Grønt Skipsfartsprogram

Request for Interest

TRANSPORT SYSTEM SHIP

«Request for Interest» (RfI) by Felleskjøpet Agri SA, org.nr. 911608103, HeidelbergCement Norway AS, org.nr. 980910369 (HeidelbergCement)

Version: 1.1
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Grønt Skipsfartsprogram

Content

Summary

HeidelbergCement and Felleskjøpet Agri have the ambition to establish a sustainable transport system without emissions of greenhouse gases. The transport system will combine the cargoes of the two companies and cover the geographical area from Rogaland in the west to the inner Oslofjord in the east.

The cargo flows will mainly be gravel in an easterly direction and grain in a westerly direction in a coordinated operation, minimizing ballast on the round trips. The cargo base will give close to full employment of one ship in weekly roundtrips **and the ship shall have zero emission of greenhouse gases during its operation.**

HeidelbergCement and Felleskjøpet offer **a long-term transport contract with a duration of up to 20 years**, to facilitate the selected transport provider to invest in such a ship.

Through a tender process, the companies seek a supplier of maritime transport services that can provide the described service. This **Request for Interest** is the first step in the tender process to find partners who share the ambitions to develop the service with the zero-emission ship in question.

HeidelbergCement and Felleskjøpet have established a co-operation with the Green Shipping Programme (GSP). The GSP Service Centre for Green Fleet Renewal is committed to facilitating the process until the transport agreement is established. **Public funding** will be sought for both the development project and the financing of the ship.

It is the companies ambition that this first of its kind long-term transport contract will facilitate the ship being developed also to pave the way for a **new generation of green, standardized ships** in the necessary fleet renewal in the short sea shipping segment.

1. Background

1.1 Green Focus

An increasing number of transport customers set targets and cast strategies for zero-emission and low-emission transport. Public organisations are reconsidering their purchase policy and weight the environment significantly more. However, the experience so far shows a lack of motivation, desire and competence. The green shift is expected to take more time than available to reach the national targets of emission reductions if the market prevails alone.

Five years of work experience with studies and pilots in the Green Shipping Programme (GSP) shows that an essential aspect of obtaining a swift "green shift" is to make the markets of green technology usage work rapidly. Experience also shows that the time towards a green fleet renewal may be reduced significantly by involving cargo owners (charterers) in the studies and the analyses of cost-efficient and sustainable logistics solutions.

HeidelbergCement and Felleskjøpet Agri aim to produce and deliver their products in the most environmentally friendly and sustainable way possible. Both companies have a strategy which contains the target of bringing sustainable logistics solution into reality.

In the GSP pilot "Transport of Gravel and Grain by Sea" ("Sjøtransport av byggeråstoff og korn") the two companies found that by combining their flow of cargoes, they may enable the goal of making zero-emission sea transportation a reality.

Based on an analysis of the volume of transported cargoes (gravel and grain) in the period 2017 – 2019 it has been identified a cargo potential of more than 300 000 tonnes yearly for roundtrips between Rogaland and the inner Oslofjord.

These quantities, combined with the directional balance, enable a coordinated transport system where one zero-emission dry bulk carrier can make weekly roundtrips with a high utilisation rate.

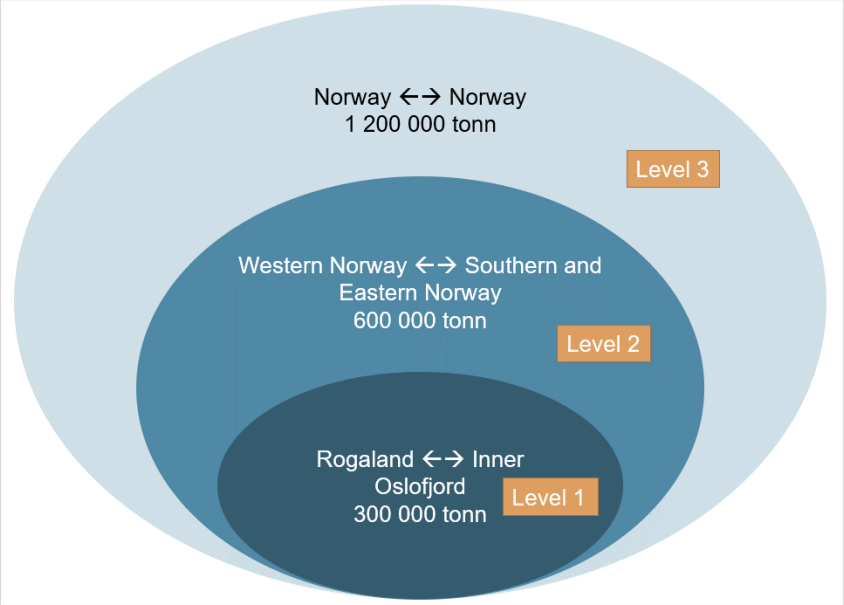


Figure 1: Potential annual cargo volumes for HeidelbergCement and Felleskjøpet Agri (based on statistics from 2017-2019).

1.2 Felleskjøpet Agri

Felleskjøpet Agri transports grain from the Oslofjord to Western Norway and Mid-Norway and has the ambition to establish climate-neutral transport on these legs. The goal is to reduce GHG emissions from the company's transport activities by 50 % within 2030. Felleskjøpet shows special attention to the climate and the environment, both when it comes to the company's services and to operation goods and production solutions they deliver to the agricultural industry. They set requirements to raw materials, suppliers of raw materials and the use of it. The company strive to use more renewable energy continuously, such as biofuel at its factories and the mills.

The annual volume of grain which is being transported from the east coast to the west coast is around 200 000 tonnes. The quantity varies during the year and peaks in the autumn.

1.3 HeidelbergCement

HeidelbergCement has made an ambitious target in 2030 concerning CO_2 emissions. Within that year the company has stated it will have 30% less CO_2 emissions compared to the 1990 level. For the company's Norwegian-based activities, the target is to have carbon-neutral products within the same year.

The company is responsible for Norcem, NorStone and Norbetong's logistics. NorStone alone represents an annual quantity of 2,5 million tonnes seaborn gravel. From the West Coast to the East Coast of Norway around 500 000 tonnes is carried on board self-discharging dry bulk carriers ranging between 3 500 and 6 000 dwt where the average shipment is 4 000 tonnes.

1.4 The Pilot Project

In the Green Shipping Programme[1] (GSP) pilot project "Transport of gravel and grain by sea" the two cargo owners (charterers) have co-operated to enable a combination of the logistics needs between the Western and Eastern Norway to enable a sustainable transport system with a "zero-emission" ship.

