Transport Canada Transports Canada

No. T8080-230135
Advance Contract Award Notice
Optimizing the Use of Hydrogen Energy at Canadian Airports

An ACAN is a public notice indicating to the supplier community that a department or agency intends to award a contract for goods, services or construction to a pre-identified supplier, thereby allowing other suppliers to signal their interest in bidding, by submitting a statement of capabilities. If no supplier submits a statement of capabilities that meets the requirements set out in the ACAN, on or before the closing date stated in the ACAN, the contracting officer may then proceed with the award to the pre-identified supplier.

BACKGROUND:

In the long-term, hydrogen could play a significant role in the decarbonization of transportation subsectors like aviation, which require light and energy-dense fuels that preclude electrification with existing battery energy storage technologies. If a transition to hydrogen aviation does occur, airports will come to occupy a central role in its distribution and potentially even in its production. This is fortuitous because airports are large users of energy, and many of the energy services they provide are unrelated to airplane refuelling, ranging from ground support equipment to space heating to the refuelling of road transportation.

There are some key questions that need to be answered when it comes to this transition; there are large remaining gaps in our knowledge: what would a hydrogen airport look like? How might its integrated, hydrogen-backed energy system components be optimally sized and operated? What would they cost, and how much primary energy sources would hydrogen production and usage require?

DEFINITION OF REQUIREMENTS:

Transport Canada has a requirement for the development of an energy system optimization model for a hydrogen backed airport microgrid that serves the following energy loads: aircraft refuelling; ground support equipment; building electrical and thermal needs; backup power; and vehicle refuelling (hydrogen for freight and electricity for light duty vehicles).

The scope of this project must extend to 40 Canadian airports with Nav Canada towers, in order to account for more than 80% of emissions from aviation in Canada.

CRITERIA FOR ASSESSMENT OF THE STATEMENT OF CAPABILITIES (MINIMUM ESSENTIAL REQUIREMENTS:

Transport Canada is seeking a service provider who can provide an energy system optimization model that meets all of the mandatory requirements set out below. Any interested supplier must demonstrate by way of a statement of capabilities that it meets these requirements:

1. The energy system optimization model must be constructed using Pyomo, an open-source optimization package based in Python, due to the open-source nature of the language, which would allow investors, communities, and analysts to employ or adapt the model to integrate their own assumptions or data. Therefore, the service provider must know how to use Pyomo and have a minimum of five years of experience using it.
2. The service provider must have a minimum of four years of experience working on projects related to hydrogen, especially with those related to hydrogen infrastructure deployment.
3. The service provider must have knowledge of and a minimum of ten years experience working on net-zero energy models and optimization of microgrids.

4. The service provider must have access to sorted, existing datasets, including but not limited to airplane movements in Canada, charging behaviour use, building thermal loads and electrical loads, costs of hydrogen production, transportation and storage, electricity costs and grid emission factors in Canada, and freight truck movements around the airports.
5. The service provider must have ten years of experience in uncertainty analysis, risk analysis and quantitative policy analysis.
6. The service provider must have an interdisciplinary PhD in fields such as public policy and engineering/science.

APPLICABILITY OF THE TRADE AGREEMENT(S) TO THE PROCUREMENT:

This procurement is subject to the following trade agreements

a. *Canadian Free Trade Agreement* (CFTA)

b. *Canada-Chile Free Trade Agreement* (CCFTA)

c. *Canada-Colombia Free Trade Agreement*

d. *Canada-Honduras Free Trade Agreement*

e. *Canada-Korea Free Trade Agreement*

f. *Canada-Panama Free Trade Agreement*

g. *Canada-Peru Free Trade Agreement* (CPFTA)

JUSTIFICATION FOR PRE-IDENTIFIED SUPPLIER:

Transport Canada intends to enter into a sole source contract with Professor Ahmed Abdulla and his team at Carlton University, 1125 Colonel By Dr, Ottawa, ON K1S 5B6. Professor Abdulla and his team is the only known supplier that meets all the mandatory criteria set out in the section above. Specifically, Professor Abdulla's team specializes in hydrogen research related to aviation. Additionally, Professor Abdulla and his team have access to all the datasets necessary to complete this work.. Additionally, an understanding of the feasibility of hydrogen in the aviation landscape is necessary and his previous work indicates that he has the understanding necessary to complete this work.

The data that will be used was collected by the research team from multiple sources. Aircraft movement data were purchased from commercial providers under educational licenses that permit dissemination of results. Electric vehicle charging data around airports were collected in real-time through web-scraping tools that were developed by the research team. Freight movement databases were constructed using a combination of databases from provincial Ministries of Transportation and web-scraping tools that the research team developed. Building energy performance data were generated by the research team using building performance simulation software that simulated the electric, heating, and cooling loads of airport terminals. Databases purchased from commercial providers were found to contain significant errors or omissions; the research team developed bespoke algorithms to resolve these errors and to classify aircraft movements into distinct clusters based on aircraft type, engine, and fuel consumption for further analysis.

The research team currently has exclusive rights to two novel software products developed in-house: 1) the algorithms used to transform raw data into usable model inputs, and 2) the model to transform processed data into hourly hydrogen demand profiles, calculate costs and emissions, and calculate a benefit-cost ratio. To the knowledge of the research team, both the research approach and the model constitute novel contributions.

Should Canada receive a statement of capabilities from a supplier that contains sufficient information to indicate that it meets the requirements set forth in this ACAN, a competitive process will be triggered with a technical and financial evaluation methodology of the bids proposed by the potential bidders.

GOVERNMENT CONTRACTS REGULATIONS EXCEPTION:

The following exception(s) to the Government Contracts Regulations is (are) invoked for this procurement under subsection 6 (d) that states “only one person or firm is capable of performing the contract”.

OWNERSHIP OF INTELLECTUAL PROPERTY:

Ownership of any Foreground Intellectual Property arising out of the proposed contract will vest with Carleton University.

PERIOD OF THE PROPOSED CONTRACT:

The proposed contract is for 3 years commencing from Contract award to March 20, 2026.

ESTIMATE COST:

The estimated value of the contract including option years is $193,000.

NAME AND ADDRESS OF THE PRE-IDENTIFIED SUPPLIER:

Supplier: Ahmed Abdulla, Assistant Professor, Mechanical and Aerospace Engineering

Company Name: Carleton University

Address: 1125 Colonel By Dr, Ottawa, ON K1S 5B6

SUPPLIERS’ RIGHT TO SUBMIT A STATEMENT OF CAPABILITIES:

Suppliers who consider themselves fully qualified and available to provide the services described in the ACAN may submit a statement of capabilities in writing to the contact person identified in this notice on or before the closing date of this notice. The statement of capabilities must clearly demonstrate how the supplier meets the advertised requirements.

CLOSING DATE FOR A SUBMISSION OF A STATEMENT OF CAPABILITIES:

The closing date and time for accepting statements of capabilities is August 15, 2023 at 2:00 p.m. EDT.

INQUIRIES AND SUBMISSION OF STATEMENT OF CAPABILITIES:

Inquiries and Statement of Capabilities are to be directed to:

Name: Jessica Hanschell
Title: Procurement Specialist
Department: Transport Canada
Tel: 613-324-1856
Email: jessica.hanschell@tc.gc.ca