



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

**Bid Receiving - PWGSC / Réception des
soumissions → TPSGC**
10th Floor, 4900 Yonge Street /
10e étage, 4900 rue Yonge
Toronto
Ontario
M2N 6A6

REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION

**Proposal To: Public Works and Government
Services Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Proposition aux: Travaux Publics et Services
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

Comments - Commentaires

Vendor/Firm Name and Address

**Raison sociale et adresse du
fournisseur/de l'entrepreneur**

Issuing Office - Bureau de distribution

Public Works and Government Services Canada
Ontario Region
10th Floor, 4900 Yonge Street
Toronto
Ontario
M2N 6A6

Title - Sujet Pwr Gen Efficiency Evaluation System	
Solicitation No. - N° de l'invitation 23584-200546/A	Date 2019-12-16
Client Reference No. - N° de référence du client 23584-200546	
GETS Reference No. - N° de référence de SEAG PW-\$TOR-024-7864	
File No. - N° de dossier TOR-9-42092 (024)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2020-01-27	Time Zone Fuseau horaire Eastern Standard Time EST
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Brewster, Shannon	Buyer Id - Id de l'acheteur tor024
Telephone No. - N° de téléphone (647) 273-1369 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: See Herein	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée See Herein	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

BID SOLICITATION

for

Power Generation Efficiency Evaluation System

required by

**CanmetMATERIALS,
Natural Resources Canada (NRCan)**

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Solicitation No. - N° de l'invitation
23584-200546/A

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur
tor024

Client Ref. No. - N° de réf. du client
23584-200546

File No. - N° du dossier
TOR-9-42092

CCC No./N° CCC - FMS No./N° VME

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PART 1 - GENERAL INFORMATION

1.1 Statement of Work

The Work to be performed is detailed under Article 6.2 of the resulting contract clauses.

1.2 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days of receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

1.3 Epost Connect Service

This bid solicitation allows bidders to use the epost Connect service provided by Canada Post Corporation to transmit their bid electronically. Bidders must refer to Part 2 entitled Bidder Instructions, and Part 3 entitled Bid Preparation Instructions, of the bid solicitation, for further information.

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

- (a) All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.
- (b) Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.
- (c) The 2003 (2019-03-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.
- (d) The following modification is to the standard instructions 2003:

Subsection 5.4 of 2003, Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: sixty (60) days

Insert: ninety (90) days

2.2 Submission of Bids

- (a) Bids must be submitted only to the Public Works and Government Services Canada (PWGSC) Bid Receiving Unit specified below by the date and time indicated on page 1 of the bid solicitation:

Bid Receiving - PWGSC

10th Floor, 4900 Yonge Street

Toronto, Ontario, M2N 6A6

TPSGC.orreceptiondessoumissions-orbidreceiving.PWGSC@tpsgc-pwgsc.gc.ca

(Bids will not be accepted if emailed directly to this email address. This email address is to be used to open an epost Connect conversation, as detailed in Standard Instructions 2003, or to send bids through an epost Connect message if the bidder is using its own licensing agreement for epost Connect)

To submit a bid using epost Connect service, the Bidder must send as early as possible, and in any case, at least six business days prior to the solicitation closing date and time, (in order to ensure a response), an email that includes the bid solicitation number to the specified PWGSC Bid Receiving Unit requesting to open an epost Connect conversation. Requests to open an epost Connect conversation received after that time may not be answered.

- (b) Due to the nature of the bid solicitation, bids transmitted by facsimile to PWGSC will not be accepted.

2.3 Enquiries - Bid Solicitation

- (a) All enquiries must be submitted in writing to the Contracting Authority no later than seven (7) calendar days before the bid closing date. Enquiries received after that time may not be answered.
- (b) Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.4 Applicable Laws

- (a) Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

-
- (b) Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

- (a) If the Bidder chooses to submit its bid electronically, Canada requests that the Bidder submits its bid in accordance with section 08 of the 2003 standard instructions. Bidders must provide their bid in a single transmission. The epost Connect service has the capacity to receive multiple documents, up to 1GB per individual attachment.

