



Advancing the Offshore Oil & Gas Industry through the Lens of the Energy Transition

A Submission to Newfoundland and Labrador's Oil and Gas Industry Recovery Task Force

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Introduction

The Newfoundland and Labrador Environmental Industry Association (NEIA) is pleased to have the opportunity to present a series of recommendations to the *Oil and Gas Industry Recovery Task Force*.

This is an important time in Newfoundland and Labrador's history. The challenges are immense. The oil price war and the economic downturn resulting from the pandemic have hit the industry hard, while also accelerating the global discourse on the energy transition. While some may view this as yet another challenge, NEIA views this as an opportunity that is complementary to the recovery of the province's oil and gas industry.

NEIA does not believe that the energy transition is a struggle between oil and gas and renewable energy; rather we view it as a continuous pursuit of environmental sustainability within the energy sector at large. Ultimately this will lead to a world that uses much less fossil fuel, however this is a change that will take time. In the interim, achieving excellence in emissions intensity and environmental performance within the oil and gas industry is a valuable contribution to the fight against climate change.

Viewing the oil and gas industry's future through the lens of the energy transition presents enormous opportunities that – if realized – will contribute substantially to not just the long-term success and resiliency of that industry, but also the provincial economy at large. Conversely, it is NEIA's position that dismissing this approach will put the long-term future of the industry in Newfoundland and Labrador in peril.

This submission outlines the opportunities that NEIA sees for the oil and gas industry as it relates to the energy transition.

Context

In considering the recommendations being made by NEIA, there is some background that may be helpful for members of the *Task Force* to be aware of to set the proper context.

About NEIA

NEIA is a not-for-profit industry association that promotes the development of clean technology and the growth of the green economy in Newfoundland and Labrador.

In pursuit of its business growth objectives, NEIA focuses its activities and initiatives in six (6) areas by providing: a support framework for entrepreneurs and startups; networks to help firms increase their productivity and competitiveness; tools to encourage and foster firm and sector-level innovation; export and international business development programming; training and professional development opportunities; and leadership on policy and advocacy issues.

Founded in 1992, NEIA now has over 200 members and has become the leading voice in Newfoundland and Labrador on clean growth, the green economy, and sustainable economic development.

Cleantech and NEIA Membership

The phrase ‘clean technology’ is often confused with ‘clean energy’ or greenhouse gas (GHG) emissions reductions technologies. While these technologies are important categories of cleantech, they are just two of many.

There is no singular definition for cleantech, but NEIA views it as being products, processes, and services that: improve on environmental performance; use resources in ways that improve efficiency, reduce wastes, or mitigate environmental risks; or help provide the information required to enable any of the above.

NEIA has long viewed the development and application of clean technologies within the offshore oil and gas industry as being an area of opportunity for Newfoundland and Labrador. Indeed, many of NEIA’s members already provide clean technology and/or environmental services to the industry.

Why the Cleantech Focus is Important

NEIA has observed increasing public, political, and investor interest worldwide on GHG emissions reductions, particularly within heavy industry. Discourse has intensified in response to the economic

disruption presented by COVID-19, but the trend was clear in advance of the pandemic and will continue after it ends.

The quality of a product or service will always be an important differentiating factor in the free market, and it is our belief that a primary measure of 'quality' in the oil and gas industry will be the GHG intensity associated with a barrel of oil sold. Jurisdictions that perform well in this regard will be providing a product in a world that is increasingly making decisions that factor in climate change impacts.

Newfoundland and Labrador has an opportunity to be a low-emissions producing jurisdiction. The light sweet crude extracted from its offshore is highly efficient to refine. Some of its assets offshore are among the world's best in terms of GHG emissions per barrel. However, aging infrastructure threatens to erode this competitive advantage in short order. A deliberate and strategic pursuit of emissions reduction is required.

NEIA believes that the medium and long-term survival of Newfoundland and Labrador's offshore oil and gas industry is predicated on its ability to adapt to this changing economic environment. As a low-volume and high-cost producing jurisdiction, in a time of low oil prices and with global peak oil demand around the corner, there are few other investment attraction avenues to pursue.

The stakes are high, as the industry has been the major economic driver for the province for the past 30 years. It is our view that investments into improving the environmental performance of current and future offshore oil and gas production will enable innovation, investment attraction, and growth opportunities that will help diversify Newfoundland and Labrador's economy and help make us a leader in the global energy transition.

The Energy Transition

Today oil and gas represents upwards of 60% of international energy consumption. Urgent action is required worldwide in order to tackle climate change and meet the objectives of the Paris Agreement, but the necessary changes in the global economy, its infrastructure, and the habits of its people will not happen overnight.

Discussions about the 'energy transition' often devolve into a conflict pitting oil and gas versus renewable energy. But it is clear that if the world has any hope of meeting greenhouse gas emissions

targets, changes within the oil and gas industry have to be part of the solution. NEIA believes that the energy transition is about the continuous pursuit of sustainability within the energy sector at large.

