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Hydrogen on the West Coast of Norway

Photo: Møre and Romsdal County Council



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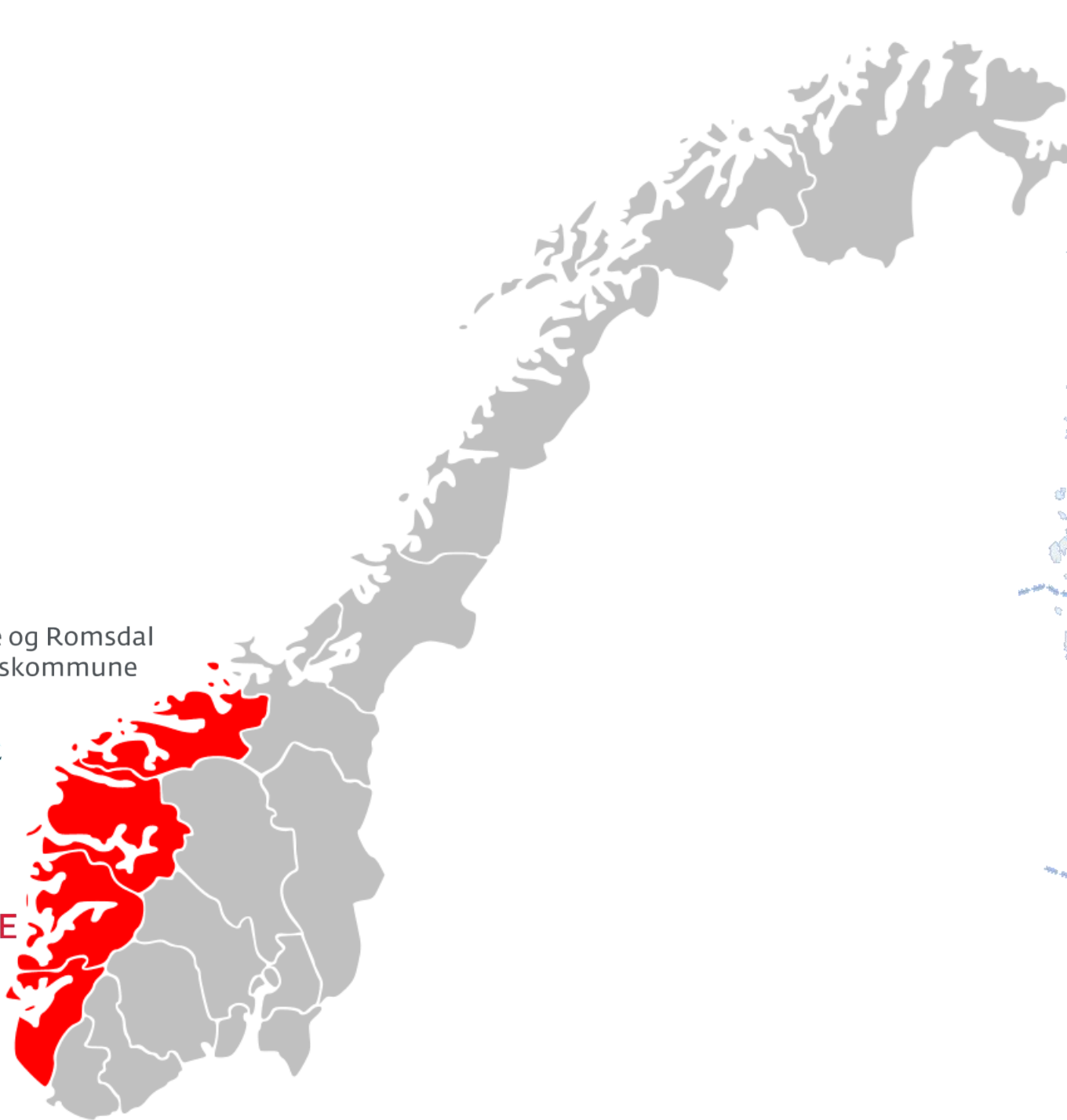
SOGN OG FJORDANE
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AGENDA

