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ADVANCE CONTRACT AWARD NOTICE (ACAN)

1.   Title

Potential Temperature Trends under Climate Change Scenarios and the Impact on Energy Demand across Canada

2.   Definition

An Advance Contract Award Notice (ACAN) allows departments and agencies to post a notice, for no less than fifteen (15) calendar days, indicating to the supplier community that it intends to award a good, service or construction contract to a pre-identified contractor. If no other supplier submits, on or before the closing date, a Statement of Capabilities that meets the requirements set out in the ACAN, the competitive requirements of the government's contracting policy have been met. Following notification to suppliers not successful in demonstrating that their Statement of Capabilities meets the requirements set out in the ACAN, the contract may then be awarded using the Treasury Board's electronic bidding authorities.

If other potential suppliers submit Statement of Capabilities during the fifteen calendar day posting period, and meet the requirements set out in the ACAN, the department or agency must proceed to a full tendering process on either the government's electronic tendering service or through traditional means, in order to award the contract.

3.   Background

In summer 2013, NRCan requested participation from provinces and territories, energy and/or electricity agencies and companies, along with lead Climate Change modelling organizations to collaborate on a national-scale project to examine the risks and opportunities of changes in demand as a result of projected temperature trends under a changing climate. This project complements 5 other projects under the same theme. The first of these projects, which is now complete, generated temperature data under various climate scenarios that could be used in other energy or electricity forecasting models. Four other regional projects are underway that use the aforementioned temperature data in their regional energy or electricity forecasting models/tools (British Columbia, Yukon, Quebec and Manitoba). These projects are scheduled to be complete December 2014.

This particular project will use the ENERGY2020 (E2020) model, in combination with climate scenario data, to forecast national and regional energy demand under different climate scenarios.

E2020 has been identified as the model for this project as it is a multi-sector energy analysis system that simulates the supply, price and demand for all fuels. E2020 also allows for results that will show the direct impact of temperature change on energy demand. Its flexibility to be configured to any level of detail with regard to the energy system and the fact that is can aggregate results at a national level while providing disaggregate results for provinces and sectors is essential to this project. Moreover, E2020 has been used extensively by NRCan, Environment Canada and the National Energy Board and permits us to leverage the expertise of our colleagues working within similar areas within the Federal Government. In choosing the same tool we are also able to leverage the significant investment that has already been made by EC, NRCan and NEB to develop the reference case data. By using the same reference case data and model, this project will contribute to the national body of work looking at energy demand and supply scenarios and policies in a cohesive fashion.

4.   Objective

This contract will focus on executing model runs of approximately 5 pre-defined scenarios using the E2020 model. These scenarios will in effect, challenge an assumption that the weather (as represented here by temperature) of the past 30 years will be the weather of the next 30 years. As such, under this project the Contractor will need to modify the model in order to more precisely capture the monthly fluctuations in temperature and increase the sensitivity to the model to this variable that in the past may have been assumed to be relatively stable over time. In addition to output files aggregated and disaggregated as specified, the Contractor will assist with the analysis of the results, make adjustments to scenario data if required, prepare documentation pertaining to E2020 in non-technical language that will be incorporated into a final report, and provide support to the Project Authority in meetings.

The results of this contract will be data files containing the results and a report providing the Contractor's analysis and potential recommendations where appropriate.

THE SCENARIOS

The scenarios and level of disaggregation should allow for a robust analysis of how changes in the normal observed historical temperatures could impact demand for energy. The spatial requirements for the project are to run all scenarios for all provinces, territories and a few US states (as represented by census divisions) where there are significant electricity exports. The level of disaggregation should allow for outputs including:

- Data listed below specific to each Province and Territory but also aggregated at a national level
- Data listed below specific to each economic sector at the aggregated level (Residential, Commercial, Industrial, Transportation)
    - Enduses
    - Demand by Energy Source
    - Primary Energy Demands (TBtu/Yr)
    - Electricity Sales (GWH/Yr)
    - Price of Electricity ($/MWH)
    - Fuel and Electricity prices
    - Device Efficiency electric and non-electric

An energy demand scenario will be replicated for each of the following:

1. The historical energy demand for the period 1971-2000 (or a subset of such as 1980 – 2000) modeled using observed temperature (historical) information. The purpose of this scenario is to provide a comparable reference case to the temperature conditions in which industry and government and the public have experienced. It also provides confidence in the models ability.
2. Future projected energy demand for the period 2011-2040 using the observed historical temperature data from 1971 – 2000. The purpose of this scenario is to provide a future reference scenario to then compare the impacts of changes in temperature under the same assumptions (all other variables being equal).
3. Future projected energy demand for the period 2011 – 2040 using the 10th, 50th and 90th percentile temperature simulations for the same period. The purpose of running these scenarios is to represent the range of uncertainty in the climate models that provided the temperature simulations.

