



THE SKY'S THE LIMIT CHALLENGE

Seeking a Canadian Breakthrough in Green Aviation Fuels



Applicant's Guide



Green Aviation
Research & Development
Network

Canada 

INTRODUCTION

Accelerating the affordability and availability of sustainable aviation fuel is an important part of Canada and the world's transition to a low-carbon economy. The aviation industry is growing, with air traffic growing by 5% per year. While other modes of transportation can turn to alternative energy sources (e.g., electric vehicles), aircraft will continue to need liquid fuels for the near future. Existing technologies and aircraft efficiency improvements will not be enough for the aviation industry to achieve its ambitious goals of: carbon neutral growth by 2020 and to cut its total CO₂ emissions to half of 2005 levels by 2050. Achieving greater greenhouse gas (GHG) emission reductions in the aviation sector requires the widespread availability and use of sustainable aviation fuel (sustainable aviation fuel), which is currently more expensive than conventional jet fuel.

CHALLENGE OBJECTIVES

The objectives of The Sky's the Limit Challenge (the Challenge) are:

1. Accelerate innovation to bring down the cost of sustainable aviation fuel and reduce GHG emissions from air transportation.
2. Build on Canadian strengths (e.g., forestry, agriculture, fuel production, innovation) to develop a world-class supply chain for the production of sustainable aviation fuel.
3. Support Canadian leadership in clean technology innovation and the growing global market for green fuels.
4. Promote the use of Canadian-made sustainable aviation fuel in domestic commercial flights in Canada.

CHALLENGE OVERVIEW

Stream 1: Green Aviation Fuels Innovation Competition

An open call for proposals where up to four finalists will receive up to \$2 million each over 18 months to support their efforts to develop the best way to scale up sustainable aviation fuel in Canada, leveraging the experience gained from the first production. Applicants are encouraged to develop a consortium across the supply chain to support their efforts.

At the end, a \$5-million prize will be awarded to the finalist with the most economically and environmentally sustainable approach for commercial-scale sustainable aviation fuel production in Canada.

Stream 2: Cross-Canada Flight Competition

A prize of \$1 million will be awarded to the first sustainable aviation fuel¹ producer to provide 2500 litres of Canadian-produced sustainable aviation fuel to be used as part of a cross-Canada commercial flight with a minimum blend of 10% sustainable aviation fuel.

TIMELINE

- The Sky's the Limit Challenge launch: August 17, 2018

Stream 1: Green Aviation Fuels Innovation Competition

- Call for proposals opens: August 17, 2018
- Call for proposals deadline: February 1, 2019
- Four finalists announced: By May 31, 2019
- Final prize submission deadline: November 1, 2020
- Final prize winner announced: By March 31, 2021

¹ For the Cross-Canada Flight Competition, the sustainable aviation fuel must meet all applicable aviation fuel standards (Canada General Standards Board (CGSB) and American Society for Testing and Materials (ASTM)).

Stream 2: Cross-Canada Flight Competition

- Competition opens: March 1, 2019
- Competition closes: January 1, 2021
- Prize winner announcement: By March 31, 2021

Specific dates will be communicated through the Challenge website at <http://impact.canada.ca>.

GENERAL TERMS AND CONDITIONS

Applicants to the Challenge agree to the following when submitting their application:

- Applicants agree to comply with all applicable laws.
- Applicants must be able to demonstrate ownership of or permission to use any intellectual property (IP) used in the Challenge.
- The Minister of Natural Resources Canada has the sole discretion to cancel this Challenge or any part thereof at any time.

PRIVACY

The use and distribution of data collected under this program will comply with both the *Privacy Act* and the *Access to Information Act*.

Pursuant to the *Privacy Act*, the program will keep confidential any personal information it may collect and will not disclose or transmit said information without the applicant's written consent.

Pursuant to the *Access to Information Act*, the program will protect from disclosure any information of a financial, commercial, scientific or technical nature it collects from applicants so long as the applicants treat said information as confidential in their own establishments. If the applicant chooses to send the proposal or other confidential information to Natural Resources Canada by e-mail, Natural Resources Canada will respond to the proposal by e-mail. Similarly, if the applicant's correspondence is through regular mail, Natural Resources Canada's response will be in like manner. However, in all cases, Natural Resources Canada will use e-mail correspondence to the applicants for all non-confidential matters.