- Background for the commitment on hydrogen
- Challenges and opportunities for hydrogen on the West Coast
- Cross-connecting value chains
- Ongoing projects



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Background

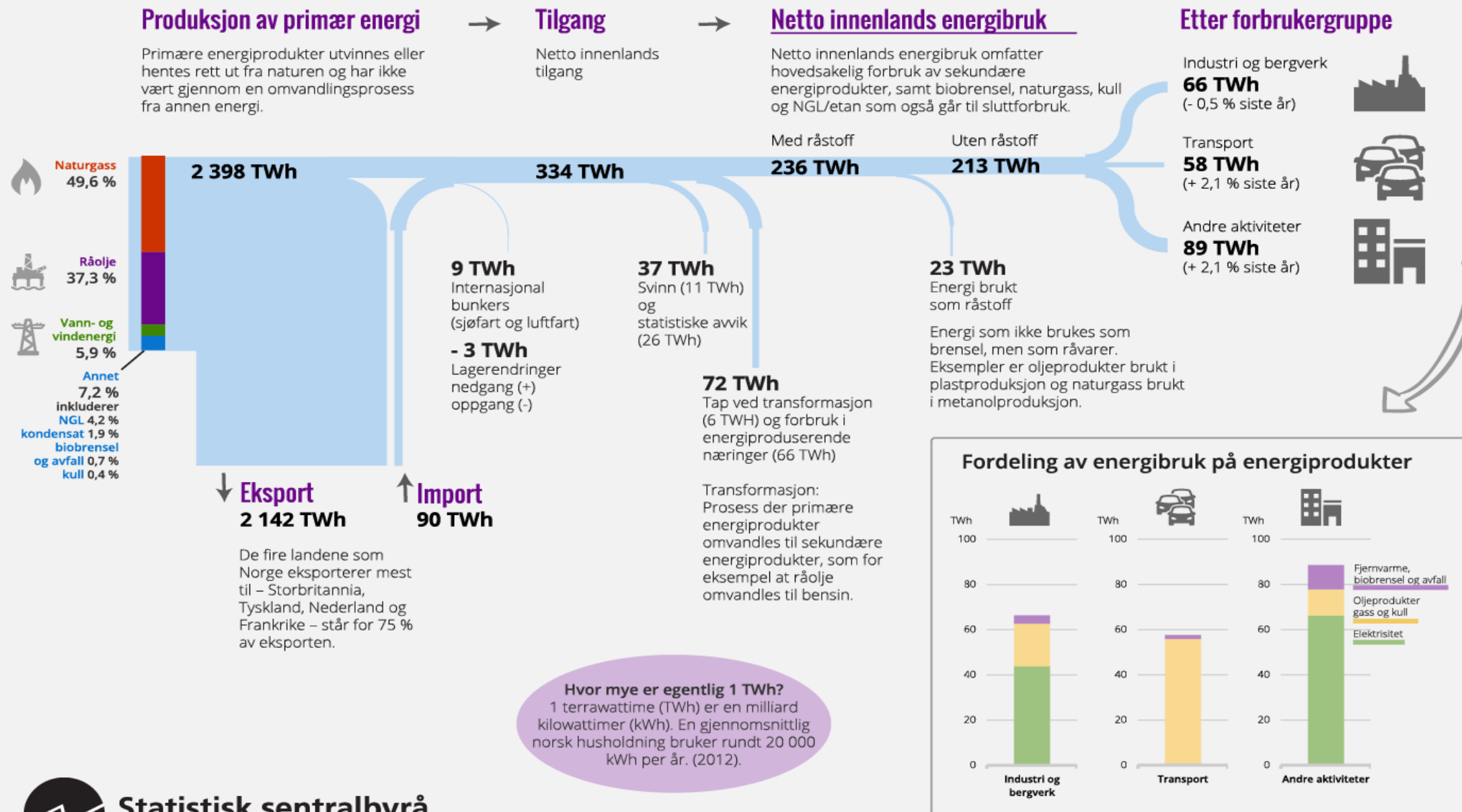
Photo: Leif J. Olestad

WHY H₂?

