

FORESIGHT ARCTIC NAL RESOURCES ARO CHALLENGE FAQ

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1 THE CHALLENGE COMPETITION

1.1 WHAT IS THE APPLICATION DEADLINE?

Applications will be received by Foresight up to 11:59 PM (Pacific Time), August 30, 2017.

1.2 WHO IS ELIGIBLE TO PARTICIPATE IN THE CHALLENGE?

Any organization is eligible to participate in the program so long as there are demonstrable benefits to developing and commercializing the innovation in Western Canada.

Innovators applying to participate do not require a current working relationship with NAL Resources or any company in the energy sector.

1.3 WHAT TECHNOLOGY READINESS LEVELS ARE RELEVANT?

Levels 4 through 7 are of interest in this Challenge. Technology Readiness Levels (TRLs) are a measure to evaluate the maturity of an evolving Innovation. This program references the Build in Canada Innovation Program definition of TRL: <https://buyandsell.gc.ca/initiatives-and-programs/build-in-canada-innovation-program-bcip/program-specifics/technology-readiness-levels>.

1.4 WHAT IS THE EVALUATION PROCESS?

Projects will be evaluated through four stage gates:

- Stage Gate 1: Completeness.**
Applications received by Foresight will be reviewed for completeness and their ability to provide relevant information to a technical reviewer.
- Stage Gate 2: Technical Review.**
Based on a review of submitted information, technical reviewers will assess the fit of the proposed technical solution against their ability to meet the criteria identified in the Challenge Application Package. Selected Applicants will be invited to Stage 3.

- **Stage Gate 3: Presentations.**

Presentations to the selection team will be invited in MONTH, 2016. These presentations will be via videoconference or in person in the Foresight Offices. Stage 3 participants will receive more details on the specific elements their presentations need to address based on the feedback of reviewers.

- **Stage Gate 4: Shortlist Due Diligence.**

Shortlisted applicants will be provided with supplementary questions and information requests to assist with the final selection committee decision. The focus of this stage of evaluation will be on the business and the project requirements.

A decision of the Selection Committee is anticipated in October 2017.

1.5 WILL THERE BE FEEDBACK ON SUBMISSIONS?

Participants interested in receiving feedback on their submission will have an opportunity for a debrief meeting with Foresight at the conclusion of the selection process.

2 PARTICIPATION

2.1 WHAT SUPPORT DO INNOVATORS RECEIVE FOR PARTICIPATION?

The total funding available for projects supported through each ARCTIC Challenge Sprint is up to \$610,000 Canadian Dollars (CAD), subject to the discretion of Foresight Cleantech Accelerator Centre/ARCTIC and its industry partner(s).

The range of funding available per Challenge Sprint is \$87,000 to \$305,000, with a requirement for innovator participants to commit a minimum of \$50,000 per project as an in-kind contribution. The per project allocation can vary based on the final number of projects in the Challenge Sprint.

The maximum contribution includes provision for lab space and overhead costs, marketing, a lab manager, equipment, materials and accelerator mentoring.

The winner(s) of the Sprint will be invited to undertake the next step in the development of the innovation/field trial (or equivalent) with the industry partners. This phase will have a maximum contribution from ARCTIC and industry partners at \$175,000, with a requirement for proponents to commit \$100,000 as an in kind contribution. The maximum contribution from ARCTIC and industry partners to this Phase includes support for a test site, test support, equipment and materials.

2.2 HOW WILL INTELLECTUAL PROPERTY BE TREATED?

Background Intellectual property of an applicant will remain the property of the applicant. Phase 3 does not anticipate the development of any new intellectual property by applicants. Applicants participation in Phase 4 will be governed by an agreement with the industry partners that will address intellectual property development in the Phase 4 Field Trial.

2.3 WHAT IS THE OVERALL ARCTIC NAL RESOURCES ARO CHALLENGE PROGRAM TIMELINE?

The ARCTIC Program is designed to operate in 4 Phases of critical activity over an 18-month timeframe to produce relevant field trials that will validate solutions to resource sector defined challenges.

PHASE 1: CHALLENGE DEFINITION (3 MONTHS) (COMPLETED)

In conjunction with resource sector partners and ARCTIC participants, Foresight CAC defines a resource sector identified challenge in order to focus innovators on the most promising market opportunities. A broad community of innovators with the potential to provide solutions to the challenge is identified in this Phase.

PHASE 2: INNOVATOR SELECTION (3 MONTHS) (UNDERWAY)

Foresight CAC and the ARCTIC participants implement the Launch Plan for each Challenge and invite potential solution providers to respond. A panel made up of industry, investors, and selected experts will select 2 to 5 solutions from the pool of innovators that responded to the Challenge for a six to nine month development sprint.

PHASE 3: CHALLENGE SPRINT (3 MONTHS) (2017Q4)

This Challenge Sprint will be sponsored by resource sector industry partners and will leverage the Foresight Accelerator and its mentorship program to further advance the development of proposed solutions through:

- testing in a laboratory or other environment.
- the use of lab space, business and technical expertise.
- moving participating innovators to a point where they can seek first funding.

One technology/solution will be selected for field trial and an industry showcase event delivered with a marketing partner.

PHASE 4: FIELD TRIAL PREPARATION (3-6 MONTHS) (2018)

Following the Challenge Sprint, one solution could be selected for field-testing, or for the next appropriate level of development. The field trial phase will focus on getting the technology field trial-ready, including equipment specification requirements.

2.4 WHAT ROLE WILL PAST REFERENCES PLAY IN THE EVALUATION PROCESS?

We will use all information available in evaluations of proposals. If references are available, they will be part of the proposal evaluation process.

2.5 ARE PARTNERSHIPS BETWEEN POTENTIAL SOLUTION PROVIDERS ACTIVELY ENCOURAGED?

Yes, we are looking for a complete solution that meets the objectives of the proposal.