Temperature Datasets	ENERGY 2020 model runs	
	1971 – 2000 (30 years)	**2011 – 2040 (30 years)**
Observed 1971 – 2000	✔ Run 1[1]	✔ Run 2
2011-2040 (10th percentile)		✔ Run 3
2011-2040 (50th percentile)		✔ Run 4
2011-2040 (90h percentile)		✔ Run 5

4.1   Tasks

1. Modify model to expand to 12 months

a. Expand model from 2 to 12 months

b. Calibrate model

c. Obtain and input monthly historical temperatures

d. Obtain and input monthly load data (peaks, energy, load shapes)

e. Dynamically move heating and AC into months without load historically

2. Customize model output files for key variables of interest

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[1] **Each ENERGY 2020 model run has 30 years' worth of data.**

a. Identify variables for review and design customized reports

b. Create customized output files, review and revise as necessary

3. Review and update space heat and AC-related historical input data and assumptions

a. Review space heat and AC-related model input data and forecast assumptions

b. Incorporate revisions to input data and assumptions

c. Calibrate, review calibration parameters, and revise

d. Execute model, review, and revise

4. Review and revise response to temperature of AC saturation rate based on literature review and consultation with project team

a. Conduct research on, and/or analyze, the relationship between temperature and AC saturation rates

b. Modify model equations to incorporate response to temperature on AC saturation rates

c. Execute model with new equations; calibrate; check results and revise as necessary

5. Review and revise response to temperature of space heating and AC energy demand based on literature review and consultation with project team

a. Conduct literature review on relationship temperature to space heating and AC energy usage

b. Modify model's relationship of temperature to space heating and AC energy usage, if needed

c. Execute model with new equations; calibrate; check results and revise as necessary

6. Incorporate maximum and minimum seasonal temperatures as a multiplier on peak load

a. Incorporate maximum and minimum temperature data into model

b. Calculate peak load multiplier based on the maximum and minimum temperatures

c. Execute model with new equations; calibrate; check results and revise as necessary

7. Input historical temperature data and review model calibration

a. Input historical temperatures by province and territory into model

b. Execute model; calibrate; check results and revise as necessary

8. Set up and execute temperature scenarios

a. Input temperature scenario data

b. Set up and execute alternative temperature scenarios

9. Review and revise scenario results

a. Check peaks and energy, revise as needed

b. Check AC and heating loads, revise as needed

10. Perform temperature analysis on U.S. census divisions

a. Determine U.S. areas to include in consultation with NRCan team; incorporate into output files

b. Review and update U.S. space heat and AC model assumptions and input data

c. Incorporate U.S. historical temperatures and temperature scenarios

e. Execute model, review U.S. results and revise as necessary

11. Document model modifications and analysis of model's response to temperature

a. Write section on ENERGY 2020 assumption revisions and explanation of responses

12. Technical support, meetings, project management

a. Training and technical support

b. Meetings

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> c. Project tracking, monitoring, and status reporting
> d. 1 webinar to the Adaptation Platform

Implicit in the tasks above the Contractor will be asked to provide support and technical assistance for the following areas on an as-needed basis:

1. Technical Support for General Use of E2020 and Model Updates – The Contractor will complete the following tasks:

   a. Provide advice and support for the data update of the model and subsequently calibrate model's parameters to reflect new historical data.
   b. Provide support in understanding/analyzing and interpreting data related to scenario impacts
   c. Be available for teleconferences as needed to discuss results from model.

2. Technical Support for Policy Development and Sensitivity Analysis within E2020 – The Contractor will complete the following tasks:

   a. Develop and modify model output files to meet NRCan's needs
   b. Provide 1 webinar session to convey the E2020 results and analysis to members of the Adaptation Platform.

3. Documentation of the Methodology, Code, and Use of E2020. The Contractor will perform the following tasks:

   a. Document changes in methodology within any of the following modules as needed: electric supply, oil and gas supply, and natural gas transmission.
   b. Document changes in the key model assumptions and data sources
   c. Document the model code procedures and variables within the electric supply, oil and gas supply, and natural gas transmission sectors.
   d. Update and maintain documentation of the model User's Guide.