The pilot project was executed in the period 2019-2020, and the owners of the project were the cargo owners mentioned above. Other contributors in the Green Shipping Programme were ABB, Enchandia, Flowchange, Gasnor, Grieg Star, Hordaland Fylkeskommune, Hyon, Kongsberg Maritime, Kystverket, Kystrederiene (Roslagen Shipping and K. Sætre & Sønner), Sjøfartsdirektoratet, SINTEF, Vard and DNV GL (coordinator).

The pilot led to a requirement specification which describes the requirements to a standard transport solution by use of one unique ship with zero-emission in operation. The specification covers the transport of gravel from the West Coast to the south of Norway and inner Oslofjord, and shipment of grain (wheat, oat etc.) the opposite direction.

1.5 Co-operation Going Forward

Felleskjøpet and HeidelbergCement have decided to realize the potential of zero-emission transport as identified in the pilot project. Therefore, in cooperation with the "GSP Service Centre for Green Fleet Renewal"[2], they have decided to search for partners to meet their target – to accomplish a long-term charter party with a shipowner, or ship operator, where a zero-emission cargo vessel is being utilized. The cargo owners are aiming for a long-term contract with up to 20 years duration.

[1] https://www.dnvgl.no/maritime/gront-skipsfartsprogram/index.html (Norwegian)
https://www.dnvgl.com/maritime/green-shipping-programme/index.html (English)

[2] https://www.dnvgl.no/maritime/gront-skipsfartsprogram/Flatefornyelse/index.html

The project will undergo the following four (five) main phases:

- Phase 1: Bidding competition, search for partner
  - *Phase 1a: «Request for Interest»*
  - *Phase 1b: «Request for Quote»*
- *Phase 2: Develop detailed transport solution with a zero-emission vessel, «Request for Proposal»*
- *Phase 3: Establish the transport contract*
- *Phase 4: Build ship and infrastructure*
- *(Phase 5: Execute the new transport contract with the zero-emission vessel)*

This document is covering phase 1a "Request for Interest".

1.6 Green Shipping Programme (GSP)

HeidelbergCement and Felleskjøpet have established a co-operation with the GSP. The GSP Service Centre for Green Fleet Renewal is committed to facilitating the process until the transport agreement is established.

1.7 Public Funding Support

Public funding will be sought for both the development project and the financing of the ship.

At the start of this tender competition, PILOT-E has been identified as a possible support scheme during the development phase, as well as Enova's funding support for investments in the ship and necessary onshore infrastructure.

2. The Tender Process

2.1 Goal

The ultimate goal of the tender process is to realize an up to 20 years transport contract with zero-emission operations combining the cargoes of HeidelbergCement and Felleskjøpet Agri.

In this document HeidelbergCement and Felleskjøpet Agri are together referred to as the "Tenderer" and the shipowner/ship operator is referred to as the "Bidder".

2.2 About the Process

The tender process will go through four phases.

Phase 1 is a bidding competition consisting of two steps. The first step, phase 1a, is an open bidding competition. The purpose is to identify shipowners/ship operators with transport solutions fulfilling the transport requirements of the zero-emission operation.

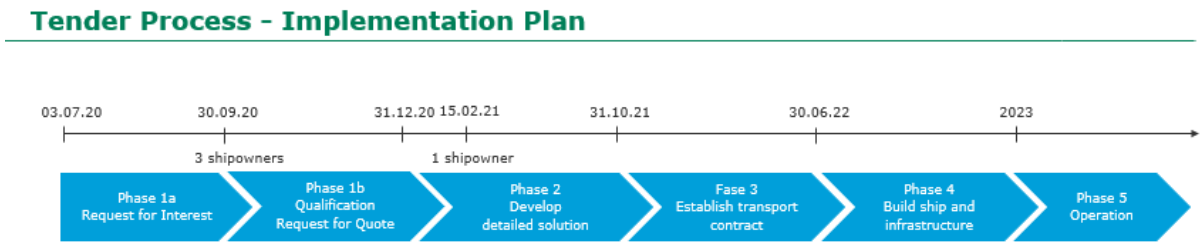
Three shipowners/ship operators will be selected for the second step, phase 1b, to identify the solution and supplier found to be the best qualified for the assignment of the transport contract. A budget price of the **transport solution** must be included in the offer document.

The selected supplier will enter **phase 2** of the tender process, to carry out the development of a detailed description of the solution and the zero-emission vessel, suited for establishing the transport contract and ordering the zero-emission vessel. This phase will be carried out with the principle of open books, and there will be a process of identifying, and subsequently applying for possible project grants and subsidies.

Phase 3 has the purpose of establishing the **transport contract for up to 20 years**, based on the results from phase 2.

Phase 4 has the purpose of order, build and get delivered the zero-emission vessel and establish necessary infrastructure in ports for vessel operation, including fuel, charging and shore power.

This document is covering phase 1a and is open to all interested shipowners/ship operators.



The schedule for tender process and development project is shown above. The timeline for phase 1b and later phases is indicative, and the Tenderers are willing to adjust this in connection with the selection of shipping companies for phase 1b.

Following a successful tender process, the new transport contract with the zero-emission vessel will be implemented (**phase 5**).

2.3 Zero Emissions

The ship(s) is required to have no greenhouse gas (GHG) emissions at sea and in port. At this stage, no preference is given to the type of fuel or energy converter.

Based on available knowledge to the tenderers, the most likely fuel option is hydrogen, but also other options may be considered, including shore power, sails and wave foils. Pressurized hydrogen, liquified hydrogen, and LOHC (Liquified Organic Hydrogen Carriers) are open options at this stage. Other energy carriers and non-fossil fuels may also be accepted if it does not result in GHG emissions during any operational mode and is likely to be available for use in operation from the start of the service in 2023.

The Tenderer will submit a parallel tender for supply of fuel. The results of this will affect the final ship design, and information regarding this will be shared with bidder. It is the ambition that the fuel used shall be sustainably sourced and produced and have minimal lifecycle emissions.

Fuel for a zero-emission ship will probably cost more than traditional fuels. Bidders must, therefore, propose energy-efficient hull and solutions to minimize fuel use. Optimal sailings speeds, minimal bunkering time and no or small deviations for fuel bunkering must be considered.

3. Requirements to the Issue of Interest

The following information is to be included in the Bidder's response to this Request for Interest.

3.1 Confirmation of Interest

The Bidder should confirm his interest to participate in the competition, and also confirm that if selected for further participation in this tender process, his intention is to carry out the necessary development of the solution, enter a transport contract, order the zero-emission ship and deliver the transport solution for agreed time frame.