Applicants to the Challenge have the option of allowing Natural Resources Canada to share submitted information for the purposes of the Challenge with other organizations who provide funding and support for innovation, such as other Government of Canada departments and initiatives (e.g., the Government of Canada Clean Growth Hub); provincial, territorial or municipal governments; and not-for-profit organizations (e.g., Sustainable Development Technology Canada).

See Annex B for the letter of consent, which must be completed and submitted in order for information to be shared.

STREAM 1: GREEN AVIATION FUELS INNOVATION COMPETITION

The Green Aviation Fuels Innovation Competition will support a maximum of four projects with up to \$2 million each to develop the most economically and environmentally sustainable approach for commercial-scale sustainable aviation fuel production in Canada. Once selected, participants will have 18 months to deliver a small sample of sustainable aviation fuel for testing along with a scale-up plan to be considered for the \$5 million prize.

1. Eligibility

Eligible participants may include the following:

- Legal entities duly incorporated and validly existing in Canada, including:
 - for-profit and not-for-profit organizations such as companies, industry associations and research associations;
 - Indigenous organizations and groups; and
 - Canadian post-secondary institutions.

Only the selected finalists' projects will be able to compete for the prize of \$ 5 million dollars.

Note: Non-Canadian individuals and entities may be part of a partnership or consortium submitting a proposal as long as the project lead meets the above criteria and is associated with a duly incorporated or registered legal entity in Canada.

ROUND 1: FINALISTS

Funding will support up to four applicants (finalists) with contribution agreements of up to \$2 million to compete for the grand prize. Funded applicants will be required to establish and demonstrate supply chain linkages, prove technology by producing a testable quantity of sustainable aviation fuel, provide credible cost and GHG projections based on initial production, and quantify benefits to Canada. Applicants are encouraged to develop partnerships or establish a consortium to provide a comprehensive approach to producing sustainable aviation fuel and strengthening supply chains in Canada.

1. Application Requirements for Round 1

Call for proposals opened with the launch of the Challenge on August 17, 2018 and will close on February 1, 2019. Applications are to be submitted through the Impact Canada website: <http://impact.canada.ca>. Challenge details, including application instructions and specific dates, are also available on the same website.

In order to be considered, each applicant must provide the following by the closing date:

- supporting documentation for eligibility;
- supporting documentation for IP, if applicable;
- detailed proposal as per described below (see Section 1.1);
- risk mitigation plan as per described below (see Section 1.2); and
- financial risk assessment as per described below (see Section 1.3).
- applicants must include information on existing funding.

Each submission must provide sufficient details to enable assessment against the Evaluation Criteria (Section 2).

1.1 Detailed Proposal

Information provided in the proposal will be used by Natural Resources Canada to evaluate the capacity of the project over the 18 months of the Green Aviation Fuels Innovation Competition.

Applicants must include a full description of how project objectives will be achieved and a clear description of all project activities and associated costs. Each applicant is expected to provide the following information in his or her proposal:

- the name(s) and contact information associated with the submission, with the project lead clearly identified;
- official proof of the project lead's legal structure and eligibility to receive funding and the prize;
- description of the partnership or consortium that will carry out the project;
- details about the business model, partnerships and supply chain integration;
- outline of milestones including projected costs, expected financial support from Natural Resources Canada, and timelines for the full duration of the project if the project was selected as a finalist list and funded;
- each applicant could require up to four separate payments and will have to clearly link the costs generated to achieve the milestone and the funding requested for the specific milestone;
- detailed description of specific tasks describing the work that will be completed to meet the project milestones (one paragraph per task) and a detailed breakdown of the activities required in order to complete the task;
- detailed analysis to support expected production costs;
- details about the technology and processes to be used to produce the fuel;
- details about how the production process will reduce costs and maximize environmental benefits;
- detailed analysis to support expected GHG emissions reductions, based on a life-cycle analysis (LCA) approach;
- detailed risk assessment (e.g., technology, business);

- general approach used to execute the project tasks (e.g., in-house, contract, partners or vendor);
- plans for scale-up and project development beyond 2021; and
- criteria supporting any decision to stop and/or end the project before November 2020.

1.2 Risk Mitigation Plan

Applicants must provide a risk mitigation plan for the full duration of the project.