The bid must be gathered per section and separated as follows:

Section I: Technical Bid

Section II: Financial Bid

Section III: Certifications

Section IV: Additional Information

- (b) If the Bidder chooses to submit its bid in hard copies, Canada requests that the Bidder submits its bid in separately bound sections as follows:

Section I: Technical Bid (3 hard copies)

Section II: Financial Bid (1 hard copy)

Section III: Certifications (1 hard copy)

Section IV: Additional Information (1 hard copy)

If there is a discrepancy between the wording of the soft copy on electronic media and the hard copy, the wording of the hard copy will have priority over the wording of the soft copy.

- (c) If the Bidder is simultaneously providing copies of its bid using multiple acceptable delivery methods, and if there is a discrepancy between the wording of any of these copies and the electronic copy provided through epost Connect service, the wording of the electronic copy provided through epost Connect service will have priority over the wording of the other copies.
- (d) Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.
- (e) Due to the nature of the bid solicitation, bids transmitted by facsimile to PWGSC will not be accepted.

3.2 Section I: Technical Bid

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

3.3 Section II: Financial Bid

- (a) Bidders must submit their financial bid in accordance with the Basis of Payment in Annex B. The total amount of Applicable Taxes must be shown separately, if applicable.
- (b) **Electronic Payment of Invoices**
- (i) If you are willing to accept payment of invoices by Electronic Payment Instruments, complete Annex C - Electronic Payment Instruments, to identify which ones are accepted.
 - (ii) If Annex C - Electronic Payment Instruments is not completed, it will be considered as if Electronic Payment Instruments are not being accepted for payment of invoices.
 - (iii) Acceptance of Electronic Payment Instruments will not be considered as an evaluation criterion.
- (c) **Exchange Rate Fluctuation**
C3011T (2013-11-06), Exchange Rate Fluctuation

3.4 Section III: Certifications

Bidders must submit and comply with the certifications and additional information required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.2 Technical Evaluation

(a) Mandatory Technical Criteria

The proposed Power Generation Efficiency Evaluation System must meet the mandatory criteria in Attachment 4.1 – Bid Evaluation Criteria. Failure to meet any one of the mandatory criteria will result in your bid being declared non-responsive.

4.3 Financial Evaluation

(a) Mandatory Financial Criteria

- (i) The Bidder must submit with its bid, pricing details in accordance with Annex B - Basis of Payment, in Canadian dollars.
- (ii) The Total Evaluated Price will be the sum of the Firm Lot Price of each line item of the Contract Period in Annex B - Basis of Payment.
- (iii) The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

4.4 Basis of Selection – Mandatory Technical Criteria

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract.

ATTACHMENT 4.1

Bid Evaluation Criteria

The Bidder must provide documentation in their bid demonstrating that their proposed system meets each and every criterion. **Failure to provide supporting documentation may result in the bid being deemed non-responsive.**

1. Mandatory Technical Criteria

#	Mandatory Criteria	Bidder's Response
		Identify corresponding page number in bid.
M1	<p>The Bidder must demonstrated that they have experience designing and manufacturing a system of the <i>*same functionality</i>, within the last 5 years, that includes shipping, installing, operating and servicing the system.</p> <p><i>*Same functionality being the measurement of power conversion efficiency of a thermoelectric module.</i></p> <p>To demonstrate this experience the Bidder must provide the following information for their proposed system:</p> <ol style="list-style-type: none"> Description of the scope of work including the design and manufacturing of the system as well as providing details of the installation, operation, and servicing of the system; Copy of shipping documents; Customer name; Customer reference and current contact information such as telephone number and/or email address. <p>Reference checks may by contacted for clarification and accuracy of the information provided in a) above.</p>	
M2	<p>The Bidder must demonstrate that the proposed system complies with the directive on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment.</p> <p>As a proof of compliance the Bidder must provide a copy of their certification of RoHS compliance.</p> <p>If a copy of the certification is not provided with the bid at bid closing, it must be provided within 2 days of request from the Contracting Authority.</p>	
M3	<p>The Bidder must demonstrate that the proposed system does not include the following hazardous substances:</p> <ul style="list-style-type: none"> - Asbestos - Radioactive Materials <p>As proof of compliance the Bidder must provide supporting certification documentation.</p> <p>If a copy of the certification is not provided with the bid at bid closing, it must be provided within 2 days of request from the Contracting Authority.</p>	

PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

(a) Integrity Provisions – Declaration of Convicted Offences

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications listed below should be completed and submitted with the bid, but may be submitted afterwards. If any of these required certifications is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to comply with the request of the contracting Authority and to provide the certifications within the time frame provided will render the bid non-responsive.