3.2 Elevated Description of the Concept

A brief description of the transport solution and the zero-emission ship with main technologies must be provided. Possible technology suppliers should be included, but no binding agreements need to be made. It should also include:

- A description of how the transport will be organised and how third-party cargoes are included to obtain high capacity utilisation and cover seasonal variations and possible periods of available capacity.
- A concept description of the zero-emission ship[3] including main technologies for energy production, propulsion and cargo handling.
- An overview of alternative suppliers of design, shipbuilding and main technologies.

3.3 Presentation of the Project Organization and Resources

A description of how the Bidder intend to carry out the work through the tender process must be provided, including an outline of the supplier's project organisation.

3.4 Company Information

The bidder must give the following information about the company, and if relevant, main partners to deliver the transport services in question:

- Certificate of registration (firmaattest)
- Tax certificate (skatteattest)
- The Bidder's economic and financial position (credit rating)
- The Bidder's technical and professional qualifications
- Description of the Bidder's quality assurance system
- Annual accounts for 2017-2019
- Confirmation of compliance with the UN Code of Conduct

3.5 Project References

The Bidder is requested to include references from transport contracts and relevant projects and engagements highlighting the Bidder's ability to carry out the requested project.

3.6 Submission of Documentation of Interest

Documentation of Interest must be submitted to the following address: **HCFK@dnvgl.com.** All documents to be sent in a zipped file.

[3] The project's definition of zero-emission is given in appendix A "Requirements to the Transport Solution".

4. Rules for Conducting the Competition

4.1 Language

The Registration for Interest, including all attachments and supporting documentation, must be written in English or Norwegian. A combination of documents in Norwegian and English is accepted.

4.2 Tenderer's Point of Contact

Eivind Dale

Eivind.Dale@dnvgl.com

Tel +47 930 59 822

4.3 Registration for Tender Process

The Bidder should registrate participation by sending a confirmation to the following e-mail:

HCFK@dnvgl.com

By registration, the Bidder will receive information during the period of the competition and invitations to information meetings and arrangements for partner search.

The Bidder shall registrate contact point for his organisation:

- Company Name
- Organisation number
- Name of contact person
- Position
- E-mail address(es)
- Phone number

The Tenderer may, at its absolute discretion, either exclude a Registration for Interest from consideration or seek clarification where the Bidder has failed to comply with the instructions given.

4.4 Questions & Answers related to the Tender Documents

The Bidder must direct all questions regarding this Request for Interest to the following e-mail:

HCFK@dnvgl.com

The questions will be anonymized and answered and made available to all Bidders that have registered according to Chapter 4.3. The Bidder will be informed about new questions and answers by e-mail registered in Chapter 4.23.

4.5 Cost and Risk

The Bidder's participation in any stage of the tender process, or in relation to any matter concerning the process, is at the Bidder's sole risk, cost and expense. The Tenderer shall not be responsible for any costs or expenses incurred by any Bidder in preparation or submission of a Proposal or taking part in the tender process.

4.6 The RfI Process and the Timeline of Events

Table 1: Key Request for Interest events

Request for Interest (RfI) process	Date	Comments
RfI public announcement	03.07.2020	The project and the RfI will be announced on a press conference at Felleskjøpet Agri's premises at Kambo in Moss
RfI release	03.07.2020	
Information Meeting incl. Q&A	TBD	A web seminar where the Tenderer will give information, candidates ask questions and answers provided
Enquiries closing date	20.09.2020	Deadline for questions
Documentation of Interest closing date	30.09.2020	Deadline for delivering Issue of Interest as described in chapter 3

4.7 Matters Concerning Interest Response

All Issue of Interests will be treated confidentially.

4.8 Conflict of Interest.

The Bidder must not place her-/himself in a position that may or does give rise to an actual, potential or perceived conflict of interest between the interests of the Tenderer and the Bidder's interests during the RfI process.

If a conflict of interest arises during the RfI Process, or appears likely to arise, the Bidder must immediately advise the Tenderer through the Contact Point given i chapter 4.2.

5. Selection Process

The main activities of the RfI Process after closing date for documentation of interest are described in this chapter.

5.1 Proposal Presentation

After the RfI closing date the Tenderer may require the Bidder to provide a presentation. The invitation will be sent out in reasonable time before the event.

5.2 Evaluation of the Documentation of Interest

The submitted documentation of interests will be evaluated on the following basis:

- Criteria #1 Description of the transport and zero-emission ship solution (40%)
- Criteria #2 Description of the project organisation (20%)

- Criteria #3 Description of the Bidder's organisation and his capability and capacities to deliver the requested transport solution (40%)

5.3 Debriefing of Bidders

When the Selection Process is ended the Tenderer will not be conducting any de-briefings for any unsuccessful Bidders.

By submitting the registration for Interest, the Bidder has agreed that the Tenderer is not required to conduct a de-briefing and will not be required to provide any reasons for not doing so.

Appendix A: Requirements to the Transport System

Appendix B: Overview of Ship Design Companies

Appendix C: Overview of Shipyards

Appendix D: Overview of Ship Equipment Suppliers

Appendix E: Overview of Ship Finance and Grant Companies

Appendix F: Overview of Ship Brokers

Grønt Skipsfartsprogram

Appendix A
Requirements to the Transport Solution

Version: 2020-07-02

Content

1. Introduction

This document gives a description of the functions and specification required for the transport system including the ship which shall be operated under the Agreement. The requirements described in the following aim to clarify what is expected from the solution at the end of the tender process.

2. Overview of the Transport System

2.1 Geographical area and transport pattern

The transport system will combine the cargoes of the two companies and cover the geographical area from Rogaland in the west to the inner Oslofjord in the east. The cargo flows will essentially transport gravel in easterly direction and grain in westerly direction in a coordinated operation, minimizing ballast on the round trips. The cargo base will give close to full employment of one ship in weekly roundtrips.

Bulks of grain are going to be transported from Eastern Norway to the mills at Western Norway, and bulks of gravel/construction material from Western Norway to Eastern Norway. When the grain has been unloaded in "the West" the dry bulk carrier will be loading gravel/construction material and return to Eastern Norway, and vice versa. This roundtrip is shown in the following Figure.

Figure 1: The transport activity's round trip.

Deviation trips to other destinations in Southern Norway and in the North Sea area must be expected.

2.2 Transport of Grain

The bulks of grain are collected at typically either one or two locations (mills) of a total of seven mills located in the Oslofjord area. The cargo is shipped directly to one of several locations in Western Norway when the loading operation is finished.