The plan must outline any project risks, including:

- the technical, organizational and environmental risks associated with the project;
- approaches for overcoming or mitigating risk, including prior experience managing similar or comparable risks; and
- details on the regulatory framework that applies the project, including a summary of the permits/approvals required for the project, a status update and timeline for obtaining them, and the impact any delays in obtaining them may have on the overall project.

1.3 Financial Risk Assessment

Applicants must provide a financial risk assessment.

The financial risk assessment is intended to support the assessment of the overall financial viability of the project, the applicant and potential partners during the Challenge. If required, an additional financial risk assessment may be conducted.

2. Evaluation Criteria

The finalists will consist of up to four projects that clearly demonstrate a potential to produce a sustainable aviation fuel in Canada with low GHG emissions at a competitive cost. Finalists will also have to demonstrate a clear vision of their activities following the Challenge.

Projects must describe how 10 litres of sustainable aviation fuel will be produced by November 1, 2020 in a way that could significantly reduce the cost of the fuel and maximize its environmental benefits.

Projects that meet the application requirements will be evaluated against the following criteria. Consideration will also be given to factors that would help meet overall challenge objectives and increase their impact, such as regional diversity and representation.

2.1 Feasibility

Describe the feasibility of the project to meet the objective.

- What is the level of risk associated with the project?
- What is the probability that the project will meet its expected objectives?
- Does the project have the capacity and expertise to meet its objectives?

2.2 Feedstock(s)

Describe the feedstock to be used for the project.

- Does the project demonstrate the sustainability of the feedstock?
- Does the project team demonstrate a good understanding of the potential negative impacts of the feedstock?
- Does the project proposal demonstrate a solid understanding of the following aspects of the feedstock, as appropriate?
 - o availability;
 - o harvesting;

- o pre-treatment;
- o handling;
- o water contamination;
- o transportation; and
- o conversion (excluding conversion related to the project).

2.3 GHG Emission Reductions and Other Benefits

Describe how the project is creating environmental benefits.

- What are the expected fuel GHG emissions calculated using a life-cycle analysis (LCA) approach (per volume (i.e litre (/L)) and per unit of energy (i.e grams of CO₂e per mega joule (g CO₂e/MJ))? For coprocessing pathways, GHG emissions will be based on the amount per litre of renewable content.
- What are the expected effects on air emissions other than GHGs (e.g., particulate matter, black carbon, NOx)?
- Are there any expected fuel performance benefits (e.g., increase in energy density, weight)?

2.4 Life-Cycle Analysis (LCA) of GHG Emissions

Projects must provide an analysis of expected GHG emissions reductions using an LCA approach. The LCA methodology must be clearly explained and credible and is expected to include elements such as:

- emissions from the extraction or cultivation of raw materials;
- annualized emissions from carbon stock changes caused by land use change;
- emissions from processing;
- emissions from transport and distribution;
- emissions from fuel usage;
- emission savings from soil carbon accumulation via improved agricultural management;
- emissions savings from carbon capture and geological storage;
- emission savings from carbon capture and replacement; and
- emission savings from cogeneration.

Applicants must provide the LCA results with and without Indirect Land Use Change (ILUC). However, please note that project evaluation will be based on an LCA without ILUC.

Applicants must clearly explain why any of the above components have not been included in the LCA.

More information on conducting an LCA approach may be provided by Natural Resources Canada during the course of the Challenge. Information will be communicated through <http://impact.canada.ca>.

2.5 Consortium Building

Describe the consortium support for the project.

- Do the partners or the consortium have the structure or capacity to support a successful project?
- Is the governance in place adequate for this type of project?
- How will project activities be shared among partners or consortium members?

- How will any weaknesses in partnership or collaboration be addressed by 2021?
- What is the level of support from an airline to the partners/consortium?
- What is the level of support from an airport to the partners/consortium?
- Does the partnership or consortium have the financial resources to achieve its objectives?

2.6 Business Model

Describe the project business model.

- How does the project demonstrate financial viability?
- Is there a credible path and timeline to commercialization for the proposed sustainable aviation fuel?
- How does the business model support the long-term (over three years) viability of the project?

2.7 Business Innovation

Describe the innovative aspects of the project.

- Is the project scalable and replicable (not case-specific)?
- What financial innovations are proposed to advance and support the project?
- What kind of improvement is proposed to the feedstock/integration of production technology?
- What is the potential for partnership(s) to support the development of a regional value chain for producing the fuel?
- How does the project integrate with existing fuel delivery infrastructure and the needs of end consumers?