(a) Integrity Provisions – Required Documentation

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real procurement agreement of the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

(b) Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "[FCP Limited Eligibility to Bid](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&ga=1.229006812.1158694905.1413548969#afed)" list available at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's website](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&ga=1.229006812.1158694905.1413548969#afed) (http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&ga=1.229006812.1158694905.1413548969#afed).

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "[FCP Limited Eligibility to Bid](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&ga=1.229006812.1158694905.1413548969#afed)" list at the time of contract award.

PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

6.1 Security Requirements

There is no security requirement applicable to the Contract.

6.2 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex "A".

6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

(a) General Conditions

2010A (2018-06-21), General Conditions – Goods (Medium Complexity), apply to and form part of the Contract.

(b) Supplemental General Conditions

4003 (2010-08-16), Supplemental General Conditions – Licensed Software, apply to and form part of the Contract.

4004 (2013-04-25), Supplemental General Conditions, Maintenance and Support Services for Licensed Software, apply to and form part of the Contract.

6.4 Term of Contract

(a) Period of the Contract

The period of the Contract is from date of Contract award to April 30, 2021 inclusive.

6.5 Authorities

(a) Contracting Authority

The Contracting Authority for the Contract is:

Name:	Shannon Brewster
Title:	Supply Specialist
Organization:	Public Works and Government Services Canada Acquisitions Branch Ontario Region
Address:	4900 Yonge Street Toronto, Ontario, M2N 6A6
Telephone:	647-273-1369
E-mail address:	shannon.brewster@pwgsc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

(b) Project Authority (to be provided at Contract Award)

The Project Authority for the Contract is:

Name:	_____
Title:	_____
Organization:	_____
Address:	_____

Telephone: _____
E-mail address: _____

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority, however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

(c) **Inspection Authority** (to be provided at Contract Award)

The Inspection Authority for the Contract is:

Name: _____
Title: _____
Organization: _____
Address: _____
Telephone: _____
E-mail address: _____

The Inspection Authority is the representative of the department or agency for whom the Work is being performed under the Contract and is responsible for inspection of the Work and acceptance of the finished work. The Inspection Authority may be represented on-site by a designated inspector and any other Government of Canada inspector who may from time to time be assigned in support of the designated Inspector. Contracting officers must identify any designated inspector in the contract.

(d) **Contractor's Representative** (to be provided with bid)

Name: _____
Title: _____
Organization: _____
PBN: _____
Address: _____
Telephone: _____
Facsimile: _____
E-mail address: _____

6.6 Payment

(a) **Basis of Payment - Firm Price, Firm Unit Price(s) or Firm Lot Price(s)**

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid firm lot prices, as specified in Annex B for a cost of \$ _____ (*insert the amount at contract award*). Customs duties are included and Applicable Taxes are extra.

(b) **Limitation of Price**

SACC Manual clause C6000C (2017-08-17), Limitation of Price

(c) **Multiple Payments**

SACC Manual clause H1001C (2008-05-12), Multiple Payments

(d) **Method of Payment - Milestone Payments Subject to Holdback**

(i) Canada will make milestone payments in accordance with the Schedule of Milestones detailed in the Contract and the payment provisions of the Contract, up to 90 percent of the amount claimed and approved by Canada if:

(A) an accurate and complete claim for payment using PWGSC-TPSGC 1111, Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;

- (B) the total amount for all milestone payments paid by Canada does not exceed 100 percent of the total amount to be paid under the Contract;
 - (C) all the certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives;
 - (D) all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.
- (ii) The balance of the amount payable will be paid in accordance with the payment provisions of the Contract upon completion and delivery of all Work required under the Contract if the Work has been accepted by Canada and a final claim for the payment is submitted.