There are important climate and economic reasons for Newfoundland and Labrador to position its offshore oil and gas industry as being one of the most environmentally sound in the world. And this pursuit is a worthy contribution from Canada to the fight against climate change.

But it is also important to consider how this repositioning fits within the broader context of the energy transition. In Newfoundland and Labrador, we already have an electricity grid that is close to 100% clean; domestically we have already made a considerable transition. This is a significant achievement, and it is time that we begin to view this as being a major asset for the province. How can we make the most of our clean electricity grid? How can this relate to the future of our oil and gas industry?

Meanwhile our province has an enormous cache of undeveloped renewable energy resources that have the potential to be harnessed to assist others in making this transition. How do we leverage the skills, expertise, resources, and infrastructure of our offshore oil and gas industry to exploit these environmental and economic opportunities?

These are the questions that drive the recommendations that NEIA is making to the *Oil and Gas Industry Recovery Task Force*.

NEIA's Approach

NEIA believes that Newfoundland and Labrador's offshore oil and gas industry can act as the centrepiece of its clean growth strategy; the continuous pursuit of environmental sustainability within it can enable the innovation, investment attraction, and growth that can make the province a world leader in the energy transition.

NEIA has been vocal about these ideas in public arenas (e.g. the media) and in its advocacy efforts. NEIA's forthcoming clean technology and environmental services sector growth strategy for Newfoundland and Labrador was informed by substantial research and jurisdictional scanning that reinforced these positions. In June of 2020, these concepts featured prominently in its submission to the provincial and federal governments: *'Economic Recovery – Towards a Clean Growth Future for*

Newfoundland and Labrador' (<https://neia.org/neia-submits-economic-recovery-recommendations-for-newfoundland-and-labrador/>).

This has been a long-held understanding within our organization, but in 2019 NEIA began to lay the groundwork to accelerate discussion within the province on the subject of cleantech within oil and gas. A joint committee was struck between NEIA and Noia which soon also saw representation from the Canadian Association of Petroleum Producers (CAPP) and the Newfoundland and Labrador Oil Corporation (OilCo). Noia's partnership and support in the activities that followed was crucial to their success.

In February 2019, with the financial support of the Government of Newfoundland and Labrador (GovNL) and Global Affairs Canada (GAC), NEIA led an international business development mission to Norway. The intent of the mission was to help businesses from Newfoundland and Labrador explore how clean technology can be deployed in offshore oil and gas international supply chains. The mission featured (1) site tours of relevant assets, facilities, & institutions; and (2) a program of business-to-business meetings for participants in Oslo, Trondheim, and Stavanger. Much was learned about the role that oil and gas could play in the energy transition – from powering offshore assets with clean electricity, to the research and development of process efficiencies, to the importance of environmental characterization and monitoring technologies, to electrified port infrastructure, to the opportunity the production of hydrogen presented.

This work was followed up with the creation of an international business development program, supported by GovNL and the Atlantic Canada Opportunities Agency (ACOA), that helps individual firms continue similar explorations in one of three ways: (1) it helps firms in oceans industries position their products or services in European supply chains from the perspective of cleantech; (2) it helps firms identify opportunities for partnership with European firms that have unique clean technologies in oceans industries; and (3) it helps firms in oceans industries explore opportunities to diversify into the offshore wind industry through Europe.

In January of 2020 NEIA and Noia hosted a seminar '*Sustainability and the Offshore: International Trends in Oil and Gas*' which was supported by CAPP. The event introduced and/or reinforced two ideas. First, that the oil and gas industry has a crucial role to play in reducing global greenhouse gas emissions – and those jurisdictions that excel in this regard will gain a competitive advantage. Second, that Newfoundland and Labrador can learn from other jurisdictions (such as the United Kingdom and Norway) as it works towards balancing the oil and gas industry and environment and ultimately net zero.

These interventions were impactful, but NEIA recognized that further work had to be done on a more aggressive and continuous basis if a true shift for the industry was to be instigated.

Stimulating Cleantech Activity in Canada’s Offshore Oil and Gas Industry

In the Winter of 2020, through its cleantech committee, NEIA and Noia – with support from OilCo – developed plans for a project which they felt would significantly advance discussions within Newfoundland and Labrador around the importance of its oil and gas industry being viewed through the lens of clean growth.

With the financial support of GovNL and ACOA, the project engaged in research that included:

Evaluating the Technical Feasibility of the Electrification of FPSO Vessels Offshore Newfoundland and Labrador, Canada

A pre-front- engineering and design (Pre-FEED) level of analysis identifying challenges that will arise from electrifying a green field FPSO for two potential developments. The two potential greenfield “power from shore” development scenarios used are a development in the West Orphan Basin with a point of interconnection (POI) at the Soldier’s Pond Station, and a potential development in the Labrador Sea with a POI at the Muskrat Falls generating station. This research will build on our understanding of how our clean electricity assets can contribute to future offshore oil and gas industry development. This research has been completed and will be made available publicly in January of 2021.