- Surplus or curtailed renewable energy (mostly wind and hydropower)
- Energy sector expects heavy investments in the local and regional grid
- Industry sector is using, producing or have hydrogen as a by product
- Maritime public transport, such as car ferries and high speed passenger boats - are the worst polluters in the transport sector on the West Coast
- Strong clusters with world leading companies ready to develop new zero emission hydrogen technology for maritime and marine use

Energibalanse for Norge, 2015

Energibalansen følger energiflyten på norsk territorium.



Kilde: <http://www.ssb.no/energibalanse>



Statistisk sentralbyrå
Statistics Norway



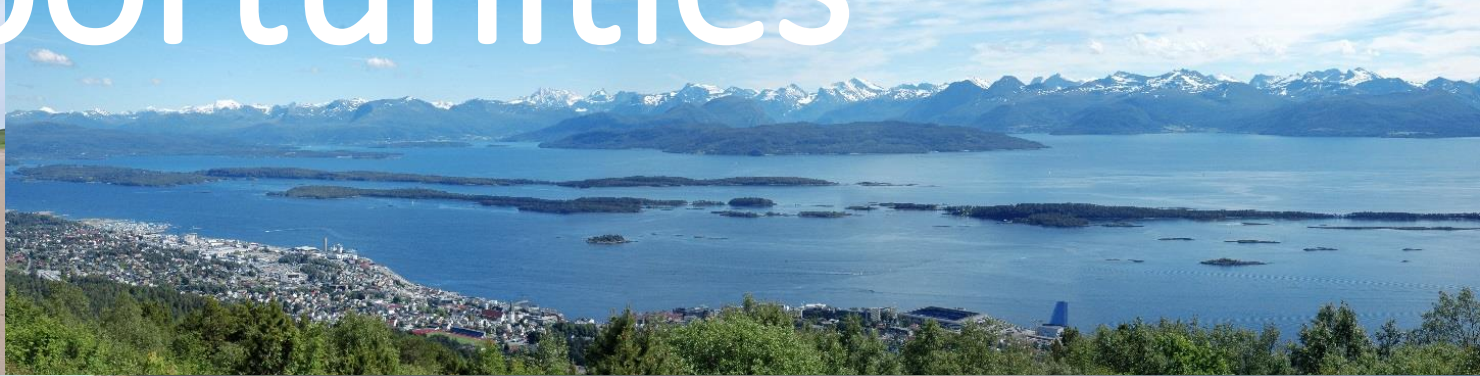
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Challenges



CHALLENGE

- Sparsely populated
- Many sea and fjord crossings
- Limited access and capacity for use of electricity
- High costs

