Agenda

• Terminology
• Parameter
• Existing Ships
• New Construction, selection
• Discussion
Terminology / Applications

- Cargoes
- Fuel / Dual-fuel
- Liquefied Natural Gas
- Existing ship / New Construction

Existing Ship
- Fuels (Sulphur)
- Retrofit scrubber
- Retrofit dual-fuel / LNG

New Construction
- Fuels (Sulphur)
- Scrubber
- Dual-fuel / LNG
Parameter

Operation vs. design
- Trading area
- Trade pattern
- Ship type

- Trade / route / link
- Operation profile / port cycle / manoeuvring / transit
- Propulsion concept / engine / consumption / tank capacities
- Main engine / auxiliary engines / boiler
Parameter

- Trading area, pattern, route
- Ship types
  - Cargo
  - Ferry
  - RoRo Cargo
  - Tug / Workboat
Logistics

- LNG Carrier
  - Approx. 400 ships in-service
  - Approx. 100 ships on order
- Pipeline
- LNG terminals
  - Import terminals
  - Bi-directional terminals
  - What / where / how to bunker
## LNG Bunkering Infrastructure Survey 2014

<table>
<thead>
<tr>
<th>Location</th>
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<tbody>
<tr>
<td>Amsterdam</td>
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<td>Brunsbüttel</td>
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<td>Vancouver*</td>
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<td>Yokohama</td>
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<td>Zeebrugge*</td>
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Existing Ships, selection

Deen Shipping BV
- I.W.W. Tanker ARGONON
- Dual-fuel
- Flag Netherlands

Viking Line AB
- RoRo Passenger Ferry VIKING GRACE
- Dual-fuel
- Flag Finland

SRD Group
- I.W.W. Tanker GREENSTREAM, GREENRHINE
- LNG
- Flag Netherlands
New Construction

Trading area, pattern, route

- Ship types
  - Cargo, example
  - Ferry, example
  - RoRo Cargo
  - Tug / Workboat, example

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For Immediate Release
14424
July 3, 2014

BC FERRIES AWARDS $165 MILLION IN CONTRACTS FOR THREE NEW LIQUEFIED NATURAL GAS FUELLED INTERMEDIATE CLASS FERRIES

VICTORIA – Following the completion of an extensive competitive bidding process, BC Ferries has awarded Remontowa Shipbuilding S.A. of Gdansk, Poland contracts totaling $165 million to build three new intermediate class vessels.

The contracts have been approved by BC Ferries’ Board of Directors, as well as a total project budget of $252 million that includes financing and project management costs that would have been incurred regardless of where the vessels were built. The budget also includes $51 million for Canadian taxes and federal import duties. The total project budget is within the capital envelope set by the BC Ferries Commissioner.

British Columbia Ferry Services

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UECC orders two Dual Fuel Liquefied Natural Gas (LNG) Pure Car and Truck Carriers (PCTC) with 1A super Finnish/Swedish ice class

United European Car Carrier
New Construction, example

Passenger and Vehicle Ferry F.A. GAUTHIER

- Prospective owners
  Societe des Traversiers du Quebec, Canada

- $L$ [m] 133.20
- $B$ [m] 22.40
- $T$ [m] 5.40
- Tonnage [GT] 12,000
- Dual-fuel propulsion
- Capacity
  800 Passenger
  180 Vehicle
- Flag Canada
New Construction, example

Icebreaker NB 510

- Prospective owners
  Finnish Transport Agency
- L [m] 110.00
- B [m] 24.40
- T [m] 8.00
- Tonnage [GT] 10,000
- Propulsion power [kW] $2 \times 6,500 + 1 \times 6,000$
- Fuel MGO and LNG propulsion
- Flag Finland
Passenger and Vehicle Ferry

- Hulls 2990/1, 2990/2, 2990/3
- Prospective owners
  British Columbia Ferry Services Inc
- L [m] 107.20
- B [m] 23.50
- T [m] 4.65
- Tonnage [GT] 8,690
- Capacity
  600 Passenger
  145 Vehicle (AEQ – 5.34 m × 2.60 m)
- Flag Canada
New Construction, example

Parameter
- Trading area
- Trade pattern
- Route
New Construction, example

Pure Car and Truck Carrier

- Hulls 212, 213
- Prospective owners United European Car Carrier
- L [m] 181.00 / B [m] 30.00 / T [m] 8.40
- Tonnage [GT] 43,200
- Capacity 3,800 CEU
- Flag Norway
- Main engine
- Auxiliary engines
- Boiler
- LNG bunker station PS and SB, liquid lines, vapour lines
- Vent mast
New Construction

Ship concepts and new construction projects
- LNG - cargo / cargo and fuel / fuel
- Prospective owner / operator / charterer
- Main particulars L \times B \times T
- Fuel capacities / fuel tank arrangements
- Flag state / port state / port authorities

LNG distribution and supply functionalities
- Shore-to-ship, ship-to-shore, ship-to-ship
- Handling boil-off gas
- Thermal cycle, cool down, warm up
- Inerting, gas freeing
- IGC / IGF / SGMF
- Loading, loading arms, discharging, (elevated) manifolds, hose handling
Hybrid propulsion

RT ADRIAAN

HALLAIG and LOCHINVAR

Isle of Skye
Sconser to Raasay

Timetable: Sconser – Raasay Route

Speed, Power Predictions and Engine/Generator

Innovative Ship Power Distributionネット

With Schneider

Population

Lithium batteries

Main switchboard

Generation 150kW

LR
Summary

- Parameter
  - Trading area, trade pattern, route
  - Ship types
    - Ferries as pioneers
    - Logistics, terminals, supply cycle
- New construction orders
- Ship concepts, designs, tenders
- Discussion
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