2.8 Technological Innovation

Describe the technological innovations of the project.

- What is the nature of the technological advancement resulting from the project?
- How does the project demonstrate a clear understanding of directly competing technologies?
- Does the project demonstrate a progression in technology readiness level (TRL)?
- What is the Canadian content of the innovation?

2.9 Future Fuel Performance

Describe the expected future performance of the proposed sustainable aviation fuel.

- What are the expected fuel production costs on a commercial scale?
- When could commercial-scale production begin?

2.9 Feedstock

Describe the feedstock to be used for the project.

- Does the project demonstrate sustainability of the feedstock?
- Does the project team demonstrate a good understanding of the potential negative impacts of the feedstock?

2.10 Timelines

Outline the project timelines.

- Does the project have clear timelines and key milestones (i.e., a clear pathway to achieve the objective)?
- Are the project timelines feasible?

2.11 Economic Benefits

Describe how the project will generate economics benefits.

- How many direct and indirect jobs could the existing project and future scale-up create (overall and for local communities)?
- Does the project rely on locally produced feedstock?
- What are the benefits for Canadian and foreign airlines?
- What are export opportunities for the technology?

3. Assessment and Selection Process

- The Evaluation Criteria (Section 2) identifies the type of information required for assessment.
- A Technical Evaluation Committee will review and evaluate all of the applications. The applicants who do not meet the eligibility criteria will be informed by the end of April 2019.
- The Evaluation Committee will provide a list with the ranking of each project to Natural Resources Canada for confirmation before the official release of the finalists' names.
- Natural Resources Canada may take into account additional considerations, such as regional diversity and participation of Indigenous groups/communities.
- Unsuccessful applicants will have the opportunity to receive feedback on their results.
- Natural Resources Canada, at its sole discretion, may decide to cancel the Green Aviation Fuels Innovation Competition, following recommendation from the Technical Evaluation Committee, if any concern exists about the quality of the applications or the projects.
- The selected projects will be announced in May 2019. The specific date will be posted at <http://impact.canada.ca>.

4. Terms of Funding

- Up to four projects will be eligible for up to \$2 million through a contribution agreement to be negotiated between Natural Resources Canada and the finalists.
- Natural Resources Canada guarantees the availability of up to \$2 million for each of the selected projects.
- Natural Resources Canada does not guarantee payment of the full or partial amount of the agreement. Payments can be delayed or withheld if the project does not meet the expected milestones identified in the proposal.
- The Minister reserves the right to terminate the agreement in the event that the Technical Evaluation Committee determines that some of the milestones could not be achieved.
- Project proposals must identify a maximum of four clear and measurable milestones for payment between July 2019 and November 2020. Provision of financial support will be based on demonstrating the achievement of the milestones identified in the project proposal.
- Natural Resources Canada will work with the applicant to validate the proposal and project funding requirements.
- Once the project has started, the achievement of the milestones will be validated/verified in order to release payment.
- If a milestone is not met, Natural Resources Canada will not release the payment associated with this specific milestone.

ROUND 2: PRIZE WINNER

A \$5-million prize will go to the production method with the lowest expected cost, greatest GHG emission reductions, and the highest likelihood of commercial success through scale-up. Submissions must include 10 litres of sustainable aviation fuel for testing, a detailed technical report explaining how the fuel was produced, and a plan for scale-up. An independent jury will recommend the winner, with advice from an expert technical Evaluation Committee.

1. Submission Requirements

Submissions of all required information for the prize will be closed on November 1, 2020. Submissions can start as soon as a project has been officially declared a finalist. Submissions are to be sent in through the Impact Canada website: <http://impact.canada.ca>. Challenge details, including submission instructions and specific dates, are also available on the same website.

In order to be considered, each applicant must provide the following by the closing date:

1.1 Sustainable Aviation Fuel Sample

Each participant must submit a minimum of 10 litres of sustainable aviation fuel for testing by December 2020.

- Each applicant must provide confirmation from an auditing company in Canada that the applicant is the producer of the sustainable aviation fuel.
- Each applicant must be able to provide 10 litres of sustainable aviation fuel at any time, after the December 2020 deadline, at the request of Natural Resources Canada.
- Additional details about how to submit the fuel sample will be provided by Natural Resources Canada before the submission deadline. Information will be provided at <http://impact.canada.ca>.