Evaluating the Technical Feasibility of Wind Energy to Electrify Oil and Gas Production Facilities Offshore Newfoundland and Labrador, Canada

A scoping study of electrifying offshore oil and gas production facilities via the development and installation of offshore wind farms and the technical challenges this will encompass. This research includes recommendations for specific equipment and design criteria that should be implemented in four different contexts: one brownfield scenario, and three greenfield scenarios. This research will help us gain a better understanding of how offshore wind and oil and gas industries can complement one another in Newfoundland and Labrador. This research has been completed and will be made available publicly in January of 2021.

Understanding current activity and capacity in clean technology research, development, and innovation in Canada's Offshore Oil and Gas Industry

Research that will compile and thematically represent the research, development, and innovation capacity of Canada's offshore oil and gas industry as it relates to clean technology. This will include an identification of areas of strength or emerging strength in the Atlantic region (e.g. by specific subject matter and/or collective capabilities) that can be leveraged to drive clean growth and investment within the industry. This research is underway and expected to be completed in early January of 2021.

Delineating emerging environmental requirements and expectations in the offshore oil and gas supply chain

Understanding the related emerging requirements and expectations for supply chain participants will help ensure the competitiveness of firms in Atlantic Canada – or help local firms gain a competitive advantage. This is important from both the perspective of firms maintaining their market share in domestic oil and gas supply chains, and also for firms engaging internationally. This research is commencing in December 2020 and expected to be completed in early 2021.

Identifying regulatory and support ecosystem initiatives from leading jurisdictions supporting clean technology innovation in the offshore oil and gas industry

This work will help stakeholders gain an understanding of what deliberate interventions related to cleantech were made (by leading global jurisdictions) to foster innovation, attract investment, diversify the supply chain, and enhance long-term environmental performance within the industry. This will be compared to the regulatory and innovation support ecosystem in Atlantic Canada, and a series of recommendations will be made to drive and/or enable clean growth within the local industry. This research is underway and expected to be completed by early January of 2021.

This research collectively was viewed as being important for the industry in late 2019 when the project was conceived. After the effects of the oil price war and the COVID-19 pandemic, the importance of the work and the interest in the associated findings has magnified significantly. NEIA suggests that the results will provide vital insight for decision-makers – such as the *Task Force* – to consider in charting the path forward for the industry.

With this context established, NEIA is making the following recommendations to the *Task Force*.

A Strategic and Deliberate Approach to the Energy Transition

The challenges and opportunities that the energy transition provides for Newfoundland and Labrador require full-time and long-term attention.

A Gap in the Ecosystem

NEIA and Noia are proud of the work that they have been able to accomplish through their cleantech committee. The creation of this committee came about organically through the discovery of mutual interests and a willingness to partner between two organizations. But it is but one of many competing priorities for both NEIA and Noia. Ultimately, the breadth and scope of the work of the committee is nowhere near what is required for Newfoundland and Labrador and its energy transition, and beyond the capabilities of any one organization to deliver on within their existing resources.

In its work over the past years exploring the relationship between cleantech and offshore oil and gas, NEIA has observed a significant gap in the Newfoundland and Labrador innovation ecosystem. There is no single organization, entity, or group dedicated to the development and pursuit of a provincial vision for the decarbonization of industry and/or the energy transition. This is in contrast to the leading oil and gas jurisdictions – whether that be Norway, the United Kingdom, or even Alberta – which all have substantial infrastructure in place in this regard.

This has been to Newfoundland and Labrador's detriment. The province, its industries, its institutions, and its businesses have missed out on opportunities for investment attraction in a national and international fiscal environment that has been very favourable to such initiatives. The emergence of the *Emissions Reduction Fund* is notable, however this is a support that has a short time horizon.

Given the enormous economic growth and diversification potential for Newfoundland and Labrador associated with the energy transition – and the opportunity cost of the status quo – a deliberate and strategic plan must be put in place. There is no such organization that exists to take this work on, and in a time of fiscal crisis it is unreasonable to expect that the province can play this role.

An Energy Transition Project

Thus NEIA and Noia are proposing a collaboration within the energy and environmental industries to drive economic growth, diversification, investment, and awareness through the lens of sustainability and the energy transition in Newfoundland and Labrador by facilitating the development, demonstration, and adoption of clean growth strategies and technologies.

This project is a natural progression for the Noia/NEIA cleantech committee; the initiative will provide the committee with the resources it needs to ensure the province strategically participates in the energy transition and accrues maximum benefit.