The grain has relatively low density and is volume intensive. Various types of grains have different annual volumes, and the density/load factor varies between 0,45 tonne/m3 (wheat) and 0,63 tonne/m3 (oat).

2.3 Transport of Gravel

The volumes of gravel/construction materials are transported from the quarries at Tau, Jelsa and Årdal in Ryfylke county to different places along Southern and Eastern Norway. Which ports that will be called at for delivery of the cargo varies between the round trips depending on the projects supplied.

In one shipment there are typically two to three different sorts of gravel being carried. These have roughly the same density/load factor which is around 1,6 tonne/m3. However, depending on the degree of fineness, the lot's load factor may in some cases be up to 1,9 tonne/m3.

2.4 Utilization of Load Capacity and Voyage Planning

High level of interaction between HeidelbergCement's and Felleskjøpet's flows of cargo will provide a co-ordinated transport schedule to obtain high utilization of the ship when sailing the round trip on a

weekly basis. Relative short ballast voyages between the location of unloading and the location of loading within the same region may be expected.

3. Transport Agreement

The type of agreement between charterer (cargo owners) and carrier (transport provider) is not decided at this stage and will be subject to discussion in phase 3 of the tender process (settlement of transport agreement). However, the cargo owners are ready to enter into an agreement of up to twenty years.

4. Requirements for Cargo Handling

The ship must be able to load and unload by use of its own cargo handling gear. Loading of cargo – both grain and gravel – is normally done by the quay side's own cargo handling equipment. How the loading/unloading operations are likely to be under the agreement is described in the following sections.

4.1 Handling of Bulks of Grain

The grain will be loaded on board the ship in general using the cargo handling system fitted on the quay structure, typically loading pumps and conveyor belts. Consequently, the intensity of the loading will depend on the quay structure's own cargo handling equipment.

When discharging the grain, the ship will primarily be using the tenderer's shore-based gear which is a 'suction discharger'. However, there are mills with no such gear. In these cases, the ship needs to use its own cargo gear and drop the cargo to a port hopper. The ship must be able to feed the port hopper with an intensity of minimum 300 tonnes per hour.

A critical aspect when handling bulks of grain is the weather conditions, i.e. rain or snow. To prevent water from entering the grain is crucial for the loading and unloading operations. Therefore, the cargo needs to be protected from water when transferred between the mill and the ship's cargo hold to enable loading and unloading operation regardless of weather. The level of water accepted in the cargo depends on the purpose of the grain; whether it will be stored on long term or consumed immediately. Information about the criticality and the maximum water containment allowed will be provided by the charterer.

There are different sorts of grain which need to be separated from each other on board the ship.

4.2 Handling of Bulks of Gravel

The gravel will be loaded on board the ship by using the quay structures' own cargo handling equipment. Typically, conveyor belt is used, but also wheeled loader which tip the gravel down into the ship's cargo hold(s) while the ship distributes the bulk by its own gear.

When unloading the cargo, the ship is primarily using its own equipment and transferring the load to 'port hopper' or trucks at the quay along the ship side.

There are normally two to three different fractions of gravel on board the ship in one single shipment. The fractions are naturally separated by storing them in each their end of the cargo hold(s).

5. Ports for Loading and Unloading

An overview of regular loading and discharging ports is provided in the following table. Other ports and quays may also be used.

Table 1: List of ports.

Location:	Loading/Discharging	Cargo handling gear:
Felleskjøpet Agri		
Sandesund (Østfoldkorn SA)	Loading port	Conveyor belt
Kambo, Moss (FKA Kambo)	Loading port	Loading pump
Drammen (FKA Drammen)	Loading port	Loading pump
Holmestrand (FKA Holmestrand)	Loading port	Conveyor belt
Larvik (FKA Larvik)	Loading port	Loading pump
Halden (Østfoldkorn SA)	Loading port	Loading pump
Kvalaberg (FKRA Kvalaberg)	Port of discharge	Suction discharger
Stavanger (FKA Stavanger havnesilo)	Port of discharge	Port hopper
Vaksdal (FKA og Norgesmøllene)	Port of discharge	Port hopper
HeidelbergCement		
NorStone Askøy	Loading port	Conveyor belt
NorStone Jøsenfjorden	Loading port	Conveyor belt
NorStone Årdal	Loading port	Conveyor belt
Norsk Stein Jelsa	Loading port	Conveyor belt
Norsk Stein Larvik	Loading port	Conveyor belt
Norsk Stein Tau	Loading port	Conveyor belt
Norsk Stein Dirdal	Loading port	Conveyor belt
Kristiansand	Port of discharge	Discharging to truck or quay
Mandal	Port of discharge	Discharging to truck or quay
Skien	Port of discharge	Discharging to truck or quay
Brevik	Port of discharge	Discharging to truck or quay
Larvik	Port of discharge	Discharging to truck or quay
Halden	Port of discharge	Discharging to truck or quay
Moss	Port of discharge	Discharging to truck or quay
Oslo	Port of discharge	Discharging to truck or quay

6. Requirements to the Ship

6.1 General

It will be required that the ship will satisfy current rules and regulations and have valid certificates for the sailing areas being operated in. A valid safety management certificate (SMC) is required. The safety management systems onboard the vessel shall at least be in accordance with the International Safety Management Code (ISM code) and accompanying latest guidance concerning the execution of the code.

It is required that the ship has the capability to use existing quay structures and terminals along the coastal route. Possible changes which are needed require acceptance from the Tenderer.

There are also requirements concerning the maneuverability of the ship; no assistance should be needed in normal operation in Nordic weather conditions throughout the year.

Regarding port operations and stay, it is required that the ship can be connected to shore power to receive external energy (electricity) for port operation and possible charging of batteries. Shore power shall always be used when available at the quayside.

6.2 Operational Profile

The following requirements to the operation of the ship applies:

- Operational speed 9-10 knots
- Cargo loading/unloading speed: Minimum 500 tonnes of gravel per hour and minimum 300 tonnes of grain per hour.
- Voyages offshore – the North Sea and Skagerrak
- Indicatively capacity of minimum 500 nautical miles incl. port operation in normal operation and weather conditions.
- Loading and unloading at ports/quay with own cargo handling equipment and connected to shore power when available.
- The table below shows the specifications for the vessel that need to be satisfied.

Table 1: Ship Specifications.