(e) **Electronic Payment of Invoices**

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s): *(to be confirm at Contract award)*

- i. Visa Acquisition Card;
- ii. MasterCard Acquisition Card;
- iii. Direct Deposit (Domestic and International);
- iv. Electronic Data Interchange (EDI);
- v. Wire Transfer (International Only); or
- vi. Large Value Transfer System (LVTS) (Over \$25M).

6.7 Invoicing Instructions - Progress Payment Claim

- (a) The Contractor must submit a claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment.

Each claim must show:

- (i) all information required on form PWGSC-TPSGC 1111;
 - (ii) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
 - (iii) the description and value of the milestone claimed as detailed in the Contract.
- (b) Applicable Taxes, must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.
- (c) The Contractor must prepare and certify one copy of the claim on form PWGSC-TPSGC 1111, and forward it by email to the address identified on the front page under the section entitled "Invoices" of the Contract for appropriate certification after inspection and acceptance of the Work takes place.
- The Technical Authority will then forward one (1) copy of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.
- (d) The Contractor must not submit claims until all work identified in the claim is completed.

6.8 Certifications and Additional Information

(a) **Compliance**

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

6.9 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in _____ (*insert the name of the province or territory as specified by the Bidder in its bid, if applicable*).

6.10 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) these Articles of Agreement, including any individual SACC clauses incorporated by reference in these Articles of Agreement;
- (b) the supplemental general conditions:
 - (i) 4003 (2010-08-16), License Software
 - (ii) 4004 (2013-04-25), Maintenance and Support Services for Licensed Software
- (c) the general conditions 2010A (2018-06-21), General Conditions – Goods (Medium Complexity);
- (d) Annex A, Statement of Work;
 - (i) Appendix 1 to Annex A - Table of Designated and Hazardous Substances
 - (ii) Appendix 2 to Annex A - Building Constraints
 - (iii) Appendix 3 to Annex A - Acceptance Test Plan
- (e) Annex B, Basis of Payment; and
- (f) the Contractor's bid dated _____. (*insert at time of contract award*)

6.11 SACC Manual Clauses

- (a) A2000C (2006-06-16) Foreign Nationals (Canadian Contractor) or A2001C (2006-06-16) Foreign Nationals (Foreign Contractor); and A9068C (2010-01-11) Government Site Regulations
- (b) **Shipping Instructions - Delivery at Destination**
Goods must be consigned to the destination specified in the Contract and delivered:
Delivered Duty Paid (DDP) (Hamilton, Ontario) Incoterms 2000 for shipments from a commercial contractor.

6.12 Insurance

G1005C (2016-01-28), Insurance

ANNEX A

STATEMENT OF WORK

1. REQUIREMENT

Natural Resources Canada (NRCan), Energy Technology Sector, CanmetMATERIALS research centre, has a requirement for the fabrication, supply, delivery and installation of a Power Generation Efficiency Evaluation System. This system as an integral part of the Materials Automation Platform (MAP) and will be needed to support the research and development in thermoelectric waste heat-to-energy conversion technology. It will determine the conversion efficiency of a thermoelectric module by measuring two quantities: power generated, and heat flow rate. The equipment must consist of all the hardware, software and service required to achieve the above objective.

2. BACKGROUND

The objective of the system is to provide researchers with an essential tool to support the research and development of thermoelectric materials, in determining the electronic properties of these materials from room temperature to 800°C. By comparing the actual vs the calculated power output, it enables the identification of parasitic interfacial losses, and the optimization of the balance-of-system components in a TE module (e.g. metallization, dielectric, ceramic substrate).

3. SPECIFICATIONS

The Contractor must fabricate, supply, deliver and install one (1) fully function Power Generation Efficiency Evaluation System that meets the specifications outlined under this Annex. The system will be procured in three phases:

- a) Phase I, Engineering:
 - The Contractor must complete a safety-compliant design by supplying documentation that prove design compliance to CSA, ESA, UL or a *standard acceptable** to CanmetMATERIALS. Proof of compliance could include, but not limited to, copies of certifications and/or stickers.
 - The Contractor must supply a design of the electrical system, and a plan for the procurement of sensors and control system. Must include as a minimum design drawings, bill of materials and photos of all parts.
 - The Contractor must filled out and submit Appendix 1 to Annex A – Table of Designated and Hazardous Substances, which details the substances used in the system.
- b) Phase II, Build:
 - The Contractor must build the system at their location. The build phase will be complete when the equipment (system) is delivered to the location indicated at Article 7 and accepted by the Technical Authority.
- c) Phase III, Installation and Commissioning:
 - The installation phase will be complete when the system passes the Acceptance Test Plan, Appendix 3 to Annex A and all the electrical safety standard. Training will take place during this Phase.

