



REQUEST FOR QUOTATIONS (RFQ)

Title: St. Kitts and Nevis Transmission & Distribution Analysis

SUMMARY OF PROCUREMENT

RMI is seeking to perform a conversion of existing power flow data for the electricity grid of St. Kitts (operated by St. Kitts Electricity Company Limited “SKELEC”) and Nevis (operated by Nevis Electricity Company Limited “NEVLEC”) from an existing Electric Transient Analysis Program (ETAP) model to a DigSILENT™ PowerFactory model, in an effort to help standardize regional analytical tools for an initiative by Caribbean Centre for Renewable Energy & Energy Efficiency (CCREEE). With the grid models converted to PowerFactory, RMI is seeking analysis in this software of up to four electricity system expansion plan scenarios. This effort is part of a larger strategy in support of more standardized planning for both energy and resiliency in St. Kitts and Nevis.

About RMI

RMI decarbonizes energy systems through rapid, market-based change in the world’s most critical geographies to align with a 1.5°C future and address the climate crisis. We work with businesses, policymakers, communities, and other organizations to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50% by 2030.

For nearly 40 years, RMI has utilized our unique techno-economic expertise and whole-systems thinking to both publish groundbreaking research and analysis. We bring together collaborations of rare reach, range, and expertise—creating unconventional partnerships and mobilizing action to drive change on the massive scale needed to combat the climate crisis.

About RMI’s Energy System Expansion Plan of St. Kitts and Nevis project

RMI is undertaking an independent, objective, and fact-based approach to conduct an Expansion Plan for Saint Kitts and Nevis (SKN) which will feed into the country’s comprehensive Integrated Resource and Resilience Plan (IRRP). The Expansion Plan is being carried out with an inclusive approach and in close collaboration with the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE), the CARICOM Secretariat, The Government of Saint Kitts and Nevis, St. Kitts Electricity Company Limited (SKELEC), and Nevis Electricity Company Limited (NEVLEC).

The process and outcomes of the Expansion Plan will reflect the joint priorities and objectives determined by stakeholders, outlining their short-term and long-term visions for the electricity sector in the country. Additionally, knowledge exchange and capacity building will be a core part of the process to build upon the capabilities of stakeholders to conduct energy planning, ensure future stakeholders have the resources and learning material to increase their energy planning understanding, and ultimately to help institutionalize expansion planning capacity within CCREEE.

Based on the joint priorities and objectives, RMI will build up to 4 expansion plan scenarios and conduct capacity planning analysis using a Plexos model to determine the installed capacity and energy mix of generation. Besides this capacity planning, a transmission and distribution network analysis are required



for St. Kitts and Nevis to understand the grid integration requirements for various future system scenarios. The Transmission network assessment will analyze transmission capacity and security - the ability of the transmission network to continue operating reliably following unexpected contingencies and whether sufficient transmission capacity exists to move power across key interfaces and corridors in the system. The Distribution system will be analyzed to determine the potential distribution expansion plan to uphold and increase system reliability from the technical side. Therefore, these grid analyses, which are outlined in this RFQ, are critical to move forward with the Expansion Plan and IRRP of St. Kitts and Nevis and evaluate the feasibility of various future scenarios for the electricity sector.

SCOPE OF WORK AND OUTPUT/DELIVERABLES

Specifically, the consultant will provide the following services under each task:

Task A: Data Review

The initial data review of the power flow model provided will include:

- Review of the bus and line representations included in the ETAP model for completeness, based on SKELEC and NEVLEC provided single line diagrams;
- Preparation of a data request (as applicable) for clarification of any discrepancies between the ETAP model and known data sources;
- Correction / conformance of the existing model to the reply to the known correct data and data request results.

Task B: Data Conversion

Because no direct transfer / translation routine exists between ETAP and PowerFactory, the consultant will utilize the corrected model (or the original model as supplemented by data request results) to build a new PowerFactory model of the SKELEC and NEVLEC grid systems. To the extent there are data structure discrepancies between the ETAP model and PowerFactory, the consultant will make reasonable assumptions to complete or supplement the ETAP model. If necessary, the consultant will prepare a second data request to clarify any data discrepancies / deficiencies necessary to build a functional and accurate Power Factory model.

Task C: QA / QC Power Factory Model

Predicated on a completed model conversion, the consultant will perform a number of QA / QC functions to validate the accuracy of the model and attendant results. These include:

- Performing a “base case” assessment of the Power Factory model, and comparing the results to other external models (from ETAP or other software);



- Presenting the results of the initial power flow model test case to RMI, CCREEE, SKELEC, and NEVLEC to validate the results;
- Correcting the Power Factory model as necessary, predicated on commentary from the applicable stakeholders; and
- Resubmitting model results for review and final validation.