Main Details	
Ship type	Dry bulk carrier – "self-discharger"
Deadweight (dwt):	About 5 000 tonnes
Operational speed	9-10 knots
Minimum volume of cargo hold (m^3):	Minimum 6 000 m3
Cargo gear	Electric excavator
Hatches	Water/weather tight and "weather cover"
Bulkheads:	Movable bulkheads for cargo separation
Shore power capability:	Yes

6.3 Emission Requirements

The ship shall have zero emission of greenhouse gases during its operation. This applies to all normal operating modes.

There is also a wish that local emissions of NO_X, SO_X and particles (PM) should be at a minimum.

7. Reporting Requirements

A reporting system will be established related to the transport work which the supplier is obliged to follow. Performance, including energy consumption, emissions to air and sea, utilization of transport capacity and regularity are parameters to be reported.

This list shows Ship design companies in the market. The list may not be complete and more shipbrokers may be added.

Company	Description	Products	Web	Contact person
Albatross Ship Design	Albatross Ship Design is an experienced and dynamic ship design and engineering company.	Ship Design & Engineering	albshipdesign.com	Darko Parcetic-Cigic Tel:+381 (021) 423 875 office@albshipdesign.com
Brevik Engineering	Design of marine and offshore structures, Floating Production and Storage, Special vessels, Passenger vessels.	Ship Design & Engineering	www.brevik.com	Roy Rødningen Tel:+47 35 51 71 00 contact@brevik.com
C-JOB	C-Job is a dedicated partner for ship owners and shipyards; we understand your aims and operations. With our knowledge and skills we translate your ideas into achievable designs.	Ship Design	www.c-job.com	Wietse Bandstra Tel: +31 (0)88 02 43 700 info@c-job.com
Conoship International	Conoship can provide assistance from the early steps of a project, through feasibility studies, concept design, to providing a full engineer and production package, up to financing, yard selection and production support. Small or big, newbuilding or conversion, Conoship team is ready to take up a next challenge.	Ship Design	www.conoship.com	Tel: +31 (0)50 526 88 22 solutions@conoship.com
Damen	Shipyard with own design unit. Damen can provide everything from the basic design to a comprehensive package – delivering the desired product in a short period of time. Clients pay a licence/royalty fee for every vessel produced.	Ship Builder & Design	www.damen.com	Remko Bouma Tel: +31 (0)183 63 99 11 info@damen.com
DEKC Maritime	DEKC offers concept design, basic design, and detail engineering for new build vessels as well as operational support during the lifetime of a vessel	Ship Design	www.dekc-maritime.com	Marleen Lenting Tel:+31 (0)50 575 39 50 marleen@dekc.nl
Delta Marine	Delta Marine is providing ship design services. Experience in ship design, offshore engineering and construction services for marine and offshore industries worldwide	Ship Design	www.deltamarin.com	Kristian Knaapi Tel: +358 2 4336 300 info@deltamarin.com
Glesvær Ship Design AS	Glesvær Ship Design is a naval architect and marine engineering company consisting of Naval Architects and Draughtsmen. With customers in Norway and around the world Glesvær Ship Design have a vast wealth of experience in ship design, ship systems and structures, including offshore, seismic, fishery, tank and bulk vessels.	Ship Design	www.gsdesign.no	Arne Bakke Tel: +47 48 99 76 26 office@gsdesign.no
LMG Marin AS	A part from shipbuilding we have highly specialized expertise in developing and sales of innovative designs,	Ship Design & Engineering	www.lmgmarin.no	Stian Teige Tel:+47 55 59 40 00 office@lmgmarin.no

This list shows Ship design companies in the market. The list may not be complete and more shipbrokers may be added.

MARIN TEKNIKK AS	The company has achieved solid recognition for its computer-assisted ship designs, project work, specifications and tender documents, classification drawings, hull strength and optimizing calculations, arrangement drawings, engine and piping arrangements, isometric drawings, stability- and tonnage calculations, inclining tests and certification of cargo gear.	Ship Design & Engineering	www.marinteknikk.no	Richard Klungsøyr Gjerde Tel: +47 70 08 34 00 post@marinteknikk.no
Marine Design & Consulting	MDC is providing ship design and marine engineering support and services to clients worldwide.	Ship Design	www.marinedc.com	Arne Magne Vik Tel: +47 913 77 160 mdc@marinedc.com
Multi Maritime AS	Electrical installations, piping system and trading services. We also carry out conversions upon demand.	Ship Builder & Design	www.multi-maritime.no	Gustav Johan Nydal Tel:+47 57 82 30 00 firmapost@multi-maritime.no
Naval Dynamics	Independent marine engineering company that specializes in solutions and concept development for the Offshore-, Shipping and Energy industry.	Ship Design	www.navaldynamics.com/kopi-av-res	Øystein Jaer Tel:+47 917 72 928 info@navaldynamics.com
NSK Ship Design	NSK Ship Design specialization covers different ranges of vessels with the whole aspect of ship design and engineering, including project development and general initial design.	Ship Design	www.nskshipdesign.com	Thomas Myhre Tel:+47 7700 1800 nsk@nsk.as
Royal Bodewes	Royal Bodewes is able to design and build a wide variety of vessel types. We offer a tailor-made solution for every transportation requirement.	Ship Builder & Design	www.royalbodewes.com	Tel:+31 (0) 598 39 31 31 info@royalbodewes.com
Salt Ship Design	Salt Ship Design is an independent ship design company utilizing best available technologies.	Ship Design	www.saltship.com	Tor Henning Vestbøstad Tel: +47 55 62 93 40 tor.vestbostad@saltship.com
Sawicon	Sawicon AS is an independent ship design and engineering consulting company. Sawicon deliver complete design for new buildings and rebuilding of ships and marine constructions	Ship Design & Engineering	www.sawicon.no	Hans N. Yddal Tel:+47 55 34 92 40 hans.yddal@sawicon.no
Ulstein	We develop high revenue designs for cost-effective operations. Keen consideration is given to CAPEX, OPEX and technical aspects such as safety, station-keeping, crew comfort and on-board logistics.	Ship Builder & Design	ulstein.com/ship-design	Erwin Jager Tel: +4770008000 gr@ulstein.com
Vard design	Vard Design was established based on our long experience and competence in the shipyards. We deliver designs for standardized – as well as highly advanced – vessels with significant customer-specified adaptations.	Ship Builder & Design	www.vard.com	Juliann Clemetsen Tel:+47 70 21 06 00 juliann.clemetsen@vard.com

This list shows Ship design companies in the market. The list may not be complete and more shipbrokers may be added.

