

ARCTIC MARINE NATURAL GAS SUPPLY CHAIN STUDY

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Task 5 & 6

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Work in Progress – Tasks 5 & 6

- Task 5: Human Resources
 - Required Competencies
 - Seagoing
 - Shore-side
 - Training Considerations
 - International
 - Domestic
 - Arctic
- Task 6: Regulatory Considerations
 - Existing Framework
 - Gaps and Uncertainties

Task 5 – Human Resources

- Operators of LNG-fuelled vessels and LNG carriers have mandatory certifications under IMO codes (STCW) and national regulations.
- Maintainers and shipbuilders also need to understand the hazards associated with systems containing LNG.
- Operating shore facilities and conducting shore-to-ship bunkering operations require suitably trained personnel.
- Emergency responders should also be trained in measures such as cryogenic burn treatment, fire and spill response.

Training Challenges

- Early adopters of marine LNG in Canada have drawn heavily on international operators to gain service experience required for certifications.
- Training has also used international expertise.
- Canadian education and training centres have limited capability and capacity at present.
- Arctic projects will need to give special consideration to these issues.

Task 6 - Regulatory

- The international marine regulatory system for LNG-fuelled vessels and LNG carriers is quite mature:
 - IGF and IGC Codes
 - Industry standards (ISO, IEC, IACS, etc)
 - Industry guidelines (SIGTTO, IGMF, etc)
 - Risk assessment of vessels under IGF required for some aspects of design and for any novel approaches
- Bunkering operations are generally under national jurisdiction; in this case Canada.
- Shore facilities are always under national or local jurisdiction.

Canadian Regulatory Regime

- No Canadian regulations for LNG-fuelled ships or LNG carriers currently exist; though treatment of LNG-fuelled ships is addressed by policy:
 - Application of IGF Code with some supplementary requirements
 - Delegation of design and construction approvals to Recognized Organizations (classification societies) with MTRB approval
 - Treatment of LNG carriers/bunker vessels tbd, but likely to follow similar model
- LNG bunkering approval and inspection currently being led by port authorities

Shore Facility Approvals

- Canadian system involves multiple federal, provincial/territorial departments and agencies
- Often difficult to identify clear responsibilities for final approvals
- Work is ongoing to ensure task report clarifies situation, to extent possible.

Future Work – Tasks 7 & 8

- Task 7: Implementation Scenarios
 - International and Canadian experience
 - Potential projects
 - Roles for incentivization and support
- Task 8: Benefits to Canada's Arctic
 - Economic opportunities
 - Environmental benefits
 - Longer-term considerations