The proposed *Energy Transition Project* is an initiative to maximize the economic growth and diversification potential for Newfoundland and Labrador related to the energy transition through four areas of focus:

- (1) improving environmental outcomes, present and future, within Canada's offshore oil and gas industry;
- (2) exploiting the potential of Newfoundland and Labrador's cache of clean energy resources;
- (3) maximizing opportunities related to Newfoundland and Labrador's low-emissions electricity grid; and,
- (4) exploring the potential for a hydrogen production industry in Newfoundland and Labrador.

Relative to these areas of focus, it is anticipated that *The Energy Transition Project* will engage in the following activities:

- (1) develop and execute strategies;
- (2) attract public and private investments to execute initiatives in line with established strategies that will facilitate the development, demonstration, and adoption of clean growth technologies;
- (3) proactively stimulate, guide, and/or lead clean growth projects where appropriate;
- (4) leverage national and international resources, partnerships, and organizations to enable innovation;
- (5) provide policy guidance to decision-makers and stakeholders within the focus areas, including on subjects that are cross-pollinating (e.g. greenhouse gas offset mechanisms, carbon capture and storage, etc.); and,
- (6) Foster the involvement of Newfoundland and Labrador organizations in the energy transition process.

Ultimately, the specific initiatives undertaken in the project will be heavily informed by the findings of the *Energy Transition Workstream* of the *Task Force*, and three pieces of research nearing completion:

- *Identifying regulatory and support ecosystem initiatives from leading jurisdictions supporting clean technology innovation in the offshore oil and gas industry*
- *Understanding current activity and capacity in clean technology research, development, and innovation in Canada's Offshore Oil and Gas Industry*
- *A hydrogen strategy for Newfoundland and Labrador* (commencement to be announced, completion anticipated early 2021)

Small Investment, Large Impact

Supporting the *Energy Transition Project*, to continue the work laid out by the *Task Force's* energy transition work stream, is a relatively inexpensive action that Newfoundland and Labrador can take today that can have a significant long-term impact on both the viability of its offshore oil and gas industry and the diversification of its economy at-large.

NEIA is convinced that such a construct is necessary to help Newfoundland and Labrador reach its economic growth potential, and as such will be pursuing its development aggressively. Supporting the *Energy Transition Project* is NEIA's number one recommendation to the *Task Force*.

Outlining the Industry's Pathway to Net Zero

In June of 2020, the Government of Newfoundland and Labrador committed to the pursuit of 'net zero' greenhouse gas (GHG) emissions by the year 2050. Net zero emissions refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere.

Net zero is seen as a major milestone in the energy transition, and so an energy transition that includes a thriving oil and gas industry – like that which we are working towards in Newfoundland and Labrador – will require that same industry to aggressively and continuously pursue the lowest possible GHG emissions.

Plans for industries or jurisdictions to meet net zero would typically include short, medium, and long-term actions. In the short term, proven existing technologies and processes can be applied. In the long-term, it is often the case that new technologies and processes will be required that have not yet been developed or refined. Knowing these unknowns, with an established timeline targeted, allows for focused research, development, and innovation to take place.

There is a clear trend amongst industrialized nations towards net zero commitments, with many now becoming enshrined in law. Some oil and gas majors have followed suit, developing net zero plans within their own operations.

If Newfoundland and Labrador is going to seize the economic opportunities associated with the energy transition, having a net zero plan in place for its oil and gas industry must be an immediate need.

Net Zero in Newfoundland and Labrador's Offshore

The offshore oil and gas industry in Newfoundland and Labrador has a strong record when it comes to its environmental performance. However, the primary focus of governments and industry in measuring environmental performance (until very recently) has not been on GHG emissions.

While the industry pivots to pursue net zero by 2050, this of course must change. As Newfoundland and Labrador is just beginning this journey, there is a significant amount of work that must be done to develop a strategy that satisfies the needs and priorities of a number of key stakeholders.

Developing a clear plan, or a 'pathway', to net zero by 2050 should include:

- *Strategies to reduce emissions on existing facilities*

The plan must include the initiatives that can be taken to reduce emissions for existing facilities, including the investments that will be required to implement them. The first phase of this work can present the options available to stakeholders, weighing variables such as: cost, emissions impact, and asset lifespans. The second phase of this work can be the commitment to a specific pathway based on the options presented.

- *Policies and regulations to ensure new facilities meet emissions requirements*

If new offshore development is going to occur, it must be done 'right' from the outset to ensure that it is in line with the vision for the jurisdiction to become one of the best performing (from an environmental perspective) in the world. This means that work must be done today to ensure that the appropriate policies and regulations are in place when the time comes. It is anticipated that the research underway by NEIA, Noia, and Oilco (*'Identifying regulatory and support ecosystem initiatives from leading jurisdictions supporting clean technology innovation in the offshore oil and gas industry'*) will provide specific recommendations to decision-makers on what policies and regulations should be considered. Some may view more stringent environmental requirements as being a barrier to future development, however NEIA views this as an opportunity to attract interest and investment from developers and operators that have made strong environmental commitments of their own.

