

**EQUIPMENT AND SERVICE SUPPLIERS**

Anel AS   Tresmarka AS   Green Fjord Cruises   Thoria AS   Auxios AS   SeaTracker

**YARDS**

**SHIP OWNERS**

**maritime cleantech**  
Norwegian Centre of Expertise

**ENERGY COMPANIES**

**PORT**

**R&D AND EDUCATION**

**PUBLIC SECTOR**

**CLASS SOCIETY - REGULATORS**

**FINANCE & LAW**



maritime cleantech



PASSENGER TRANSPORT

TFAM

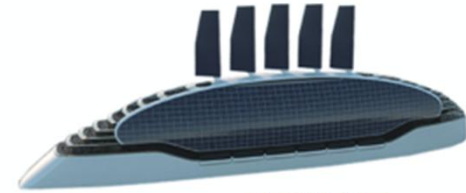


zawas

AUTONOMOUS VESSELS



CARGO VESSELS



CRUISE SHIPS

# Innovation projects in the cluster

FLAGSHIPS



BARGE VESSELS

SHIPFC  
GREEN AMMONIA ENERGY SYSTEM



OFFSHORE VESSELS



FISHFARMING VESSELS

FERRIES

HyShip



RO-RO VESSELS



# AURORA *Europe's first maritime value chain project for liquid hydrogen*



- The Aurora project will provide emission free LH2 to the maritime transport sector in Norway.
- The hydrogen will be produced by electrolysis based on hydropower.
- Partners are global industrial gas supplier Air Liquide, Norwegian energy major Equinor and regional hydropower company BKK.
- A production and liquefaction facility will be established at the Mongstad Industrial Park, close to a Equinor refinery and close to large seaports.
- Through cooperation with Wilhelmsen's planned liquid hydrogen-powered "Topeka" base-to-base vessels, the partners will distribute LH2 from Mongstad across Western Norway.
- The project also covers the development of a distribution network, multi-user terminals and ship bunkering stations.
- Aurora is a mature project ready to commence cooperation with new partners immediately.



## Innovation areas for common European interest

### *Aurora areas of innovation with potential spillover effects:*

- improvements in Liquefaction technology
- LH2 bunkering solutions and certification
- flexible and scalable zero emission distribution
- safety and public acceptance

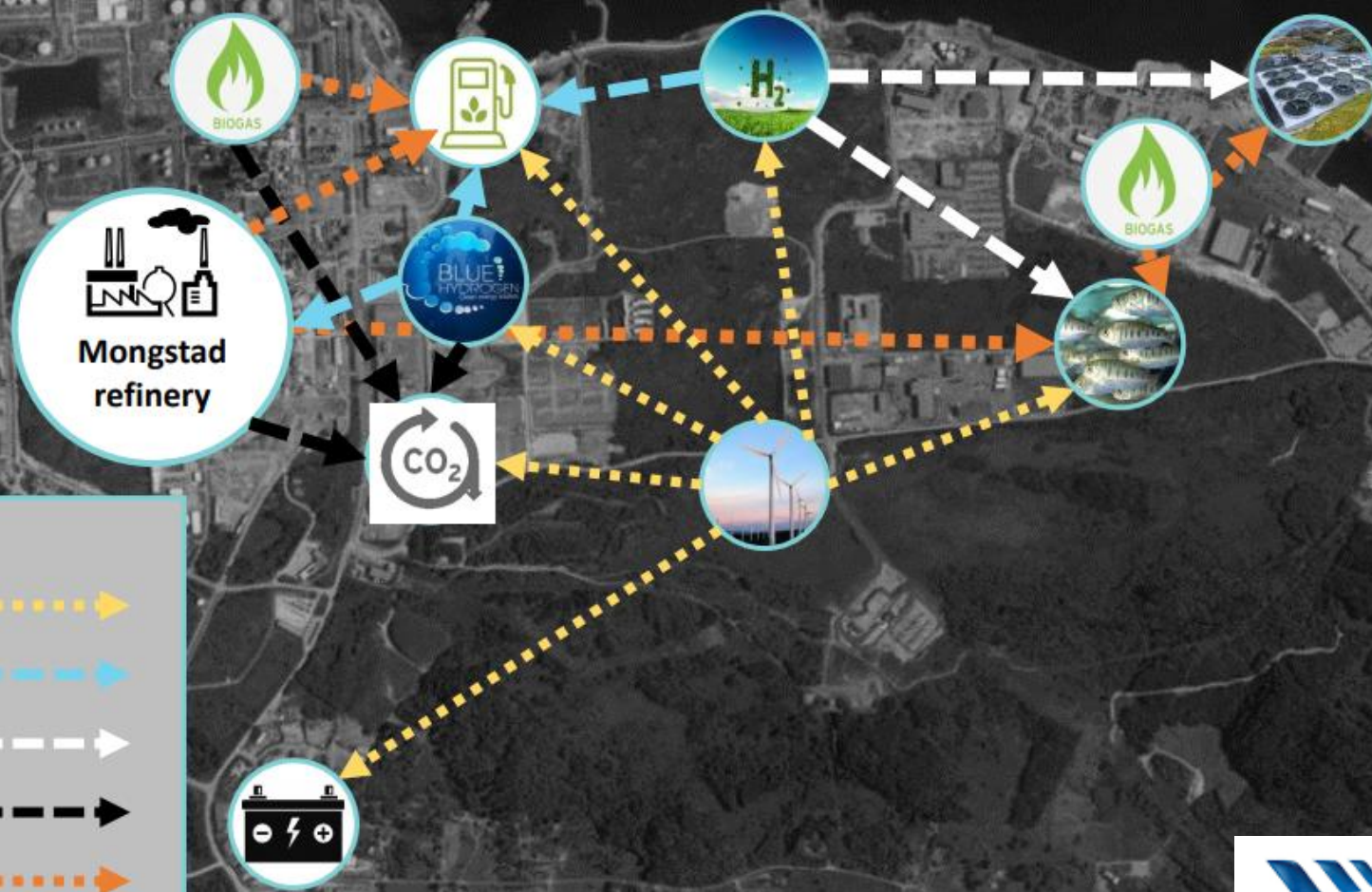
### *Areas where Aurora seeks spillover effects from other projects:*