2.6 WHAT ARE ELIGIBLE COSTS RELATED TO FIELD TRIALS?

The evaluation process will look at what is required during the sprint phase for each solution provider or team to prove how well their proposed technology/solution tackles the challenge. Any relevant costs will be supported in the sprint phase.

2.7 CAN YOU CLARIFY THE FINANCIAL INFORMATION THAT WOULD NEED TO BE PROVIDED TO DETERMINE THE AMOUNT OF FINANCING THAT IS PROVIDED?

The amount of financing information that is included in the proposal does not determine the amount of financing that is received. The amount that each company receives will be made as close to equal as it can be, depending on the number of companies that participate in the sprint. The information in the proposal is for evaluating the financial viability. Companies must have the cash flow needed to see them through the Challenge.

3 TECHNICAL QUESTIONS

3.1 WHAT CONSIDERATION HAS BEEN GIVEN TO THE POSSIBLE IMPACTS OF WEATHER CONDITIONS FOR THE SPRINT OR FIELD TRIAL PHASES?

We anticipate the Challenge Sprint will be possible to complete without weather interference. Depending on the proposed solutions from selected innovators, scheduling the field trial may require weather considerations that will be worked out with the successful participants.

3.2 ARE THE TEST WELLS ACTUAL PRODUCTION WELLS?

Yes.

3.3 WHAT PERCENTAGE OF YOUR WELLS HAVE GAS MIGRATION PROBLEMS THAT ARE HARD TO ISOLATE?

Twenty (20) are presently being worked on as part of the current abandonment program.

3.4 DO GAS MIGRATIONS SIGNIFICANTLY INCREASE YOUR COTS OVER THE AVERAGE WELL ABANDONMENT?

Yes absolutely, but the amount is dependent upon the site and very hard to estimate.

3.5 HOW IMPORTANT IS IT FOR NAL TO IMAGE THE INSIDE OF WELLS BEFORE RECLAIMING THEM?

This is not currently done, but may be interesting to learn more about the benefits.

3.6 IS ELECTRIC GRID SERVICE TYPICALLY AVAILABLE AT THE WELL SITES?

Yes.

3.7 ARE THERE PARTICULAR SITES ON WHICH YOU ARE HOPING TO TEST THIS? IF SO, WOULD INFORMATION ON THOSE SITES BE AVAILABLE?

There are sites in mind. For the purposes of evaluating innovators, we are using the Alberta Energy Regulator's standards to define site characteristics. Please see the referenced documents in the Challenge specification for more information.

3.8 WHAT IS THE TYPICAL COMPLETION IN YOUR ABANDONMENT PROGRAM THIS YEAR (TUBING/CASING SIZE, NUMBER OF ZONES)?

The abandonment program is focusing on Edmonton sands shallow gas wells, with 1-3 zones and 2 3/8" tubing.

4 THE CHALLENGE SPONSORS AND THE ARCTIC PROGRAM

4.1 WHAT IS ARCTIC?

The Advanced Resource Clean Technology Innovation Centre (ARCTIC) was established by Foresight in early 2015 to fulfill the need for a demand-pull approach to innovation targeting both specific environmental, operational and environmental challenges and potential sources of innovation from across Canada and marrying them to drive performance improvements and accelerate the commercialization of new technologies.

ARCTIC models a new approach for industry/innovator collaboration.

The ARCTIC program is funded with support from BC Innovation Council (BCIC), Western Economic Diversification (WD) and Canada's National Research Council's Industrial Research Assistance Program (NRC/IRAP). In this Challenge, the ARCTIC program is working with NAL Resources to reduce the costs associated with asset retirement obligations (ARO) and associated reclamation activities.

4.2 WHERE CAN I LEARN MORE ABOUT ARCTIC?

The website for ARCTIC is <http://arctic.foresightcac.com> where more information about the program and Open Challenges is available.

4.3 WHO IS THE FORESIGHT CLEANTECH ACCELERATOR CENTRE?

Foresight Cleantech Accelerator Centre is Western Canada's first clean technology accelerator, launched in March 2013 as a not-for-profit corporation to foster the growth of small and medium size businesses (SMEs) in the development and commercialization of viable technology solutions to create and produce energy more efficiently and responsibly.

Funded by the **BC Innovation Council (BCIC)** and **Canada's National Research Council's Industrial Research Assistance Program (IRAP)**, Foresight is dedicated to providing everything it takes to see the clients succeed. They believe start-up success requires an ecosystem of mentorship, like-minded entrepreneurs, and industry specific guidance.

Foresight helps clients discover sustainable and profitable business models through parallel processes of Customer Development and Agile Product Development. During this process they bring clean technology entrepreneurs together with corporate partners, universities, government agencies and local service providers.

Foresight is located in Surrey, British Columbia, Canada.

4.4 WHO IS NAL RESOURCES?

NAL Resources Management Limited (NAL) produces approximately 27,000 boe per day of oil, natural gas and liquids from its core areas of southeastern and southwestern Saskatchewan and central and northwestern Alberta. The company is based in Calgary, Canada. NAL operates as a subsidiary of Manulife Financial Corporation. NAL remains focused on its strategy of growing through the drill bit, and through corporate and property acquisitions, while also managing oil and gas assets on behalf of investors. With approximately 300 dedicated team members working in Western Canada, NAL brings expertise in all areas of finding, development and the management of oil and gas assets. NAL Resources is seeking new innovations and potential partnerships to address its Asset Retirement Obligation (ARO) priorities. As part of this effort, NAL is partnering with Alberta Innovates and its ASBIRI Program and Foresight Cleantech Accelerator Centre and its ARCTIC Program to launch this Challenge Request for Responses.