*Standard acceptable**



At a minimum, the system must meet the following mandatory equipment requirements.

3.1 General Design Requirements

- a) The proposed system must not be a prototype, demonstration model, used or refurbished.
- b) The system, as assembled, must be sized for placement on the first floor of CanmetMATERIALS laboratory, Room 147. The system's footprint must be less than 3 m (width) x 1 m (depth). See Appendix 2 to Annex A - Building Constraints, for further delivery requirements.
- c) The Contractor must calibrate the system and provide training.

3.2 Facility Integration Requirements

- a) The system must operate indoors where the ambient humidity may vary from 10% to 80% (non-condensing) and where the ambient temperature may vary from 10 °C to 35 °C.
- b) The system must operate within these electrical requirements:
 - (i) AC200V, 1 phase, 8kVA, 1 point (for main body)
 - (ii) AC100V, 1 phase, 1.5kVA, each 3 point, electrical outlet (for computer, pump, and constant temperature water circulator)

3.3 Equipment Functional and Technical Requirements

- a) The system must have a function of automatic measurement of power generation amount and heat flow.
- b) The conversion efficiency must be calculated from the measured power generation amount and heat flow automatically by the software included with the system.
- c) The system must measure temperatures of both upper and lower surface of the sample.
- d) The system must be capable of applying to the hot side of the sample under test, a temperature ranging from room temperature to 800 degree Celsius.
- e) The system must perform the measurements under an inert atmosphere of high purity Argon gas (99.999% or better).
- f) The system must apply to the sample under test a constant compressive force of at least 180kgf.
- g) An Infrared Furnace must be included into the system in order to heat the sample.
- h) The system must accept a sample TE (Thermoelectric) module with dimensions up to 40mm x 40mm.
- i) The repeatability of the measurement values must be within +/- 15%.
- j) The system must be equipped with a turbomolecular pump and an accompanying roughing pump system.
- k) The system must achieve a base pressure of better than 3×10^{-6} Torr.
- l) Sheathed thermocouples must be used for measuring the temperature gradient inside the sample mounting blocks to measure the heat flow through the system.
- m) A constant temperature water chiller must be supplied with the system.
- n) The heating and cooling rate must be controlled from 0.1 to 100°C/min.

3.4 Software and Computer Requirements

- a) The software must operate in an IBM compatible PC operating under Windows 10.
- b) The software must be able to record data and present it in a graphical and tabular format.
- c) The software must be able to plot, analyze and process data.
- d) The software must allow data to be exported in ASCII format
- e) The system and software must not require user intervention once the test is started.
- f) All possible features of the software must be included and work without the use of options or add-on packages.
- g) The computer used for data acquisition must have an USB connection for retrieval of data.

3.5 Training

On-site (CanmetMATERIALS Facility, Hamilton, Ontario) training is to include system operation, hardware maintenance procedures, software usage, safety training, procedure for maintenance, system calibration and troubleshooting of the system for up to a maximum of five (5) users in English for one (1) week.

Example of proposed system



4. INSTALLATION

- a) The Contractor must provide calibration and certification of calibration of the equipment.
- b) The Contractor must include a calibration report identifying and listing each measuring device that have been calibrated, the calibration range(s), and the recommended recalibration schedule(s).
- c) The equipment as supplied and installed must pass all tests and checks as specified in Appendix 2 of Annex A - Acceptance Test Plan.

