



## Natural Gas Futures Research Consortium

### Background

The Clean Energy Research Centre (CERC) at UBC is engaged in developing viable solutions for sustainable energy, and operates within the Faculty of Applied Science at the University of British Columbia (UBC). CERC has established the Natural Gas Futures (NGF) industry-led applied research and education consortium to inform the responsible use of natural gas. The consortium includes Canadian and international companies and research organizations engaged in the production, distribution, design, development and use of solutions for natural gas in applications such as marine, mining, industrial, rail, road transport, buildings and remote community power.

### Scope and Vision

The NGF consortium aims to provide reliable evidence-based recommendations and technology solutions for the safe and environmentally responsible adoption of natural gas. The consortium will:

1. Investigate and **develop technology, processes and systems** for improving natural gas fuel production, distribution, bulk transfer, storage, dispensing and consumption for application in heavy duty trucking, rail, marine, mining, oil & gas, agriculture and remote communities.
2. Support the drive for broader **educational and regulatory initiatives** to inform the deployment of natural gas.
3. Support **engagement with government** agencies to accelerate the realization of economic and environmental opportunities based on expanding local and international markets for gas commodity, products, technologies and expertise.
4. Develop the future **engineering and trade workforce** to support sector growth and especially develop the necessary expertise in specialist fields like cryogenics and to build capacity.
5. Collaborate with **government funding** programs to support the growth of the sector and execute on demonstration projects.

### Outcomes

- Largest possible GHG emissions reduction through low- or zero methane venting across the value chain
- Increased safety, automation and ease of use
- Simplification and cost reduction of systems and equipment to improve the business case
- Broader education of public and users
- Regulations and standards that are fit for purpose
- Better integration of Renewable Natural Gas (RNG)
- Net-zero carbon emission solutions for buildings

### Value Proposition

This initiative will create value for partners by:

- A. Leveraging applied research expertise at multiple institutions to address technical topics of interest
- B. Providing insights into new technology developments and directions.
- C. Accelerating the development of breakthrough technologies in collaboration with consortium partners to reduce operating costs and simplify operations.
- D. Training future employees and building workforce capacity.
- E. Enabling a Natural Gas Innovation Centre that will provide world-class LNG testing, research and training facilities.

### Governance and Operation

CERC manages the consortium operations and research program according to an agreed governance process. Members of the NGF consortium sit on a Partner Advisory Board that directs consortium operations. CERC recruits qualified researchers from across Canada and provides them with appropriate supervision and facilities at designated research institutions. A Research Steering Committee helps to set the research agenda.

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## CERC Obligations

As part of managing the NGF operations, CERC agrees to:

- Apply for matching government funding to obtain a minimum 1x multiplier on partner contributions.
- Recruit qualified research staff to join the NGF team and provide them with facilities and supervision at partner institutions.
- Manage the research and consortium activities.
- Operate governance processes to coordinate and develop the consortium's vision.

## Partner Obligations

As NGF consortium members, partners agree to:

- Make annual Consortium Membership Fees each year to support agreed research programs, and to gain access to the broader consortium capabilities being developed.
- Participate in NGF governance structures and consortium meetings.

## Annual Partner Contributions

Primary Industry Contributor      \$100,000 per year

Other Companies                  \$35,000 per year

Partner contributions may be eligible for tax incentive under the Canadian Scientific Research and Experimental Development Tax Incentive Program (SR&ED).

## Intellectual Property

NGF consortium member in good standing will be granted a perpetual royalty-free non-exclusive license to practice (for any use) any IP generated by the NGF projects during the period that they were members and prior to their membership. IP is owned and protected by UBC on behalf of the consortium.

Where practical and agreed by the consortium members, IP will be commercialised and the net proceeds returned to the consortium to fund further research and development.

Partner-specific projects (with separate IP arrangements) can be initiated in addition to the consortium projects and are funded independently by the partners.

## Research Priorities

Initial areas of research focus will include:

1. LNG transfer and refuelling optimisation
2. Boil-off gas management
3. Gas cloud dissipation modelling
4. CNG smart fuelling and heat dissipation
5. Natural gas vehicle lifecycle assessment
6. Microliquefaction
7. High-efficiency isothermal gas compression
8. Mobile emissions measurement
9. Gas engine combustion and emissions reduction
10. Renewable natural gas
11. Direct hydrogen production from methane
12. Net zero carbon building heating with natural gas