Vard Engineering Brevik	VARD provides a whole range of worldwide services within the shipbuilding industry.	Ship Design & Engineering	www.vard.com	Andreas Buskop Andreas.buskop@vard.no Tel:+47 412 82 841

Appendix C: Overview of Shipyards

Grønt Skipsfartsprogram

This list shows shipyards in the market. The list may not be complete and more shipyards may be added.

Company	Description	Products	Web	Contact person
Royal Bodewes	Royal Bodewes is specialized in building efficient dry cargo vessels in a range 1,500 up to 15,000 dwt. Over the years Royal Bodewes have gained solid experience in building all different types of ships from scratch. Multipurpose vessels, which are able to carry project cargo, containers, geared vessels and mini-bulkers are all within our competence. Any specific demands in the ship's characteristics and specifications will be translated to customized and tailor-made solutions.	Dry cargo Tankers	www.royalbodewes.com	Gerhard Drenth Tel:+31(0)598-39 31 31 g.drenth@royalbodewes.com
Damen Shipyards	Damen build vessels either at our own yards or at our numerous partner yards around the world. This global presence means that Damen can build your vessel close to the delivery destination – considerably reducing the cost and guaranteeing a rapid response.	Bulk Carriers	www.damen.com/en	Remko Bouma Tel:+31 (0)183 63 99 11 remko.bouma@damen.com
Ferus Smit SY Group	Ferus Smit SY Group is a familiy owned company with inhouse design and engineering. Building 6-8 vessels annually. Building sites at Leer.The locks of Leer have dimensions of 192 * 26 mtr.	Bulk carriers	www.ferussmit.com	Rick Brinkman Tlf: +31 50 404 2555 rick.brinkman@ferussmit.com
Dayang Offshore Equi	DaYang Offshore Equipment Co., Ltd, which was established at 2007 ,locates in Hong Qiao Industry Park, Tai Xing City, Jiangsu Province, China. DaYang have two 30,000T slipways(40m*280m)for Launching, one 20,000T slipway (63m*380m) with Air-Bag Launching.	Bulk Carriers	www.dyoffshore.com	Simon Zhou Tel: +852 2436 7801 zhouminyi@cmhk.com
Zhenjiang Shipyard	The yard contains the area of approx 500,000 square meters and has equipped with each one 50,000DWT,20,000DWT and 5,000DWT shipbuilding slipway with the maximum lifting capacity 700t,also a 1,200m fixed quay and bulkhead wharf with the maximum lifting capacity 30t. The yard has 100,000 square meters of indoor assembly plant and more than 1300 sets of various kinds of advanced production and processing equipment.	Bulk Carriers	www.zjshipyard.com	Yu Xiaoxing Tel:+86 137 0177 5333 xiaoxing.yu@oceanbcs.com

This list shows shipyards in the market. The list may not be complete and more shipyards may be added.

CSSC Chuandong Shipbuilding Industry	A major State-owned shipyard, subordinated to China State Shipbuilding Corporation Limited(CSSC). Have 2 production bases in China, Home base, Chongqing, annual capacity 150,000DWT and Donggang base,Chongqing, annual capacity 100,000DWT. Main products are Liquid cargo vessels and small offshore engineering vessels including Chemical Tankers, Bitumen Tankers, Product Oil Tankers, OSV, PSV, AHTS, PCC etc	Offshore vessels Liquid cargo vessels	http://www.cqccsic.com/	Mr. Xuehong Han Tel:+86 138 1878 1207 hanxkong@163.com
CSSC Wuchang Shipyard	A major State-owned shipyard, subordinated to China State Shipbuilding Corporation Limited(CSSC). Have three manufacture bases, namely Wuchang Headquarters, Qingdao Haixiwan and Wuhan Shuangliu. Total 11000 employees. Have built in total 1400 ships.	Bulk carrier offshore vessels high speed boats	www.wuchuan.com.cn/enwuchuan	Mr. Xuehong Han Tel:+86 138 1878 1207 hanxkong@163.com
CSSC Tianjin Xingang Shipyard	A major State-owned shipyard, subordinated to China State Shipbuilding Corporation Limited(CSSC). Located in Tanjin with total 5000 employees. Capacity of Drydocks no1 is 500.000t and no2 is 300.000t. Presently building hospital ship, PCTC etc. Having 300 desiners in design department.	Bulk Carriers MPC RoRo Conatiner Tanker	www.xgsic.com.cn	Mr. Xuehong Han Tel:+86 138 1878 1207 hanxkong@163.com

This list shows shipyards in the market. The list may not be complete and more shipyards may be added.

Yangzijiang Shipbuilding	Jiangsu Yangzijiang Shipbuilding Group Limited is a large corporate group, with shipbuilding and offshore engineering as its core business and with four additional sections: financial investment, metal trading, real estate and shipping combined ship-leasing as supplementary business.	Bulk carrier Container MPC Standby Vessels Product and Chemical tankers	http://www.yzjship.com/en/	Mr. Jiawei Yun Tel:+86 150 6176 0202 Y_jiawei@yzjship.com
Wuhu Shipyard	Wuh Shipyard has built export ships such as MPC, PSV, achor handling vesselss in addition to military navy vessels.With a total investment of 2.2 billion RMB and an annual building capacity of 800,000 DWT, the Shipyard is a first level & first class ship building enterprise.	Bulk carriers Tankers Offshore vessels	http://en.wuhu.com.cn/	Mr. Anming Chen Tel:+86 180 5530 9010 or 130 0304 0522 chenanming@wuhu.com.cn
COSCO shipyards	COSCO Shipyard Group Co., Ltd, which is a subsidiary of China Ocean Shipping Company (COSCO), is a large enterprise group specializing in large vessel building, marine engineering, construction and conversion, and providing services in ship repairing and building sets.	All type of vessels	http://en.coscoshipping.com/	Mr. Aizhong Xu Tel:+86 158 0177 8900 xuaizhong@cosco-shipyard.com
Vard	VARD provides a whole range of worldwide services within the shipbuilding industry, with higly specialized expertise within trading, innovative design, shipbuilding, electrical installations and piping system.	OSV Specialized vessels	www.vard.com	Magne Håberg Tel:+47 70 21 06 00 magne.haberg@vard.com
Kleven	Norwegian ship builder. The Croatian industrial group DIV Group has entered into an agreement to take-over the Norwegian yard Kleven Verft from Hurtigruten.	Offshore vessels Specializes vessels Passenger Ferries	www.en.kleven.no	Tel.: +47 70 01 91 00 post@kleven.no
Ulstein	Ulstein Group is a family-owned company comprising several marine enterprises within ship design & solutions, shipbuilding, global sales and shipping. Ulstein's vision is to create tomorrow's solutions for sustainable marine operations.	Recent references include exploration cruise, RoPax, heavylift and offshore wind	www.ulstein.com	Tel: +4770008000 gr@ulstein.com
Myklebust	Ved Myklebust Verft kan vi i tillegg til nybygg også tilby dokking for dei fleste typar fartøy, inkludert subsea konstruksjonsfartøy, ankerhandterarar, seismikkfartøy, brønnbåtar og fiskefartøy blant andre.	Offshore vessels Specializes vessels Fishing vessels	www.myklebustverft.no	Tlf.: +47 70 02 62 00 post@myklebustverft.no

This list shows Ship Equipment companies in the market. The list may not be complete and more companies may be added.

