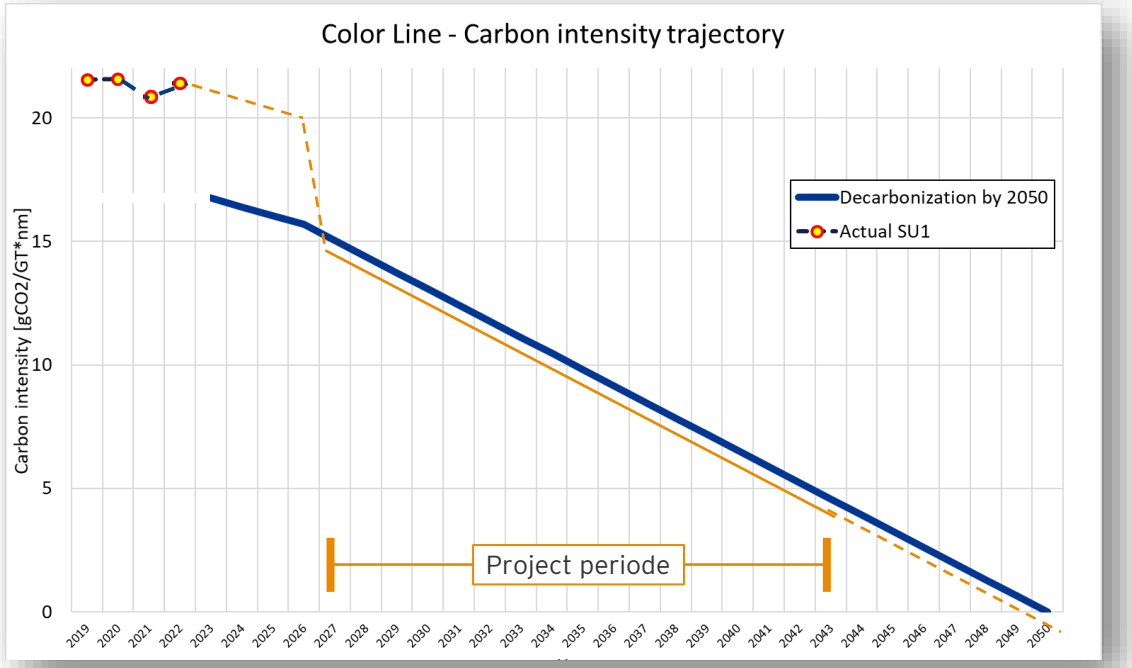
- Route 72 nm (x4/day)
- Crossing: 3h 15 min's

The energy demand

- 340 MWh/day in total
- 276 MWh/day for propulsion
- 121 GWh/ year
  - Propulsion: 81%
  - Hotel : 13%
  - Boilers : 6%

The challenge and possible solutions

Assessment of a broad range of potential solutions from both a technological and economic perspective



- 2023-2027: 8,5% reduction in fuel demand through existing initiatives
- 2027-2043: 3,71% annual reduction in carbon intensity through the project period
- 2043-2050: Further reduction of carbon intensity towards net zero propulsion

LNG

Batteries

Hydrogen

Ammonia

Methanol

Biofuel (reference case)

Key economic conclusions

Economy represents a main hurdle for the transition towards carbon-neutrality

1. Converting existing fleet to non-fossil propulsion currently represents a significant commercial risk

2. Hybridization through batteries electricity will keep long-term energy costs at current level – but only after an upfront investment of ~MNOK 750

3. Given current long-term price assumptions, fuel costs are expected to double within the next 10 years and triple within 20-25 years those who utilize liquid fuels through the green transition

Key take-away: net zero by 2050 is possible

The green transition is being weighed down by economy – not technology

- The pilot study demonstrates that non-fossil propulsion of SuperSpeed 1 by 2050 is within reach from a technological perspective
  - Main alternatives are either gradual hybridization through either batteries or phasing in -methanol or –biodiesel, given the route, speed, capabilities and technical specifications of SuperSpeed 1
- The pilot study also shows that all potential technologies for conversion of SuperSpeed 1 represent a significant economic risk
  - Hybridization through batteries will reduce operational energy costs by ~50%, but will require an up-front investment of around MNOK 750
  - While investment costs are limited both for conversion to methanol and phasing in biofuel , both alternatives will result in a substantial increase in operational costs

- Funding and support crucial to accelerate the green transition
  - Contracts of difference is a precondition for selecting green energy carriers, such as biomethanol and biofuel
  - Hybridization through batteries is dependent on support in the investment phase to mitigate risk

Thanks to the participants

Color Line

ABB

WÄRTSILÄ

DNV

GRIEG

THOME GROUP

Sjøfartsdirektoratet
Norwegian Maritime Authority

SCANWATT

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