1.2 Detailed Technical Report

Each participant must submit a detailed report and any supporting documents by November 1, 2020. All of the information submitted must, at minimum, cover the subjects highlighted in the Evaluation Criteria (Section 2).

Finalists at the end of the work phase who are ready to submit their information for the prize are encouraged to update and revise the information submitted when they applied to the Green Aviation Fuels Innovation Competition using new data and reflecting actual results from the production of the sustainable aviation fuel sample.

Below is a list of the type of information each applicant is expected to provide in addition to any other relevant information to support the evaluation based on the Evaluation Criteria presented in Section 2:

- details about the sustainability of the feedstock(s) to be used,
- details about the technology and processes to be used to produce the fuel;
- details about costs, the business model, partnerships, and supply chain integration;
- plans for scale-up and project development beyond 2020;
- detailed risk assessment (e.g., technology, business);
- detailed analysis to support expected production costs; and
- detailed analysis to support expected GHG emission reductions based on a life-cycle analysis (LCA) approach.
- applicants must include information on existing funding.

Projects leveraging a coprocessing approach must clearly differentiate and explain the differences resulting from the use of existing infrastructure with and without coprocessing.

2. Evaluation Criteria

The winner of the Green Aviation Fuels Innovation Competition will be the project that produces the best sustainable aviation fuel (lowest cost with the highest potential for GHG emissions reduction), demonstrates capacity to scale-up production in Canada, and provides economic benefits to Canadians.

To be considered, a project must meet the minimum criteria described under criteria 2.1 Volume Produced (a minimum of 10 litres of tested sustainable aviation fuel). Projects that meet evaluation criteria 2.1 will be evaluated against criteria 2.2 to 2.4.

2.1 Volume Produced

Provide a minimum of 10 litres of sustainable aviation fuel for testing.

- Has the project produced the minimum required 10 litres of sustainable aviation fuel?
- Is the provided sample confirmed as jet fuel?
- Has the bio content of the fuel sample been confirmed?

2.2 Feedstock(s)

Describe the feedstock to be used for the project.

- Does the project demonstrate the sustainability of the feedstock?
- Does the project team demonstrate a good understanding of the potential negative impacts of the feedstock?

2.3 GHG Emission Reductions and Other Benefits

Describe how the project creates environmental benefits.

- How does the project demonstrate a clear pathway for achieving the expected GHG emissions reductions in the production of the fuel compared to conventional jet fuel?
- What are the expected fuel GHG emissions calculated using a life-cycle analysis (LCA) approach based on future scale-up (per volume (litre (L)) and per unit of energy (grams of CO₂e per mega joule (g CO₂e/MJ))?
- What are the expected effects on air emissions other than GHGs (e.g., particulate matter, black carbon, NO_x, etc.) based on future scale-up?
- What are the expected fuel performance benefits (e.g., increase in energy density, weight)?
- How does the partnership or consortium contribute to the GHG emission reductions of the sustainable aviation fuel?

2.4 Life Cycle Analysis (LCA) Elements

Projects must provide an analysis of expected GHG emissions reductions using an LCA approach. The LCA methodology must be clearly explained and credible and must include all of the following:

- emissions from the extraction or cultivation of raw materials;
- annualized emissions from carbon stock changes caused by land use change;
- emissions from processing;
- emissions from transport and distribution;
- emissions from fuel usage;
- emission savings from soil carbon accumulation via improved agricultural management;
- emissions savings from carbon capture and geological storage;

- emission savings from carbon capture and replacement; and
- emission savings from cogeneration.

Participants must provide the LCA results with and without Indirect Land Use Change (ILUC). However, projects will be evaluated based on an LCA without ILUC.

Participants must clearly explain why any of the above components has not been included in the LCA.

More information on conducting an LCA approach may be provided by Natural Resources Canada during the course of the Challenge. Information will be communicated through <http://impact.canada.ca>.

2.5 Cost Reductions

Describe how the project is able to reduce costs for sustainable aviation fuel production.

- Does the project demonstrate a clear pathway to achieve the expected average cost per litre?
- What is the expected average cost per litre of sustainable aviation fuel (per litre of renewable content for any fuel produced using the coprocessing pathway) at full-scale production?
- What are the additional expected fuel performance benefits (e.g., increase in energy density, lower weight) that could contribute to lower costs?
- How does the partnership or consortium contribute to a direct production-cost reduction?