5. MANUALS, CERTIFICATIONS AND EQUIPMENT DRAWINGS

- a) The Contractor must supply one (1) hard copy and one (1) electronic copy, in MS Word or PDF format, of the manuals which must include, but not limited to:
 - Installation and startup manuals
 - Calibration procedure and certifications
 - User Manuals including electrical, hydraulic and pneumatic schematics
 - Software back-up (CD, USD or on-line download)
 - OEM certifications
 - Maintenance, troubleshooting and parts manual
 - Procedure on how to place the system into a safe and reliable shutdown state
 - Emergency procedures
- b) Manuals must be provided in English language.
- c) The Contractor must provide electronic copies, in PDF format, of the system schematics, layouts, and equipment detail drawings.

6. MILESTONES

Item	Deliverable	Estimated Delivery Dates
1	Phase I, Engineering: Including the submission of design drawings, bill of materials, photos of parts and proof of design compliance to CSA, ESA, UL or a standard acceptable to CanmetMATERIALS.	On or before March 2 nd , 2020
2	Phase II, Build: Construction of the System.	On or before September 30 th , 2020
3	Phase II, Build: Deliver to location.	On or before December 20 th , 2020
4	Phase III, Installation and Commissioning: Acceptance is subject to meeting electrical safety standards and Site Acceptance Test.	By March 1 st , 2021.
5	Phase III, Installation and Commissioning: Training on-site.	By March 31 st , 2021

7. DELIVERY LOCATION

Delivery must be coordinated with the Technical Authority.

Natural Resources Canada
183 Longwood Rd. South
Room 147
Hamilton, Ontario, L8P 0A5
Canada

8. WARRANTY, SERVICE, SUPPORT & UPDATES

- a) The Contractor must provide for 1-year parts and labour warranty on the entire equipment. Warranty will begin on the day that the equipment is accepted as fully tested and operational to the approval of NRCan at CanmetMATERIALS.
- b) The Contractor must include technical support as either; regional technical support; technical phone support; or support via the Internet. Communication must begin within 72 hours of the initial request for support.
- c) Spare parts and service support must be made available for a minimum of three (3) years after the delivery of the system.
- d) The Contractor must provide all software updates and new releases for a period of at least one (1) year following acceptance, at no additional cost.

Note: The word "updates" means all enhancements, extensions or other modifications to the software. The word "releases" means enhancements or modifications to the software or new modules or supplementary modules that function in conjunction with the software, that represent the next generation of software, and which the Contractor has decided to make available to its customers usually for an additional charge.

Appendix 1 to Annex A

Table of Designated and Hazardous Substances

Notice of Designated and/or Hazardous Substances	
Contract No.:	
Project Address:	
Technical Authority:	
Inspection Authority:	
Contractor:	
Notice to Contractors: In accordance with applicable occupational health and safety, and/or environmental protection statutes, be advised that the following hazardous substances are, or may be present at the site of the Contract 23584-200546/001/TOR (check marked items):	
Substance	Additional Details Insert the names of the documents that you have available and that will be submitted. Also check off all designated substances that will be present
<input type="checkbox"/> Arsenic	
<input type="checkbox"/> Asbestos	
<input type="checkbox"/> Beryllium	
<input type="checkbox"/> Crude Oil	
<input type="checkbox"/> Dust	
<input type="checkbox"/> Flammable Liquids	
<input type="checkbox"/> Flammable Solids	
<input type="checkbox"/> Heavy Metals	
<input type="checkbox"/> Hydraulic & metal working fluids	
<input type="checkbox"/> Hydrogen Sulfide	
<input type="checkbox"/> Isocyanates	
<input type="checkbox"/> Lead	
<input type="checkbox"/> Lithium	
<input type="checkbox"/> Magnesium	
<input type="checkbox"/> Mercury	
<input type="checkbox"/> Oxidizing Substances	
<input type="checkbox"/> Ozone depleting substances	
<input type="checkbox"/> Radioactive materials	
<input type="checkbox"/> Silica (crystalline)	
Instructions to Contractors: Please complete the following sections of this form, and return a signed and dated copy to the Technical Authority with Phase I documents.	
We, _____ (name of Contractor) hereby acknowledge having received this "Notice of Designated or Hazardous Substances on Project."	
Signed by Contractor Representative:	
Name (Please Print):	
Date:	

Appendix 2 to Annex A

Building Constraints

All building constraints must be verified against the latest version of the buildings as built drawings and specifications.