Company	Description	Products	Company Website	Contact person
ABB	ABB is a pioneering technology leader that works closely with utilities, industry, transportation and infrastructure customers to write the future of industrial digitalization and realize value. Our advanced offerings in propulsion, advisory and power generation and distribution, will allow you to reduce fuel costs without sacrificing operational qualities or reliability.	Power generation	new.abb.com	Erik Bolstad Tel:+47 90 03 62 52 erik-christian.bolstad@no.abb.com
Ballard Power Systems	Ballard's Marine Center of Excellence in Hobro, Denmark is dedicated to engineering, manufacturing and servicing fuel cell marine applications. Ballard is actively involved in a number of marine projects.	Fuel cells	www.ballard.com	Tel:+45 8843 5500 contact@ballardeurope.com
Brunvoll	Brunvoll offers an extensive range of CP-propellers, Reduction gearboxes, Thorque and CRP PM-systems, Azimuth Propulsion, Control, Alarm & Monitoring Systems.	Thrusters	www.brunvoll.no	Tel:+47 71 21 96 00 office@brunvoll.no
ConoWind	Ventilated foil systems. The eConowind-unit is integrated in a 40 ft container from which two folding VentiFoils can be deployed: ridged aspirated wing profiles acting as sails. The VentiFoils are designed as optimal compact (non-rotating) wing profiles, creating superior thrust by means of the principle of boundary-layer-suction, for which ventilators are mounted in the VentiFoils.	Wind assisted propulsion	www.conoship.com	Tel:+31 (0)50 526 88 22 solutions@conoship.com
Hexagon Composites ASA	Supplier of high-pressure hydrogen tanks for the hydrogen fuel cell vessel	Hydrogen tanks	www.hexagongroup.com	Vegard Fredheim Tel:+47 996 30 142 vegard.fredheim@hexagongroup.com

This list shows Ship Equipment companies in the market. The list may not be complete and more companies may be added.

Hyon	Powercell fuel cells, NEL Electrolizer, Hexagon pressure tanks	On customer requirements Hyon deliver integrated systems including renewable hydrogen production, storage, distribution, dispensing, and electricity generation via fuel cells.	www.hyon.no	Tomars Tronstad tomas.tronstad@hyon.no +47 93650766
Kongsberg Maritime	Kongsberg Maritime is a marine systems provider. Solutions are suitable for on- and offshore, merchant marine, subsea, navy, coastal marine, aquaculture, training services and more. Rolls-Royce Commercial Marine is now an integrated part of Kongsberg Maritime.	Power systems Thrusters etc.	www.kongsberg.com	Ketil Olav Paulsen Tel:+4797118102 ketil.olaf.paulsen@km.kongsberg.com
MacGregor	MacGregor believes that the arrangement of cargo handling equipment on a bulk carrier's weather deck and the cargo space layout should be designed with the highest possible level of ship productivity in mind. This makes fast and efficient loading possible, even in ports with limited infrastructure, and delivers the best return on investment.	Hatchcovers, cranes	www.macgregor.com	Kalle Tuomaala tel:+358 20 777 45 00 kalle.tuomaala@macgregor.com
Nel ASA	Nel is a global, dedicated hydrogen company, delivering optimal solutions to produce, store and distribute hydrogen from renewable energy.	Hydrogen production	www.nelhydrogen.com	Bjørn Gregert Halvorsen Tel: +47 23 24 89 50 BJHAL@nelhydrogen.com
NorsePower	Norsepower Rotor Sails provide a reliable and easy-to-operate auxiliary wind propulsion system with a proven savings record. Norsepower Rotor Sails can typically reduce fuel consumption by 5-20%.	Wind assisted propulsion	www.norsepower.com	Olga Liebkind Tel: +358 40 7576703 olga.liebkind@norsepower.com

This list shows Ship Equipment companies in the market. The list may not be complete and more companies may be added.

OceanWings	Soft wing sails.Oceanwings® is a fully automated, furlable and reefable *high-performance wingsail, enabling hybrid propulsion featuring a mix of wind power and conventional propulsion	Wind assisted propulsion	www.cnim.com	
PowerCell	PowerCell Sweden AB (publ) develops and produces fuel cell stacks and systems, powered by hydrogen, and produce electricity and heat with no emissions other than water.	Fuel cells	www.powercell.se	Johan Burgren Tel:+46 (0) 73 910 37 69 johan.burgren@powercell.se
Schottel	The SCHOTTEL Group, with its headquarters in Spay/Rhine, is one of the world's leading manufacturers of propulsion and steering systems for ships and offshore applications	Thrusters	www.schottel.de	Tel:+47 63 82 00 00 sno@schottel.com
Siemens	The Siemens marine commitment stretches back more than 130 years. Our highly innovative portfolio of electrical products, systems, solutions and services covers the entire lifecycle. A promise of supporting businesses like yours with future-proof solutions for the safe, efficient and reliable operation of commercial as well as naval vessels.	Power generation	new.siemens.com	Tel:+47 815 365 24 marineservice.no@siemens.com
UMOE Advanced Composites	Umoe Advanced Composites is the leading global supplier of large fibre glass composite type IV pressure vessels and transportation modules for CNG, biogas and hydrogen.	Hydrogen tanks	www.uac.no	Ola Engehagen Tel:+ 47 945 01 937 ola.engehagen@uac.no
WaveFoil	Wavefoil has developed retractable bow foils that provide significant fuel savings, reduced motions and a more comfortable experience at sea	Wave assisted propulsion	www.wavefoil.com	Eirik Bøckmann Tel: +47 45263411 eirik@wavefoil.com

Appendix E: Overview of Ship Finance and Grant companies

Grønt Skipsfartsprogram

This list shows Ship Finance and Grant companies in the market. The list may not be complete and more companies may be added.