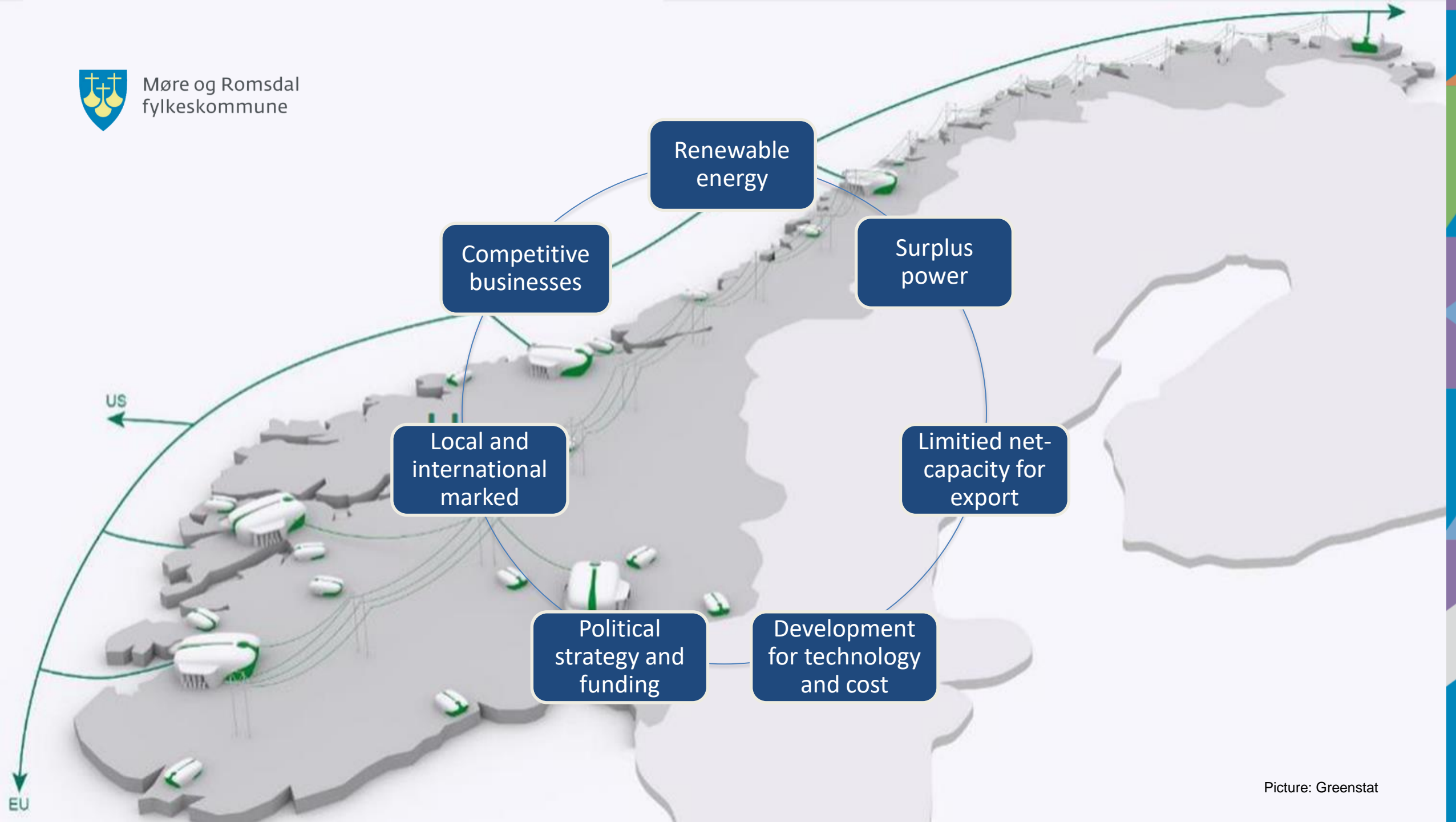


Opportunities



POSITIVES

- Strong maritime and marine cluster
 - Shipyards, design, engine/propulsion, petroleum supply industry
- Surplus energy from renewable sources
- Excess hydrogen from industry – local and export market?
- Possibilities for public and private hydrogen consumers
- Hydrogen Network between all the four County Councils





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Cross-connecting value chains

Photo: Johan Wildhagen



H₂ and O₂

- Fisheries and aquaculture are strong (export) industries
- Great demand for O₂ and heat in smolt production
- Often located near a fresh water source/hydro power plant
- Cross-connecting the value chains by delivering O₂ and heat for production, and H₂ to the service vessels