1. Loading Dock Limits

- 1.1 The pinch point for truck unloading directly from their box or flatbed is the inner door and dock leveller.
- 1.2 Overhead door 2.3m wide x 3.0m high
 - Dock floor is 1.2m below finish floor of the ground floor level.
 - Dock leveller 20 Ton capacity with platform 2.1m wide x 2.1m long + drop down lip 2.14m wide x 2.22m Deep. Hydraulic leveller range is +/- 0.3m
- 1.3 The door at the top of the ramp is 2.3m wide x 3m high.

2. Elevator Limits

- 2.1 Passenger Elevator:
 - Load Limit: 1590 kg (3500 lb).
 - Door Opening: width of 1070 mm (42") and a height of 2134 mm (84").
 - Interior Dimensions: 2030 mm (6'8") wide by 1650 mm (5'5") deep by height to suspended ceiling of 2290 mm (7'6").
- 2.2 Freight Elevator:
 - Load Limit: 4545 kg (10000 lb).
 - Door Opening: width of 2440 mm (8'0") and a height of 2440 mm (8'0").
 - Interior Dimensions: 2440 mm (8'0") wide X 4290 mm (14'1") deep X height of 3050 mm (10'0").
- 2.3 Pallet truck Limit:
 - Load Limit: 2492 kg (5500 lb).

3. Associated Documents

Note: the content of this section is not all inclusive. It is the responsibility of the supplier to ensure that all relevant regulations, guidelines and standards are met as it applies to this scope of work.

- 3.1 Regulations, Guidelines, and Standards
 - 3.1.1 Government of Canada
 - Canada Labour Code Part II: Occupational Health and Safety
 - Canada Occupational Health and Safety Regulations
 - Canadian Electrical Code
 - National Fire Code
 - 3.1.2 Province of Ontario
 - Occupational Health and Safety Act
 - Ontario's 2012 OH&S Act and Regulations
 - Ontario Building Code (current edition)
 - Ontario Fire Code (current edition)
 - Environmental Protection Act
 - Ontario Electrical Safety Code 25th edition

Appendix 3 to Annex A

Acceptance Test Plan

1. Introduction

This document outlines the methods and testing procedures for all acceptance testing for the Power Generation Efficiency Characteristics Evaluation System. In order for acceptance testing to be completed successfully, the Contractor must perform all tests to successful completion in the presence of a CANMET MATERIALS Technical representative. Each test has two possible outcomes: pass or fail. Any failed test is reason for the entire test sequence to be failed.

2. Project Description

The system is being purchased to perform measurements of power conversion efficiency of a thermoelectric module.

3. Test Team Personnel

The test team consists of one tester, the Contractor and one primary, CANMET MATERIALS 's operator, who has the authority to sign off tests and one Inspector who can certify the electrical safety.

Table 1 - Client Representative:

Name	Role	Organization
	Primary Operator	
	Inspector	

Table 2 - Contractor Representative:

Name	Role	Company

Table 3 - Sign-Off:

By signing this document, the Contractor and the client both agree to the terms and protocols in the Acceptance Test Plan.

	Contractor Representative	Client Representative
Signature:		
Name:		
Title:		
Date:		

4. Site Acceptance Test Plan

4.1 Site Acceptance Test (SAT)

The SAT will be conducted at the CANMET MATERIALS site in Hamilton, ON after installation and commissioning has been completed.

4.2 Functional Testing

Item	Test Description	Details	Acceptance
1	The system must be able to achieve a base pressure of 3×10^{-6} Torr or better within 30 minutes.		
2	The system must be able to achieve hot side temperature anywhere between room temperature and 800 °C.	Any chosen set point temperature must be reached and stabilized to within $\pm 1.0K$, within 30 minutes.	
3	Demonstrate capability to export data into ASCII format.	Provide sample	
4	If there are utility failures, the system must shutdown without any hazard to the operators, facilities, or itself.		
5	There must not be any leaks in the plumbing and fitting of the system.	Visual check	

5. Calibration

The Contractor must provide calibration and provide certification of calibration of the equipment as installed at CANMET MATERIALS's lab. The measurements must be traceable to the International System of Units (SI).