Upon completion of the QA / QC process described above, the consultant will deliver the validated “base case” model, along with the corrected ETAP model as applicable, to RMI and their stakeholders.

Task D: Expansion Plan Scenario Investigation

Using the validated Power Factory model, the consultant will prepare change cases for the transmission and distribution grid in up to four (4) expansion plan scenarios, which are developed by RMI using a Plexos model, and at varying time snapshots in the present and future. The consultant will perform standard capacity expansion analysis and power flow analysis, including both intact (N-0) and contingency (N-1) operating conditions, noting voltage violations and thermal violations based on SKELEC and NEVLEC operating criteria. The results of each of these analyses will be presented to RMI & CCREEE as the “as-is” result for the development scenario.

The consultant will then apply mitigating techniques to cure any violations or marginal conditions noted. These may include improvements to individual lines, transformers, or potentially even system re-dispatch under certain conditions. In some extreme cases, iteration between capacity planning from RMI and T&D analysis from the consultant could also happen to firm feasible integrated Expansion Plan scenarios. The consultant will also provide parametric (top-down) cost estimates for the system improvements necessary to mitigate the identified violations. A summary and relative ranking of all Expansion Plan scenarios under both “as-is” and post-mitigation conditions will be presented for completeness.

Overall, the analysis of the transmission network and distribution system will cover the following for all Expansion Plan scenarios: transfer capabilities across key grid interfaces and corridors; system improvements to meet reliability criteria, performance criteria, and demand growth; grid capacity expansion analysis; incremental system improvements for grid; and the feasibility of expected resource and infrastructure additions.

Task E: Training

During the preparation of the converted models and the initial IRRP development, the consultant will provide training to RMI, CCREEE, SKELEC, and/or NEVLEC on the basics of the use of the PowerFactory model, general power flow modelling considerations and specifically how mitigation techniques can be determined and applied. This is NOT intended as a full curriculum of how to perform these types of analyses, but as a primer for how to manipulate and provide adjustments to prepared cases, run them and interpret the results. All training will be performed virtually.

Deliverables



The deliverables associated with project are generally described above, and are provided here for completeness. They are as follows:

- A corrected ETAP model for SKELEC’s and NEVLEC’s use, at their discretion;
- A fully developed Power Factory model (and accompanying data request as necessary) of the existing SKELEC and NEVLEC transmission systems;
- Initial QA / QC of the Power Factory model results / outputs against other external modelling results, and any requisite modifications thereto;
- Results of up to four (4) Expansion Plan scenarios, including a ranking of their relative merit and associated implementation / mitigation costs; and
- Up to two days of virtual training, including applicable presentation materials for post-training reference, on the rudiments of PowerFactory use, power flow modelling and mitigation application, to be provided concurrent with the project execution.

Duration

Period of performance is March 21, 2022 – June 30, 2022. This is a limited term contract ending June 2022, subsequent contracts will be renewed based on successful performance of the previous contract.

GUIDELINES FOR QUOTATION SUBMISSION

Requirements

[Fill in the table below with all applicable information for the goods or services being procured. Delete any rows / columns that are not applicable.]

For RMI Procurement Lead to fill in:				For Tenderer to fill in:		
Line-item no.	Description of Goods / Services	Unit	Quantity required	Unit Price	Total Price	Estimated delivery date
1	Data Review	Days	[enter quantity]	\$	\$	
2	Data Conversion	Days	[enter quantity]	\$	\$	
3	Model QA/QC	Days	[enter quantity]	\$	\$	
4	Scenario Investigation	Days	[enter quantity]	\$	\$	
5	Training	Days	[enter quantity]	\$	\$	
Subtotal					\$	
Sales tax (if applicable)					\$	
Delivery charge (if applicable)					\$	
Other charges (if applicable)					\$	
TOTAL					\$	



Each tenderer must fill in the grayed sections in the table above.

The selected tenderer will also be able to demonstrate capacity in similar work or delivery of goods, particularly:

- Transmission and distribution system analysis using PowerFactory
- Grid analysis of island systems, in particular in the Caribbean

Quotation Content

Tenderers should submit:

- A statement of interest that includes a description of how the above Requirements are met
- Tenderer’s official name, address, and contact information
- Name, position, address, and contact information of person who is authorized to make decisions or represent the tenderer
- Type of entity
- Curriculum Vitae(s) (CVs) of core team
- Examples of and references for similar work
- Tenderer contact details
- Quotation validity period

Quotations, including all supporting documents, should be written in English and financial information should be provided in USD. Supporting documents may be in another language, provided they are accompanied by an accurate translation of the relevant passages in English.

RMI is aware that information contained in a quotation may indicate a tenderer’s current operations and may be confidential. Therefore, RMI requests that any confidential information in a quotation be clearly identified as such and RMI will treat it as confidential.