Company	Description	Products	Web	Contact person
Danske Bank	Danske Bank is a Nordic bank with strong local roots and bridges to the rest of the world. For more than 145 years, we have helped people and businesses in the Nordics realise their ambitions. We want to help our customers become financially confident and help them build their lives and businesses on a solid financial foundation. We aim to create long-term value for all our stakeholders – our customers, shareholders and the societies we are part of – and our vision is to be recognised as the most trusted financial partner.	Ship Finance	www.danskebank.no/bedrift	Tom Erik Vågen Tel: 911 70 281 tv@danskebank.com
DNB	Shipping, Offshore & Logistics er et av hovedområdene i DNBs internasjonale strategi. Vi har global tilstedeværelse gjennom våre kontorer i New York, London, Singapore, Oslo, Bergen, Shanghai og Athen. Vi tilbyr bedrifts- og investeringstjenester, og er stolte av at mange av verdens ledende maritime selskaper velger oss som deres finansielle partner.	Ship Finance	www.dnb.no/konsern/bransje/shipping.html	Nicolay Dyvik Tel: nicolay.dyvik@dnb.no
Eksportkreditt Norge	Export Credit Norway is a goverment company providing ship finance for equipment and ships.	Ship Finance	www.eksportkreditt.no/en/	**Laila Johnsen** Tel: +47 22 31 35 00 LaJ@eksportkreditt.no
Enova	Enova works for Norway's transition to the low emission society. The restructuring requires us to cut greenhouse gas emissions, maintain security of supply and create new values. That's why Enova is working to get the good solutions into the market and contribute to new energy and climate technologies.	Grants	www.enova.no	Ingrid Aune Tel:+4773 19 04 30 ingrid.aune@enova.no
Forskningsrådet	Forskningsrådet (The Research Council of Norway) invest in research and innovation that builds knowledge for a sustainable future and meets major societal challenges.	Grants	www.forskningsradet.no	Sigurd Falck Tel:+47 22 03 70 00 post@forskningsradet.no

Appendix E: Overview of Ship Finance and Grant companies

This list shows Ship Finance and Grant companies in the market. The list may not be complete and more companies may be added.

GIEK	GIEK is the Norwegian Export Credit Guarantee Agency. GIEK provides long-term guarantees that encourage Norwegian industry to take part in more international trade and export. On behalf of the Norwegian state, we provide guarantees on commercial terms for loans, investments and product deliveries. These guaranteesare given to Norwegian companies, their international buyers and banks.	Ship Finance Guarantee	www.giek.no	Solveig Frøland Tel:+47 22 87 62 00 Solveig.Froland@giek.no
Innovation Norway	Innovation Norway contributes to sustainable growth and exports for Norwegian businesses through capital and expertise.	Grants	www.innovasjonnorge.no	Roger Martinsen Tel:+ 47 22 00 25 00 Roger.Martinsen@innovasjonnorge.no
KLP	KLP tilbyr pensjon, bank, fond og forsikring til din virksomhet. Vi har løsninger for alle typer virksomheter, både i det private og det offentlige.	Equity	www.klp.no	Lars Erik Mangset Tel:+47 93 20 94 94 Lars.Erik.Mangset@klp.no
NOX fondet	The NOx Agreement 2018-2025 was signed by fifteen business organisations and the Ministry of the Environment. Through the Agreement, the business organisations shall ensure that the total NOx emissions from sources covered by the Agreement do not exceed a set emission ceiling.	Grants	www.nho.no/samarbeid/nox-fondet	Tommy Johnsen Tel:+47 23 08 80 00 tommy.johnsen@nox-fondet.no
Nysnø	Nysnø investerer i selskaper som løser klimautfordringer på en smart og lønnsom måte. Det gir grobunn for ny, klimavennlig virksomhet og teknologiutvikling. Nysnø er et investeringsselskap eid av staten, og eierskapet forvaltes av Nærings- og fiskeridepartementet.	Equity	www.nysnoinvest.no	Tel: 4751525354 post@nysnoinvest.no
Sparebanken Vest	Frittstående børsnotert finanskonsern som driver bank-, forsikring- og finansieringsvirksomhet i Hordaland, Rogaland og Sogn og Fjordane. Hovedkontor i Bergen. Forretningsidé: Bankdrift og samfunnsengasjement.	Ship Finance	www.spv.no/om-oss/jobb/organisering	Marita Hollekve Tel:+47 99640051
Swedbank	Swedbank tilbyr et bredt utvalg av produkter og tjenester innen finansiering, plassering og investeringer til selskaper og organisasjoner.	Ship Finance	www.swedbank.no	Johan Erland Tel: 48 07 60 78 johan.erland@swedbank.no

This list shows a few shipbrokers in the newbuilding market. The list may not be complete and more shipbrokers may be added.

Company	Products	Description	Web	Contact person
Galbraiths	Ship broker	We provide a comprehensive package of shipbroking services through three principal departments: tanker chartering, dry cargo, and sale & purchase. These departments are backed by specialist marine sections with expertise in consultancy, newbuilding, valuations, demolition and post-fixture care.	www.galbraiths.co.uk	Alf Petter Olsen Tel:+4795085845 apo@galbraiths.co.uk
Fearnleys	Ship broker	The Global Fearnbulk organisation gives our clients access to market opportunities and experienced advise, in the fast moving dry cargo market. Our dry cargo desks are strategically located in the Fearnleys offices in Oslo, Shanghai, Hong Kong, Singapore, Mumbai and London.	www.fearnleys.com	Haakon Oscar Steimler Tel: +47 22 93 62 74 h.steimler@fearnleys.com
Clarksons Platou	Ship broker	Clarksons is the world's leading provider of integrated shipping services, bringing our connections and experience to an international client base.	www.clarksons.com	THOMAS ROED Tel:+47 23 11 24 86 Thomas.roed@clarksons.com
Grieg Shipbrokers	Ship broker	From our offices in Bergen, Oslo, London, Shanghai and Singapore, Grieg Shipbrokers' experienced team ensure all of our clients obtain complete market coverage; advising investors, charterers, shipyards and financial institutions alike through the utilisation of a quality, creative and fact-based service.	griegshipbrokers.no	Morten Muller Tel: +47 55 57 67 16 morten.muller@grieg.no
Lorentzen & Stemoc	Ship broker	Located in the Oslo headquarters, our S&P/Newbuildings department levers on its strong network amongst ship Owners, yards, financiers, charterers and co brokers world wide to provide L&S clientele with anything from one ship second hand deals, to large complex logistical/financial structures pushing the collective L&S capacity to its maximum.	www.lorstem.no	Tel:+ 47 22 52 77 00