Table 1:

Item	Test Description	Details	Acceptance
1	Calibration report		

6. Manuals, Certifications and Equipment Drawings

The Contractor must provide two (1) hard copies and one (1) electronic copy, in MS Word or PDF format of the manuals which must include, but not limited to:

- Installation and start up manuals
- Software back-up (CD, USD or on-line download)
- Calibration procedure and certifications
- User Manuals including electrical, hydraulic and pneumatic schematics
- OEM certifications
- Maintenance, troubleshooting and parts manual
- Procedure on how to place the system into a safe and reliable shutdown state
- Emergency procedures

Table 1:

#	Test Description	Details	Acceptance
1	Installation and start up manuals		
2	Software back up		
3	Calibration procedure and certifications		
4	User manuals		
5	OEM certifications		

6	Maintenance, troubleshooting and parts manual		
7	Procedure on how to place the system into a safe and reliable shutdown state		
8	Emergency procedures		

7. Safety Testing

CANMET MATERIALS expects that all instrumentation installed in the lab will conform to the Health and Safety standards outlined within the User Requirements Specification. The Health and Safety department also expects all automation, and instrumentation to be certified with the CSA standard. This section will ensure that the system conforms to these standards. All safety tests must be passed without exception. No deficiencies will be accepted for this section.

Table 1:

Item	Test Description	Details	Acceptance
1	Approval by an ESA, CSA or UL inspector	This inspection may occur over several separate dates.	
2	Demonstrate that equipment stops operation and safely shuts off in the event of cooling failure or over temperature.		

8. Deficiencies

Table 1 - Issues

Item	Test # / Sequence	Description	Comments

Table 2 - Action Plan

Deficiency	Action Plan

ANNEX B

BASIS OF PAYMENT

All prices must be firm in Canadian funds, Delivered Duty Paid (Hamilton, Ontario), Goods and Services Tax or Harmonized Sales Tax extra.

1. Contract Period: Date of award to April 30, 2021.

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Milestone No.	Description of Deliverable	Firm Lot Price
1	Completion and acceptance of Phase I, Engineering in accordance with Annex A and its appendices.	\$
2	Completion and acceptance of Phase II, Build in accordance with Annex A and its appendices.	\$
3	Completion and acceptance of Phase III, Installation and Commissioning, including training in accordance with Annex A and its appendices.	\$
*Total Evaluated Price:		\$

Note: All progress payments against milestones will include a 10% holdback to be released upon completion of the contract.

***At contract award, 'Total Evaluated Price' becomes 'Total Contract Price'.**

ANNEX C (to Part 3 of the Bid Solicitation)

ELECTRONIC PAYMENT INSTRUCTIONS

ELECTRONIC PAYMENT INSTRUMENTS

The Bidder accepts to be paid by any of the following Electronic Payment Instrument(s):

- () VISA Acquisition Card;
- () MasterCard Acquisition Card;
- () Direct Deposit (Domestic and International);
- () Electronic Data Interchange (EDI);
- () Wire Transfer (International Only);
- () Large Value Transfer System (LVTS) (Over \$25M)

ANNEX D (to Part 5 of the Bid Solicitation)

ADDITIONAL CERTIFICATIONS

1. Board of Directors

In accordance with Part 5 - Certifications and Additional Information, Article 5.2(a), Integrity Provisions – List of Names, Bidders are required to provide a complete list of names of all individuals who are currently directors of the Bidder before contract award. Bidders are requested to provide this information in their bid.

Director Name - _____	Title: _____
Director Name - _____	Title: _____
Director Name - _____	Title: _____
Director Name - _____	Title: _____
Director Name - _____	Title: _____
Director Name - _____	Title: _____
Director Name - _____	Title: _____
Director Name - _____	Title: _____

2. Procurement Business Number (PBN)

In accordance with Section 02, Procurement Business Number of the [2003](#) (2016-04-04) Standard Instructions - Goods or Services - Competitive Requirements, Suppliers are required to have a Procurement Business Number (PBN) before contract award. Bidders are requested to provide their PBN with their bid.

Procurement Business Number - _____

Suppliers may register for a PBN online at [Supplier Registration Information](#). For non-Internet registration, suppliers may contact the InfoLine at 1-800-811-1148 to obtain the telephone number of the nearest Supplier Registration Agent.