- *Opportunities for negative emissions*

The offshore oil and gas industry is a source of significant GHG emissions, but it also has the potential to capture significant GHG emissions. There may be opportunities for reservoirs in Newfoundland and Labrador's offshore to be used for the storage of captured GHGs. This storage may not just have the potential to meet the needs of the industry itself, but also intake GHGs captured in other industries and even from other jurisdictions. Negative emissions opportunities will help dull or negate the impact of the continued growth of the industry.

In addition to identifying the actions that must take place to meet net zero by 2050, the pathway must speak to the technologies and process that will be required but that have not yet been developed or refined. This will give stakeholders a clear indication of where research, development, and innovation should be focused.

The pathway must also speak to the supports that will be required to implement the initiatives laid out. How will the costs of emissions reductions be met? What will be required from industry and from governments?

Offsets Framework

An important consideration related to the above is understanding how a carbon offset framework should and/or could take shape in Newfoundland and Labrador. Current provincial regulation mandates

emissions performance improvements in the offshore, but it was not designed to demand, incentivize, or enable net zero.

If the industry at large pursues net zero, the existing credit scheme in place will not be sufficient. There is the possibility that aggregate investments are made that exceed the performance requirements and for which an adequate number of credits are not available.

Additionally, stakeholders may take voluntary steps which do not fall under provincial or federal regulation. These stakeholders may be national or multinational in their activities, and choose to offset emissions that they are responsible for in one place with offsetting activities that they can easily access in another place. In this case, a situation where emissions-generating activities in Newfoundland and Labrador are offset in another part of the world is a lost opportunity for investment in this province.

It is understood that the discussions are only beginning nationally about what a national offset framework could look like. This is a process that may take considerable time and has a high degree of unpredictability. Yet it is Newfoundland and Labrador's interests to envision an offsetting framework that accommodates the net zero aspirations of the private sector and maximizes investment attraction for offsetting projects within the province.

The aforementioned *Energy Transition Project* could be tasked with spearheading the development of a net zero strategy for the oil and gas industry.

Making the Most of Our Clean Energy Grid

Newfoundland and Labrador will soon have close to 100% clean electricity on its grid. Though the Muskrat Falls project has been a source of negativity for the province in recent years, the energy mix that will result from its development should be viewed as an enormous asset.

Electrification

The electrification of buildings, transportation, industrial processes, etc. has four key positive impacts in the Newfoundland and Labrador context.

First, as almost all of our electricity is clean, it displaces fossil fuels and reduces GHG emissions. Second, in many cases operating costs are lower when using electrified systems and processes. Third, it increases overall demand for electricity within the province which will contribute to rate mitigation objectives. Fourth, and perhaps most importantly in the *Task Force's* view, the work associated with electrification creates jobs.

Given that electrification meets environmental and economic objectives simultaneously, the *Task Force* could look at where it can be applied such that will also support the oil and gas industry.

Electrification of Ports

One such example is the electrification of our port infrastructure. Beyond the positives listed above, the electrification of port infrastructure enables the industry supply chains to meet their own GHG reduction objectives.

Whether it is drilling rigs, supply and freight ships, fishing vessels, or even cruise ships – there is a shift towards electric and hybrid propulsion systems. Investments are being made by owners of vessels and the industries that they serve in order to meet emissions targets. Ports that cannot help them meet these objectives will become less competitive over time.

Port electrification can be a significant investment in infrastructure that will also mean jobs for engineers and trades workers. An energy transition strategy should aim to electrify as many ports as is reasonable in the province, but for the purposes of the work of the *Task Force* one could be selected as a pilot project.

Investment Attraction

A hydro-powered clean electricity grid is an attractive asset to operators that have aggressive GHG standards in their future project, as it represents a power-from-shore opportunity that can keep both their emissions and operating costs low.

The *Task Force* may consider what can be done to make this prospect even more attractive. What work can be done now to de-risk and lower costs of future projects that acquire power-from-shore? Further

research is required to identify least-cost options for transmission, and perhaps there are even opportunities for infrastructure improvements to prepare for such a scenario. Efforts in this regard will create work and build capacity within the province in an area of importance.

Continued Investment into Clean Growth Research, Development, and Innovation

The federal government's investment into the *Emissions Reduction Fund* totalling \$75M will usher in a new wave of environmentally-focused research, development, innovation, and technology adoption – the likes of which not seen before in Newfoundland and Labrador.

It is important to remember, however, that the *Emissions Reduction Fund* opportunities are only available for a very limited time. Within a matter of months, the resources allocated to the repayable and non-repayable funds will expire. Thus, the *Task Force* should consider how to enable sustained investment into clean growth research, development, and innovation.