2.6 Scaling Potential in Canada

Describe how project achievements will support future production at scale.

- Does the project demonstrate a strong pathway to commercialization?
- Does the project have the financial resources to support its pathway to commercialization?
- What level of return on investment (ROI) is expected from a scaled-up project?
- Does the project support an increase in production volume over time and maintain fuel quality?
- Does the project clearly demonstrate the required annual next steps for the 2021–2024 period?
- Does the project clearly demonstrate how a \$5-million prize will support project development and commercialization?
- What are the future risks in scaling up?
- Has the project financially de-risked future scale-up?
- Will the project governance support the continuation of activities in Canada?
- Has the project improved and strengthened integration of the Canadian value-chain?
- What are the potential barriers to the development of the project in Canada post 2021?
- What are the potential environmental issues (e.g., water contamination) resulting from the development of the project pathway?

2.7 Economic Benefits

Describe how the project will generate economics benefits.

- How many direct and indirect jobs could the existing project and future scale-up create (overall and in local communities)?
- Does your project rely on locally produced feedstock?
- What are the benefits for Canadian and foreign airlines?
- What are the export opportunities for your technology?

3. Assessment and Selection Process

- The Technical Evaluation Committee will review and evaluate each project using the Evaluation Criteria (Section 2). This does not include the physical testing of the sustainable aviation fuel sample.
- The approach and requirements to evaluate the sustainable aviation fuel sample are at the sole discretion of Natural Resources Canada. Details on evaluation of the sustainable aviation fuel sample will be provided at <http://impact.canada.ca>.
- The technical Evaluation Committee will submit the results of its evaluation as well as the results of the sustainable aviation fuel tests to the Jury.
- The Jury has discretion to require interviews with project leaders as part of the evaluation.
- The Jury will recommend the winner to Natural Resources Canada.
- The \$5-million grand prize will be announced by March 31, 2021.

4. Terms of Funding

The \$5-million prize will be subject to a grant agreement, whose terms and conditions will be negotiated between Natural Resources Canada and the winner.

STREAM 2: CROSS-CANADA FLIGHT COMPETITION²

The Canada Flight Prize will be awarded to the first Canadian sustainable aviation fuel producer to supply 2500 litres of Canadian made sustainable aviation fuel that meets all applicable aviation turbine fuel standards (i.e. meets Canadian General Standards Board (CGSB) and American Society for Testing Materials (ASTM) standards) to Air Canada and West Jet for use in a cross-Canada flight³ at a minimum blend of 10%.

This prize can be awarded at any time between June 30, 2019 and March 31, 2021. It will be awarded only once to the first Canadian producer who meets the criteria.

1. Eligibility

Eligible fuel: The sustainable aviation fuel must:

- Be made from Canadian sustainable feedstocks (see Annex A for definition)
- Be produced in Canada
- Have greenhouse gas emissions that are a minimum of 10% lower than that of conventional aviation fuel (CAF) on a life-cycle basis (i.e. less than 80.1gCO₂e/MJ)⁴
- Meet all applicable aviation turbine fuel standards (CGSB and ASTM)

Eligible applicant: A sustainable aviation fuel producer duly incorporated and validly existing in Canada.

Note: Non-Canadian individuals and entities may be part of a partnership but cannot be the project lead applying to the Canada Flight Competition and will not claim the \$1 million prize.

2. Submission Requirements

Participants must notify Natural Resources Canada that they have produced the required volume of fuel. Natural Resources Canada will inform Air Canada and West Jet of the availability of the fuel and the airlines will negotiate the terms of sale and delivery with the producer.

Producers are responsible for formalizing agreements with the airlines and delivering the required volume of aviation turbine fuel blended with 2500 litres of sustainable aviation fuel, which meets all applicable standards (CGSB and ASTM), in accordance with the terms of their agreement.

Upon completion of the purchase agreement, producers must provide Natural Resources Canada with:

- A copy of the purchase agreement with the airlines.
- Confirmation that the jet fuel meets CAN/CGSB 3.23-2016 and ASTM D7566.
- Confirmation that the greenhouse gas emissions of the fuel are a minimum of 10% lower than that of conventional aviation fuel (CAF) on a life-cycle basis.
- Confirmation from a Canadian independent auditing company that all of the sustainable aviation fuel or renewable diesel was produced in Canada (i.e. Fuel made from a feedstock delivered to a facility in Canada or fuel resulting from the conversion of the same feedstock, in the same Canadian facility).⁵
- Applicants must include information on existing funding.