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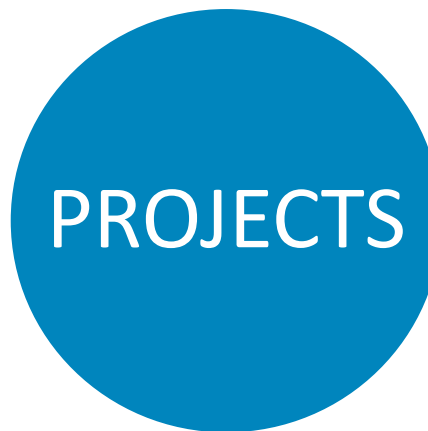
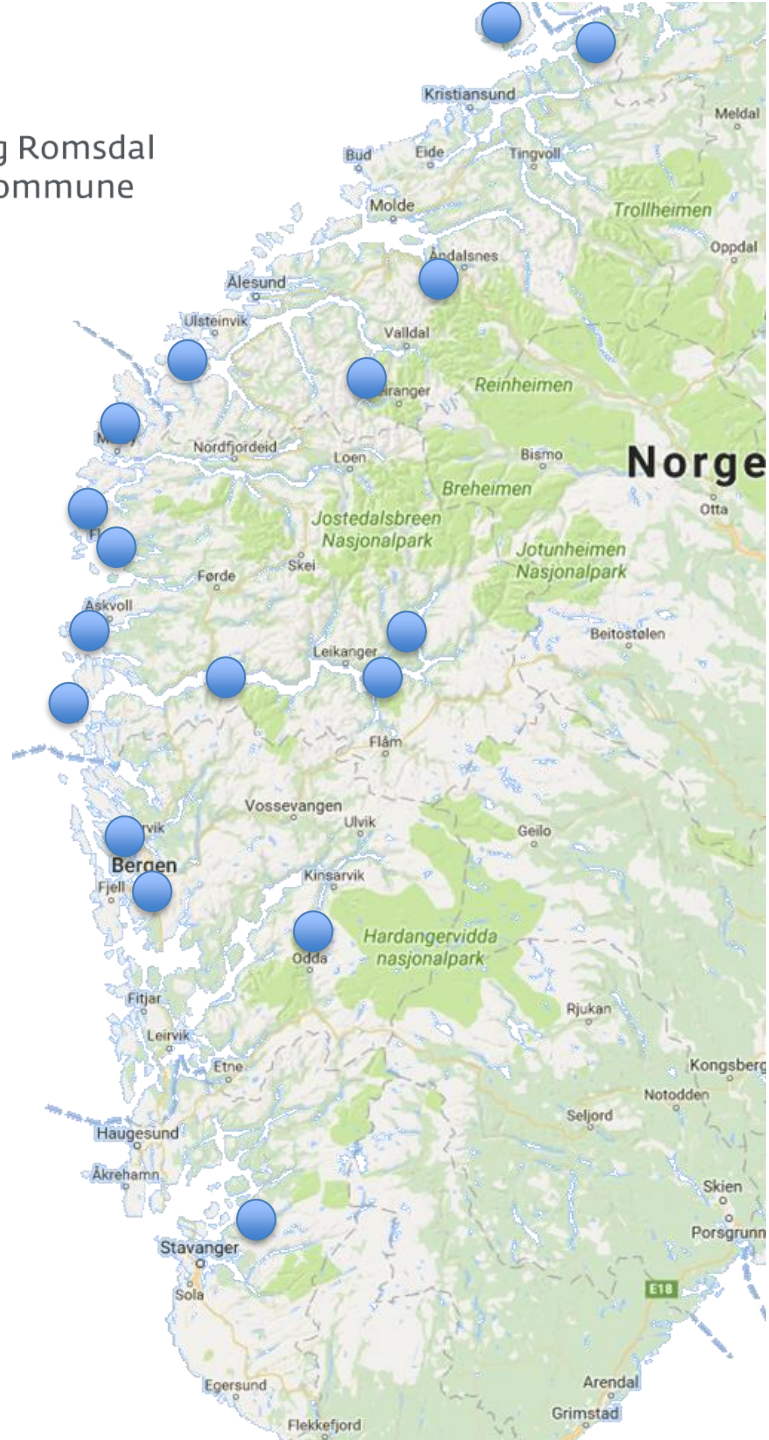
Projects