Complementing Emissions Reduction Fund Projects

Emissions reduction projects are often capital-intensive. There are solutions readily available that would have a significant impact on the offshore industry's emissions, however they are at a scale not appropriate for the *Emissions Reduction Fund* (e.g. in the tens of millions of dollars). The *Task Force* may consider how financing packages can be put together from multiple sources to initiate projects of great impact. Additionally, the *Task Force* may consider the work that is chosen to be undertaken through the *Emissions Reduction Fund*, and complement them by providing additional resources to increase job creation and emissions reduction opportunities.

Seeding a Successor to the Emissions Reduction Fund

Though the *Emissions Reduction Fund* will expire, the need for investment into cleantech research, development, innovation, and adoption within the offshore oil and gas industry will remain. Consideration must be given to what supports will be provided, and by whom. Two pieces of research will be completed by January 2021 that will provide substantial information from which the *Task Force* can draw

upon in this regard: *'Understanding current activity and capacity in clean technology research, development, and innovation in Canada's Offshore Oil and Gas Industry'* and *'Identifying regulatory and support ecosystem initiatives from leading jurisdictions supporting clean technology innovation in the offshore oil and gas industry'*. Additionally, developing a pathway to net zero (which NEIA suggests should be a top priority for the industry) will provide additional valuable insight. The aforementioned *Energy Transition Project* can be tasked with the structuring of, attracting of investment for, and delivery of these future resources.

Specific Research Needs

There are clear research needs around the quantification of Newfoundland and Labrador's clean energy resources. From waterpower to wind, the province has tremendous clean energy development potential. In areas such as hydro this potential has been studied and is known. In other areas, such as wind energy, a patchwork of information exists between public and private research. The potential in yet other areas, such as geothermal, may be entirely unknown. It is important for the province, from an investment attraction and policy intervention perspective, to have an explicit understanding of the clean energy resources that are available to be harnessed to enable and support the energy transition.

Additionally, work completed through the NEIA/Noia collaboration has uncovered a number of areas where further research could be undertaken to advance our understanding of the cleantech opportunities within offshore oil and gas. The following list is not a presentation of priorities; it is simply an indication of the need for continued investment into clean growth research, development, and innovation.

Stemming from the research on the electrification of future FPSOs, the following avenues of further investigation could be pursued:

- A more detailed assessment to determine availability of power from shore based upon details of connection point configuration and results of refined cable routing assessments.
- Refine cable routing work including:
 - Seafloor troughing and cable burial detail study based upon additional survey data
 - Investigation of Pack Ice risks associated with Labrador routing
 - Cable interaction study based on chosen routes
 - Investigate potential shore crossing locations and methodologies

- Review grid connection details at Muskrat Falls / Soldiers Pond, and investigate potential point of interconnection to grid for Trinity Bay route
- Review installation approach and timeline for power from shore associated with different assumptions regarding offshore development timeline – for example how does configuration and installation approach change if twin FPSOs are installed within 1-2 years vs 5-10 years apart.
- Review FPSO disconnection / reconnection approach and establish functional requirements for turret or riser / topsides connection equipment.

Stemming from the research on the feasibility of offshore wind developments to electrify offshore oil and gas facilities, the following avenues of further investigation could be pursued:

- Floater Concepts - In order to develop an economical ice resistant and disconnectable (if required) floating wind turbine foundation specific to the Newfoundland and Labrador offshore, additional research, engineering, and proof of concept work would need to be carried out.
- Site Specific Alternatives Screening – Further work to determine best suited floating structures specific to offshore NL could be carried out. Not only technically best options but those most beneficial to NL supply chain. This would include looking at tradeoffs between shallower water depths and longer cable lengths (to the extent feasible).
- Detailed Technology Development Assessment – Based on potential options for offshore wind in NL, determine what detailed work would need to be done to move an offshore wind concept technically forward. Concept selection, compilation of environmental data, model testing, etc.
- Cold Region Implications - An assessment of the risk to wind facilities and cables due to the presence of ice or 3rd party activity is beyond the scope of this study. If further work is carried out to more fully evaluate the feasibility of wind energy to electrify oil and gas production facilities, then this topic warrants further study. The need for a de-icing system on wind turbine blades for the local offshore environment also needs to be investigated.
- Floating Wind Turbine Generator Limitations – Additional study is required to determine the maximum size vs. cost benefits of larger floating wind turbines (i.e. 14MW vs. 8MW).

Additionally, there are identified research needs around carbon capture and storage, carbon sequestration opportunities, the applicability of combined cycle combustion technologies, and so on. There must be a permanent mechanism through which such strategic research can take place.

Outsourcing the Delivery of Programming

Given the amount of time that has already passed since the onset of the industry's downturn, NEIA's members have expressed that investment and economic activity in the oil and gas industry must happen as soon as possible. There are concerns that a new series of programs – stemming from the recommendations being made by the *Task Force* – will take considerable time to be developed, implemented, and delivered by government. Thus decision-makers may consider the delivery of programming through third-parties, such as is the case with the recently launched federal *Emissions Reduction Fund Offshore R&D Program* via Petroleum Resources Newfoundland and Labrador (PRNL). There are circumstances where investments can be accelerated through partnerships – a practice that has become commonplace across federal departments.