4.2   Deliverables

- Excel or MS Access readable output files of the 5 scenarios aggregated and disaggregated as noted (spatially by province, by Sector, end use, energy (fuel type) and year)

- Documentation that contains the following sections/information. All documentation must be of a quality and format that it be understandable by a non-technical audience.
  - An overview of the E2020 model, the scenarios being modeled and the methodology. This explanation must include how the causal relationship between temperature and energy demand is managed by the model described in non-mathematical terms (common language).
  - Written documentation on any modifications to the model, all key assumptions and any potential shortcomings or considerations when analyzing the model results.
  - Summary of consultants' analysis, considerations and recommendations based on the model results.

4.3   Milestone and Schedule

The work is to start immediately upon award of contract. The Contractor will propose precise timelines for the tasks listed in SW.4.1 for review and approval by the Project Authority.

Proposed General Timeline:

- Kick off meeting (December 22, 2014)
- Detailed timeline based on kick off meeting (January 5, 2015)
- First draft of results and analysis (March 2015)
- Final draft of report (June 30 2015)

Note: Exact delivery dates will be detailed in the award of the contract.

The Contractor will participate in a teleconference with CCIAD at the start of the contract to review and finalize the project details.

The Contractor will update the NRCan Project Authority as tasks progress by email.

The Contractor will notify the Project Authority on a timely basis (2 – 4 business days) if circumstances arise that will impact the project timeline or results.

The Contractor will hold a teleconference with CCIAD after delivery of the data and report to review progress.

5. Trade Agreements

Applicable Limited Tendering Provision under NAFTA (Article 1016.2)

1016.2(b) - where, for works of art, or for reasons connected with the protection of patents, copyrights or other exclusive rights, or proprietary information or where there is an absence of competition for technical reasons, the goods or services can be supplied only by a particular supplier and no reasonable alternative or substitute exists;

Applicable Limited Tendering Provision under AIT (Article 506.12)

506.12(a) - to ensure compatibility with existing products, to recognize exclusive rights, such as exclusive licenses, copyright and patent rights, or to maintain specialized products that must be maintained by the manufacturer or its representative.

Applicable Limited Tendering Provision under Canada-Chile (Article Kbis-09)

Kbis-09 (b) - protection of exclusive rights, such as patents or copyrights, or in the absence of competition for technical reasons, the products or services can be supplied only by a particular supplier and no reasonable alternative or substitute exists

Applicable Limited Tendering Provision under Canada-Colombia (Article 1409)

1409 (b) where the goods or services can be supplied only by a particular supplier and no reasonable alternative or substitute goods or services exist for any of the following reasons:

(i)   The requirement is for a work of art,
(ii)   The protection of patents, copyrights or other exclusive rights, or
(iii)   Due to an absence of competition for technical reasons;

6. Title to Intellectual property

The Contractor owns the Intellectual Property and NRCan has a license to use the tool.

7. Contract Period

The period of the contract shall be from date of award to **June 30, 2015**.

8. Estimated Cost

The estimated maximum value of the contract is $99,000.00.

9. Exception to the Government Contracts Regulations and applicable trade agreements

Sole Source Justification - Exception of the Government Contract Regulations (GCR):

(d) Only one person or firm is capable of performing the contract

As the developer of ENERGY 2020, the Contractor is uniquely able to make modifications to the ENERGY 2020 to allow for more robust analysis of how temperature will impact energy demand. These modifications to the model will be significant and could not be accomplished by another organization.

The vendor, Systematic Solutions Inc. is the sole owner and vendor of the ENERGY 2020 model and it has the exclusive ownership of the model and license on the use of the model. This technical support can be only delivered by the company that owns the software.

Systematic Solutions, Inc. is the only organization which contains the staff and knowledge base to successfully complete this project

Although there are other energy models in the market to prepare energy and emissions projections, ENERGY 2020 can uniquely provide:

1. Energy and emissions projections that are in line with Environment Canada's and National Energy Board's energy and emissions projections.
2. Energy and emissions projections for each year of the forecast.

10. Name and Address of the Proposed Contractor

Systematic Solutions, Inc.
1519 Heatherwood Trail
Xenia, Ohio, USA
45385

11. Inquiries on Submission of Statement of Capabilities

Suppliers who consider themselves fully qualified and available to provide the services/goods described herein, may submit a Statement of Capabilities in writing, preferably by e-mail, to the contact person identified in this Notice on or before the closing date and time of this Notice. The Statement of Capabilities must clearly demonstrate how the supplier meets the advertised requirements.

12. Closing Date

The closing date for submitting statements of capabilities is **31 December 2014 at 2:00 PM EST**.

13. Contract Authority

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