- innovative new technologies that improve the value chain
- electrolyzer technology innovation

### *General areas of interest for collaboration:*

- on-board maritime solutions including fuel cell in MW scale
- cooperation with ports, public entities and regions
- LH2 value chains initiatives within maritime, heavy duty and aviation sectors
- new business models

Sharing energy and materials throughout the park would allow for optimal resource utilization and sustainable circular growth



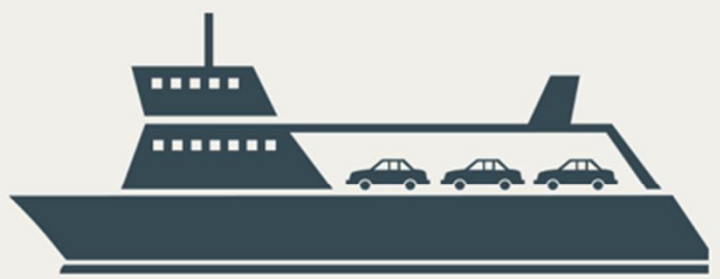
Legend

- Electricity
- Hydrogen
- Oxygen
- CO<sub>2</sub>
- Heat

LAND  
OCEAN



LAND BASED  
FISH FARMS (RAS)



CAR FERRIES

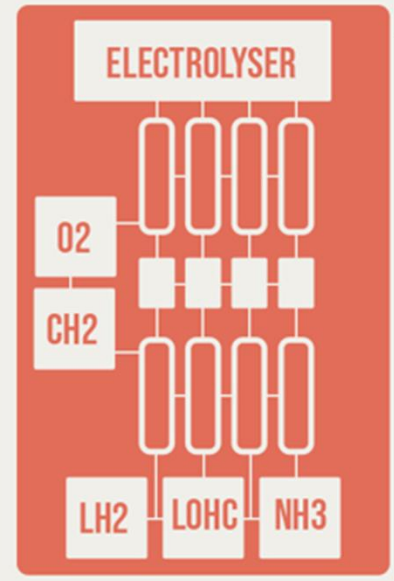


OTHER  
VESSELS



AQUACULTURE

# HYDROMAR ENERGYTERMINAL



SPILL HEAT



FAST FERRIES

**HYDROMAR**  
ENERGITERMINAL



NORWEST3D

Google Earth



**PARTNERE**



maritime  
cleantech