Centres of Excellence

Establishing centres of excellence helps provide a clear indication of what an industry's or jurisdiction's priorities are. This is important from a number of different perspectives. First, by virtue of being a priority it builds capacity within a community, develops (or enhances) a core competency, and increases the odds of tangible outcomes. Second, it enables better investment attraction prospects as it is easier to identify partners and communicate outcomes. Third, it opens the door to targeted international partnerships with other like-minded centres. Fourth, it can help guide talent development and facilitate talent attraction. The *Task Force* should consider the establishment of one or more Centres of Excellence for Newfoundland and Labrador's offshore oil and gas industry that supports its role in the energy transition. Two pieces of research will be completed by January 2021 that will provide substantial information from which the *Task Force* can draw upon to select priorities: '*Understanding current activity and capacity in clean technology research, development, and innovation in Canada's Offshore Oil and Gas Industry*' and '*Identifying regulatory and support ecosystem initiatives from leading jurisdictions supporting clean technology innovation in the offshore oil and gas industry*'.

Innovation Centre

Strategies developed in Newfoundland and Labrador have repeatedly recommended the development of an innovation centre or hub for the province. An innovation centre is a place where ideas can be shared among actors, collaborations can be explored, and lessons can be learned at an accelerated pace; a

space that supports collisions between businesses and the pursuit of accelerated growth. They are specific places that have offices, collaboration spaces, research and technical facilities, and various support services clustered in physical proximity. Unfortunately, Newfoundland and Labrador is one of the just two provinces in Canada that does not feature such a space.

NEIA has led or has been part of efforts over the last three years to establish an innovation centre. We are hopeful that tangible progress in this regard will be achieved in the months ahead. An innovation centre that is focused on technology, oceans, and energy (and the interaction thereof) will enable the research, development, and commercialization of new products and services – and investment.

Becoming a Player in the Emerging Hydrogen Economy

Recent international dialogues on zero-emissions fuels have accelerated and intensified interest in hydrogen production. Hydrogen can often be used in existing fossil-fuels infrastructure, is well-suited for heavy transportation (e.g. freight trucks, trains, ships, etc.), and can also be a source of electricity.

With its abundance of clean energy resources and unused gas inventories, Newfoundland and Labrador may be well-positioned to become a global supplier of hydrogen in the same manner as it currently is of oil. This represents a substantial opportunity for the diversification of the province's economy, and could be an important contribution to the international energy transition.

There are questions that must be answered about how Newfoundland and Labrador can participate in this emerging hydrogen economy, specifically:

- What will global demand for hydrogen look like?
- What role can our existing oil and gas industry (and infrastructure) play in the hydrogen economy?
- What role can our hydropower resources play in hydrogen production?
- Is there an opportunity to use our excess clean electricity as an investment attraction tool?
- Does hydrogen production open the door for more renewable energy development?
- What infrastructure do we need in the short term to enable pursuit of this opportunity?

By addressing these questions, Newfoundland and Labrador will be better positioned to pursue the hydrogen opportunity.

Natural Resources Canada launched Canada's hydrogen strategy on December 16. In January NEIA will release its own preliminary report on the specific opportunities it sees for the province in hydrogen that it believes should be explored further. This will be followed by the development of a hydrogen strategy for Newfoundland and Labrador which will be completed in 2021.

With more information in-hand soon, the aforementioned *Energy Transition Project* could be tasked with the continued pursuit of hydrogen opportunities for Newfoundland and Labrador.

Talent Retention and Jobs

There is immediate concern over the future of the oil and gas workers that have been displaced as a result of the pandemic and the oil price war that preceded it. These skilled professionals have contributed a great deal to the province's productivity and capacity to innovate. With no easy opportunities for transition, there is worry that many of these displaced workers will choose to leave the province for employment opportunities elsewhere. We must do whatever is in our power to avoid significant outmigration, as this would have devastating impacts for Newfoundland and Labrador's medium and long-term prospects.

Environmental Characterization and Monitoring Campaign

An area of particular strength for Newfoundland and Labrador's oceans industries is in and around the sensing, characterization, and monitoring of the environment. The province has an unusually strong cluster of private sector and institutional capacity and capabilities relating to understanding how our ocean industries are impacting the natural environment, and how the natural environment impacts our oceans industries. From wave prediction, to iceberg modeling, to seabird identification, to subsea imaging – through the use of radar, lasers, sonar, cameras, acoustic technologies, DNA, and more – Newfoundland and Labrador has organically become a centre of excellence in this field.