Picture: Fiskarstrand

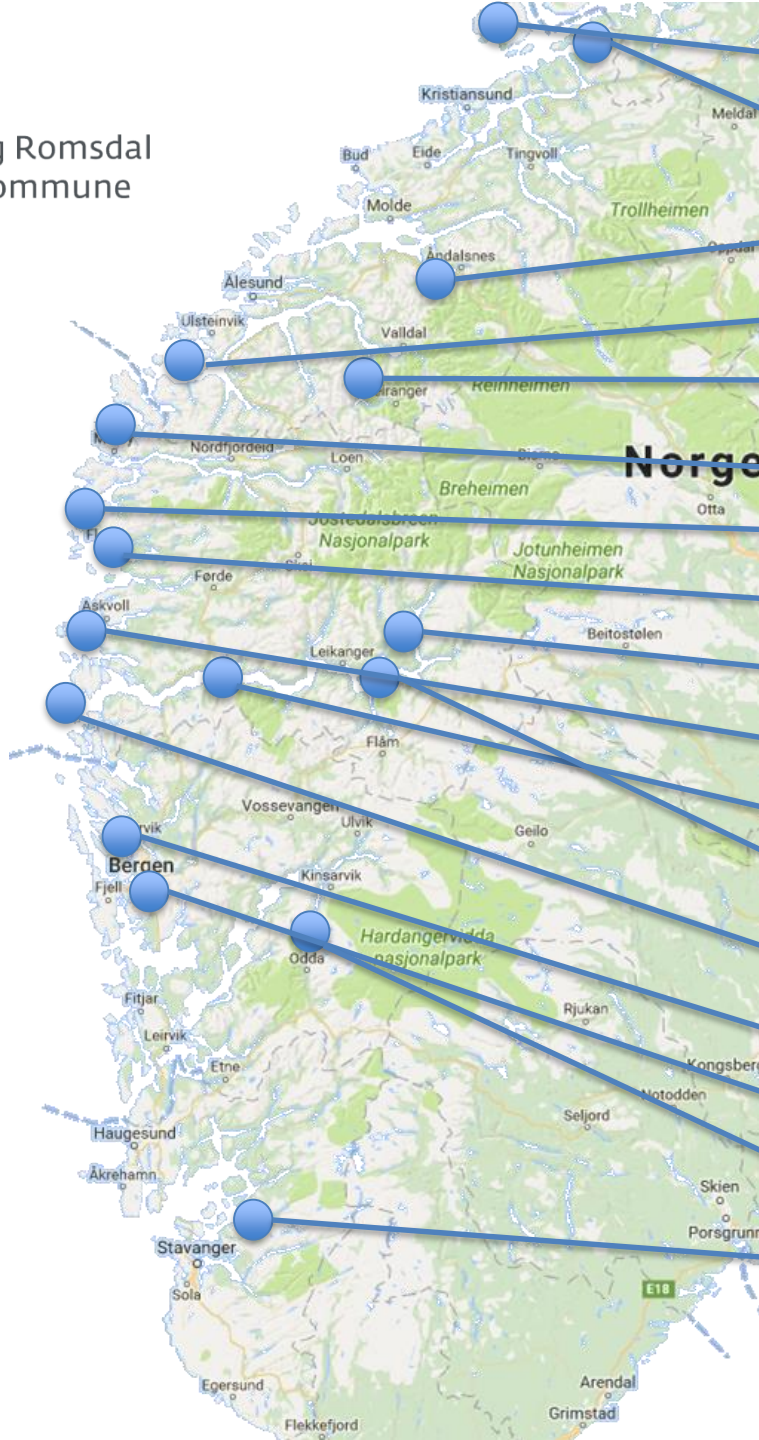


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Smøla – Smolt and hatchery plant