²For the Cross-Canada Flight Competition, sustainable aviation fuel includes any fuel that meets CAN/CGSB 3.23-2016 and ASTM D7566. Sustainable aviation fuel containing renewable diesel or fuel from co-processing, if approved under ASTM D7566 at the time of application, are eligible.

³Air Canada and West Jet will each undertake flights for a total distance of approximately 3,000 km.

⁴The International Civil Aviation Organization (ICAO) has established a baseline LCA value of 89gCO₂e/MJ for conventional jet fuel.

⁵When an intermediary sustainable aviation fuel is first produced like an alcohol or a bio-crude, the alcohol and the bio-crude must also be produced in Canada

Submissions are to be submitted through the Impact Canada website: <http://impact.canada.ca>. Challenge details, including submission instructions and specific dates, will also be available at the same website. Natural Resources Canada will review and validate all of the submitted information.

3. Terms of Funding

The \$1 million prize, a grant agreement, whose terms and conditions will be negotiated between Natural Resources Canada and the winner.

CONTACT

For any questions or clarifications regarding The Sky's the Limit Challenge, please contact the Natural Resources Canada Cleantech Impact team:

nrcan.cleantechimpact-impacttechpropres.rncan@canada.ca

Updates will be provided on the Challenge website, where applicants can review the [FAQs](#) and find out the [latest news](#).

Applicants are encouraged to follow us on social media for the latest developments:



Twitter <https://twitter.com/NRCan>



Facebook <https://www.facebook.com/pg/EnvironmentandNaturalResourcesinCanada/>



LinkedIn <http://www.linkedin.com/company/natural-resources-canada>



Instagram <https://www.instagram.com/naturalresourcescanada/>

ANNEX A – DEFINITIONS

In the context of The Sky's the Limit Challenge, the following definitions apply.

Sustainable Aviation Fuel (SAF): A fuel that is a drop-in fuel obtained from sources other than petroleum, such as biomass and hydrogenated fats and oils. It has the potential to be sustainably produced and to generate lower carbon emissions than conventional aviation fuel (CAF) on a life-cycle basis. It should have the potential to meet the safety and performance certification requirements set by ASTM International for jet fuel to be approved for use in regular passenger flights.

For the development and production of a sustainable aviation fuel, crude oil, natural gas and coal are excluded as feedstock. Any other feedstock source (including carbon capture) will be acceptable under The Sky's the Limit Challenge.

Jet fuel with a renewable content resulting from coprocessing is acceptable as long as the renewable source is introduced before the production of the fuel.

Conventional aviation fuel (CAF): Conventional aviation fuel is an aviation fuel that is derived wholly from petroleum sources, including crude oil, natural gas liquid condensates, heavy oil, oil shale and oil sands. It includes both aviation kerosene (Jet-A, Jet-A1, Jet-B) and aviation gasoline.

Aviation fuels from a sustainable source: Aviation fuels using feedstocks that conserve an ecological balance by avoiding the depletion of natural resources. Aviation fuels using feedstocks with no direct negative externalities such as carbon from carbon capture and carbon from the atmosphere will also be considered as aviation fuels from a sustainable source.

Made in Canada: A sustainable aviation fuel made in Canada is a sustainable aviation fuel physically produced at 100% in Canada. The same company at the same location produces all of the sustainable aviation fuel.

ANNEX B – INFORMATION SHARING CONSENT

Do you give Natural Resources Canada (NRCan) permission to share any information provided for the purposes of The Sky's the Limit Challenge with other funding entities of the:

- Government of Canada;
- provincial, territorial, or municipal governments; or
- not-for-profit sector (e.g., Sustainable Development Technology Canada, the Green Municipal Fund)?

YES ____

Do you give NRCan permission to share any information provided for the purposes of the Challenge with the Government of Canada's Clean Growth Hub? The Clean Growth Hub is a whole-of-government focal point for clean technology focused on supporting companies and projects.

YES ____

Full Name: _____

Address: _____

Signature: _____

Date: _____

Please complete and attach this form to your submission in order for information to be shared.