SMALL SCALE LNG INFRASTRUCTURE SOLUTIONS

2015 is closing in – is LNG still in the pipeline for Danish stakeholders?
LNG Projects in Denmark

5 ports:
- Port of Skagen
- Port of Hirtshals
- Port of Aarhus
- Samsø Island ferry
- Copenhagen Malmö Port
Projects

Denmark’s first LNG fuelled Domestic ferry October 2014

May 2012
National project with EU funding on the need for LNG infrastructure

LNG bunkering for cruise vessels April 2015

TEN-T project 2010 – Dec 2014
Ports in Copenhagen-Malmö, Helsingborg, Stockholm, Helsinki, Turku and Tallinn
Feasibility studies are finalised.
Next step: Operators

May 2013 LNG ferry Bunkering in Norway
Why LNG?

- New regulations:
  - SOx, 0.1% by 2015, 0.5% globally by 2020
  - NOx, Tier III limitations for all ships built after January 2016
  - CO2 emissions
  - European S-Directive
  - Proposal for Directive Clean Power for Transport

- LNG as a ship fuel would comply with all new regulations
  - NOx: 85-90%
  - SOx: 100%
  - Soot/particles: 100%
  - CO2 reduction (20-25%)

- Proven technology
  - Approx. 30 LNG fuelled vessels in operation
  - Boil-off used on LNG carriers

*LNG appears to be the most complete medium term viable solution*
Main Challenges for LNG

★ Safety concerns
  □ On-board vessels and in relation to port operations
★ LNG bunkering
  □ Port regulations and impact on operations
★ Infrastructure
  □ Development of supply chain
  □ Chicken-and-egg cycle
★ Vessel application
  □ Added costs for a new build
★ LNG price

What can be done by ports?
## WPCI LNG Fuelled Vessels Working Group

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### SWG 1: Draft bunker checklists

### SWG 1: Draft accreditation guideline

### Industry reference group meeting, 8th of October in Antwerp

### SWG 3: Launching LNG website

### SWG 2: Report LNG risk perimeters

### IMO 0.1% Sulfur Regulation within SECA
Stockholm-Turku

Viking Grace – daily service from Stockholm to Turku - Daily bunkering in Stockholm
Gothenburg

New LNG terminal – production, storage, ship bunkering, truck loading, rail loading and regasification (injection to national grid)

Construction 2014
Rotterdam

- LNG carrier/bunker vessel = normal tanker carrying dangerous goods
- LNG fuelled ship = normal ship, no extra port regulations
- Shore-to-Ship bunkering: 1st July 2013
- Ship-to-Ship bunkering: 2014

Gate terminal:
- 2013: Export facility

Breakbulk terminal:
- 2014: Start-up truckfilling station
- 2015: Start-up LNG BB terminal

Bunkering Seinehaven:
- 2011: Argonon: 1st inland vessel on LNG
- 2013: Greenstream: 1st single fuel vessel

LNG small scale infrastructure:
- 2014: Commercial LNG Bunker station for inland vessels
- 2014: 3 LNG tankstations for trucks
- Ambition:
  - 2015: LNG bunkerbarge operational in Rotterdam
LNG Chain: Rotterdam-Gothenburg

- Market catalyst, small scale distribution chain
- Preparations ongoing, total budget €184 mln
- Submitted to MoS TEN-T 2012-2015
- Operational 2015, 2017
Similar projects

Port of Zeebrugge and Port of Antwerp:
• LNG procedures
• LNG supply chains
• LNG security
• Bunker vessels – ship2ship
• Share the risk – port and operators in common investment setup
Hamburg

- Ongoing assessments for LNG storage facility, berth for a bunker barge and bunkering locations
- LNG barges for providing electricity to vessels
- LNG trucks (pilot 2013)
Terminal Project

- Full third party access
- Re-gas capacity (regional consumption)
- LNG bunkering, truck loading facilities
- Approval pending (TEN-T Energy), Estonia or Finland
- 2016-2020
Conclusions

• LNG is at the present the most complete medium term viable solution – still not a “silver bullet”
• Several ongoing port projects in North Europe – but still small demand
• Significant remaining challenges – demand and insecurity concerning sulphur rules 2015 and other solutions e.g. scrubber, electricity, dual fuel
• Pressing timetables, complementarity of compliance strategies and solutions
• Ongoing policy initiatives from European Commission
• An opportunity for South European ports too??
Thank you for your attention

Tom Elmer Christensen - sekretariatschef
Danske Havne – Danish Ports
Tel + 45 3370 3137
tec@danskehavne.dk
http://danskehavne.dk