Tjeldbergodden – Methanol plant

Raumabanen - Train

Harøya – Wind energy farm

Hellesylt – Hydropower and ferry

Vågsøy – Hydrogen fishing boat

Flora – Hydrogen passenger boat

Flora – Hydrogen training and safety centre, refueling station

Årdal – Big scale hydrogen production

Fjaler – Hydrogen from wave power

Høyanger – O₂ and H₂ for fish farm

Flåm – Hydrogen in tourist transport

Solund - Offgrid system

Bergen - refueling station

Bergen - Luxury yacht

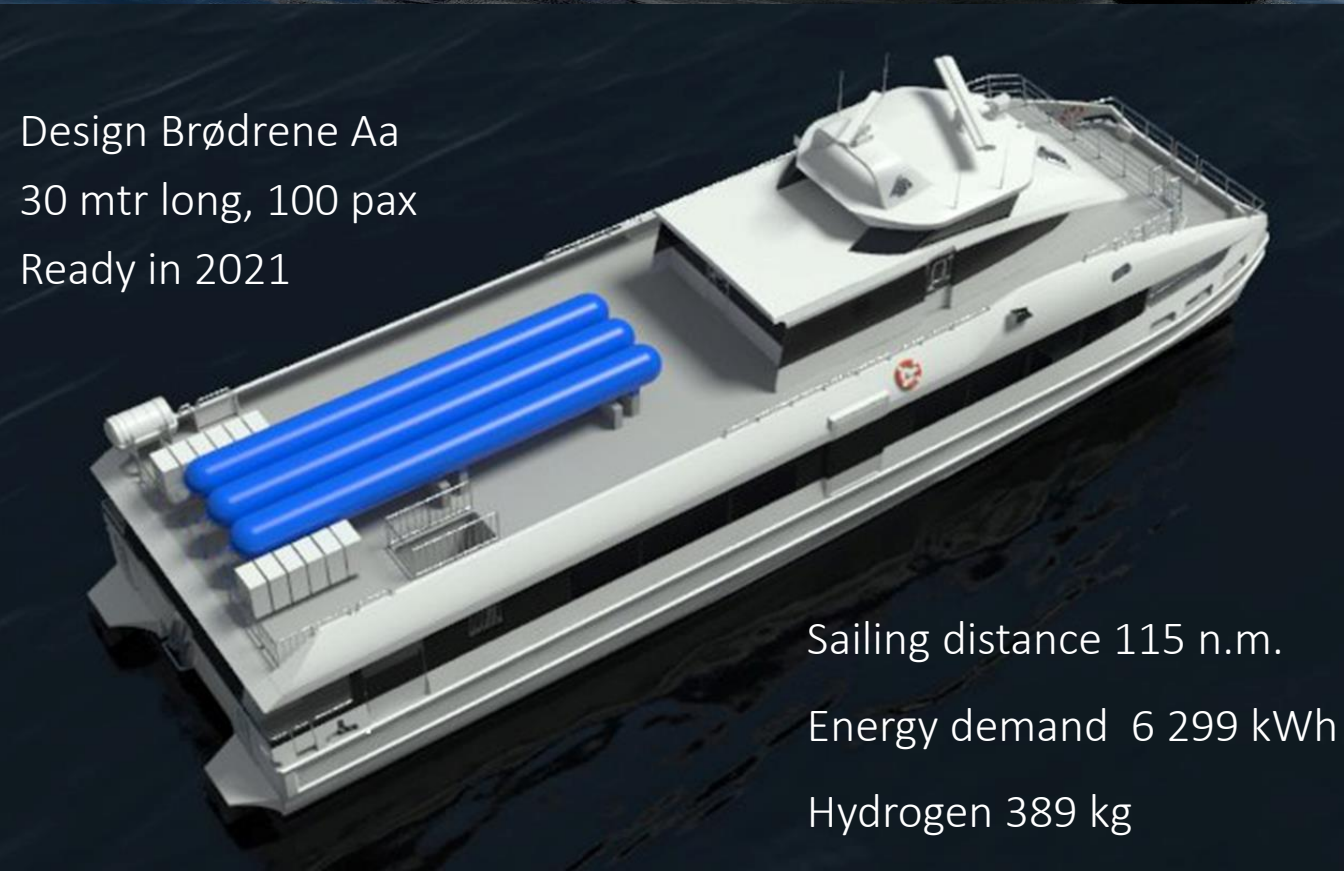
Odda - Tizir Ferroplant

Hjelmeland – Hydrogen Car Ferry

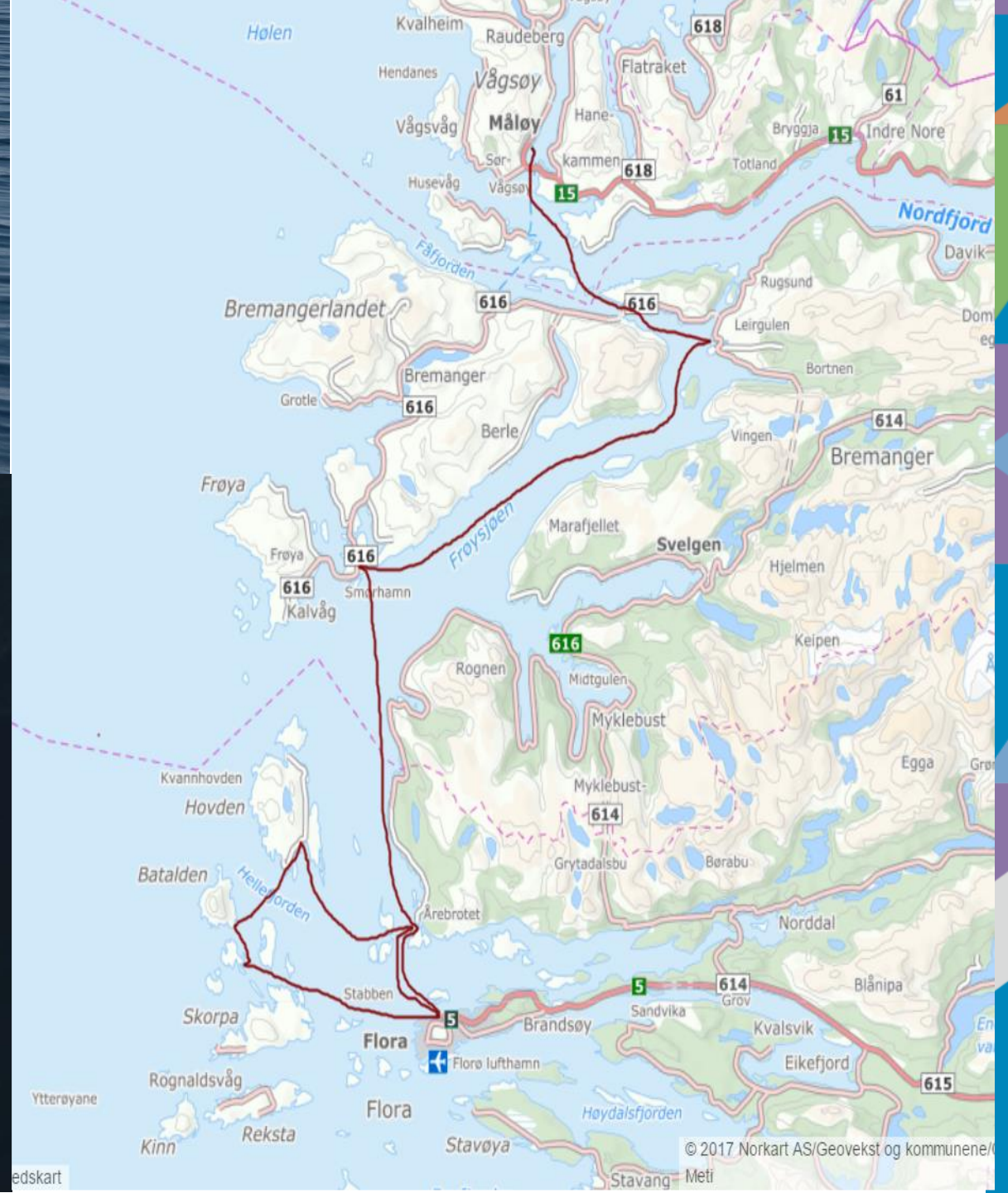
PROJECTS



Design Brødrene Aa
30 mtr long, 100 pax
Ready in 2021



Sailing distance 115 n.m.
Energy demand 6 299 kWh
Hydrogen 389 kg





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Thank you for listening 😊

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