There may be an opportunity to create work through particular parts of the supply chain, while simultaneously supporting and build upon this cluster of expertise. A campaign of related projects could be designed to demonstrate and showcase the region's capabilities in environmental characterization and monitoring, activating the businesses and institutions in the region with related products and services. With common objectives, the campaign could foster a sense of community around the cluster, support

cooperation, incite collaboration, and perhaps instigate further innovation in the field. The deployment of all of these technologies and processes would require other aspects of the supply chain to be involved, e.g. transportation, logistics, etc. and could be complemented by professional development / internship / short-term contract opportunities for displaced workers.

Activities around environmental characterization and monitoring can directly support the offshore oil and gas industry, yet the technologies deployed and processes implemented are typically highly transferrable to other oceans industries. Thus an investment in this cluster of private sector and institutional expertise supports the industry as-is and economic diversification at the same time.

Wage Subsidies and Startup Grants

There are companies, many technology-based, that are surviving the economic downturn and are positioned to continue to find success and pursue innovation in spite of it. These companies would benefit from and may have the capacity to employ displaced oil and gas workers to join their ranks, and a wage subsidy could give them the incentive to do so.

There are very few programs available to businesses to assist in the hiring of new employees that are not exclusive to either new graduates or youth (e.g. under 31 years of age) and would support the hiring of highly qualified professionals. It is possible that existing programming (e.g. JobsInNL, MITACS, etc.) can be stitched together to meet the need, but new programming may be required.

Another option for a displaced oil and gas worker could be the creation of a new business. Information sessions promoting this idea held by the Oceans Startup Project (in partnership with a number of organizations including NEIA) attracted large audiences, suggesting that there may be a significant opportunity. For many, starting a new business is a risky proposition while in the middle of their careers. A grant to support their efforts for a limited time may help usher in a new wave of startup enterprises in Newfoundland and Labrador.

Wage subsidies and/or startup grants, even if temporary, can act as an important bridge for a displaced oil and gas worker that will keep them in Newfoundland and Labrador. In the best case scenario they will be kept on in their place of employment after the subsidy expires or their startup business finds enough traction to continue on. Otherwise, the program will give individuals the breathing room to find new permanent employment in the province when the economy recovers.

In either case, there needs to be clear direction for those that have been displaced on what their options are. These individuals must feel valued during this challenging time, and at the very least should easily be able to find guidance to the question: “I am a displaced oil and gas worker, what are my options?”

Mission-Based Innovation Initiatives

The idea of explicitly identifying challenges and providing resources for interested actors to attempt to develop solutions – or ‘mission-based innovation’ – has become a best practice to incite innovation in a targeted area. Hence the growing prevalence of ‘hackathons’, technology challenges, and business competitions. This concept could be applied in Newfoundland and Labrador to both incite innovation and assist in efforts to support workers displaced in the oil and gas industry.

An priority could be established as being the ‘innovation challenge’ – the challenge selected being an area that is a barrier to success for the province’s offshore oil and gas industry. Examples could include: the reduction of costs associated with offshore development in the Flemish Pass; the increased digitalization of offshore operations; reduction of costs associated with power-from-shore; etc.

To address the selected challenge(s), displaced oil and gas workers could be employed, a scheme that could take shape in a number of different ways. One option is that the displaced worker is hired directly on a contract. Another could be that they are hired by an existing company through a wage subsidy, and seconded to the project at hand. In these cases, collaborative teams will be formed according to best practices and methodologies in building innovation teams and managing innovation-based projects. A final option could be that the displaced worker is provided a grant to start their own business to pursue a specific idea that they have that can contribute to addressing the overall challenge.

This is a new idea that amounts to an experiment in innovation, but the risk is low. In the worst-case scenario displaced workers are provided a bridge to their next job, and a portion of the province’s workforce is injected with new knowledge and capacity to address some of the biggest barriers facing the oil and gas industry. In the best-case scenario, real solutions could be identified, developed, and pursued that support the growth of the industry. This initiative could be administered by the aforementioned *Energy Transition Project*, and could be the starting point for the creation of a Centre of Excellence.

Conclusion

NEIA appreciates the opportunity to provide the *Task Force* with its ideas and recommendations.

As governments seek to stimulate economic recovery, there is a belief (including within Canada) that investments should meet two tests: first that they contribute to economic activity and jobs right away; and second that they will provide longer-term benefits for the economy, the environment, and society.

As the *Task Force* considers projects for investment, it would be beneficial to view them through the lens of 'building back better' – for holistic reasons of course, but also because aligning with these values will make it easier to attract additional investment and partners.

It is NEIA's view that the best projects for Newfoundland and Labrador would be those that not only support the oil and gas industry, but also contribute to the province's energy transition in the process. We have provided some actionable recommendations in that regard, and have also contributed some ideas that are admittedly more 'experimental'; in times of renewal, we believe there is value in trying new things and disrupting the status quo.

NEIA is available at your convenience to elaborate on any of the ideas and/or recommendations that we have shared, and stand ready to assist in any way that we can with the recovery of the province's oil and gas industry.