All materials submitted with a quotation become property of RMI. RMI will have the right to use all ideas or adaptations of the ideas contained in the quotations received subject to clearly identified confidential or proprietary limitations. Disqualification of any quotation does not restrict or eliminate this right.

RFQ Process & Timeline

Stage of Procurement	Date, Time, Time zone
RFQ released	February 4, 2022. 9:00 am MT
Deadline for questions	February 14, 2022. 5:00 pm MT
Questions answered by RMI	February 18, 2022. 5:00 pm MT
Quotation submission deadline	February 25, 2022. 5:00 pm MT
Interviews with selected tenderers (if applicable)	March 7 – 11, 2022
Final tenderer selection	March 14, 2022



All questions about this RFQ must be received via electronic mail to the contact below. Answers to the questions will be shared with all parties who have asked questions or otherwise expressed interest.

All quotations must be sent via electronic mail to the same contacts listed below by Friday February 25, 2022, 5:00 pm MT.

<i>Kaitlyn Bunker</i>	<i>Sidney Jules</i>
<i>Director, Islands Energy Program</i>	<i>Senior Associate, Islands Energy Program</i>
<i>RMI</i>	<i>RMI</i>
<i>kbunker@rmi.org</i>	<i>sjules@rmi.org</i>

When sending questions or submitting a quotation please use this electronic mail subject: ***Quotation for St. Kitts and Nevis T&D Analysis.***

Please note that it is the tenderer's responsibility to ensure that the quotation and all other required documents are received by the closing date at the email address specified above. Quotations received after the time and date specified will not be reviewed or considered. Failure to provide any information requested in this RFQ may result in rejection for non-responsiveness.

EVALUATION AND SELECTION

Evaluation Criteria

The following elements will be the primary considerations in evaluating quotations submitted in response to this RFQ.

Criteria	Weighting
1. Portfolio and prior work (20%)	20%
2. Demonstrated capacity and qualifications of the prospective firm to perform the work (20%)	20%
3. Approach to the project, including a thoughtful response to the objectives outlined in the RFQ, with attention to the scope of work, deliverables, and other major details (20%)	20%
4. Price, or Financial proposal (or formula) for the work (40%)	40%

The tenderer offering the best overall value will be selected. For this procurement, price is considered more important than non-price aspects.

Selection Process

No quotation development costs shall be charged to RMI. All expenses are to be borne by the tenderers. RMI may award to the tenderer offering best value without discussions. However, RMI reserves the right



to seek tenderer clarifications and to negotiate with those tenderers deemed to be within a competitive range.

RMI may, at its discretion and without explanation to the prospective tenderers, choose to discontinue this RFQ without obligation to such prospective tenderers or make multiple awards under this RFQ. Procurement contracts will not be awarded to tenderers debarred by the U.S. government or named on restricted parties lists. Any quotation may be rejected in whole or in part for good cause when in the best interests of RMI.

A quotation will be selected based on the evaluation of the RFQ response, the interview results, any necessary vetting and due diligence, and the satisfactory outcome of financial negotiations. After the selected tenderer and RMI have entered into a contract for goods/services, RMI will notify the unsuccessful tenderers.

Any Tenderer who wishes to ascertain the grounds on which its quotation was not selected, should request explanation. The RMI procurement contact shall promptly provide in writing an explanation of why such quotation was not selected. Please note, if a tenderer requests a debriefing meeting, the Tenderer shall bear all their costs of attending such a debriefing meeting and the hourly rates of the RMI staff required for the meeting if significant expenses are incurred by RMI.



Questions and Responses to Request for Quotations (RFQ) for St. Kitts and Nevis Transmission & Distribution Analysis

February 18th, 2022

Question	Response
<p>1. We recognize that there are two separate utilities involved in the project. May we assume that all training activities will be done jointly, or should we provide for separate sessions?</p>	<p>Training activities will be carried out with both utilities (NEVLEC and SKELEC) in joint sessions.</p>
<p>2. We have reviewed the infrastructure information available for the islands. Are there two separate existing ETAP models, or are they combined in a common file?</p>	<p>There is a single ETAP model, which includes detailed information on the Nevis electricity system, and St Kitts represented as an equivalent circuit. An existing model of similar detail does not currently exist for St. Kitts in ETAP (existing St. Kitts models are in CYME and PSS/E. Therefore, a PowerFactory model of St. Kitts will need to be converted from the CYME or PSS/E models (subject to availability) or created using single line diagram information received by the consultant.</p>
<p>3. If there are two separate existing models, will two separate PowerFactory models be required as part of the deliverables?</p>	<p>One PowerFactory model will be required as part of the deliverables. It should detail the individual networks of St. Kitts and Nevis, as well as a potential connection between them.</p>
<p>4. Approximately how many buses are there in the existing ETAP model(s)? This is to ensure that our PowerFactory license is sufficient.</p>	<p>The existing ETAP model consists of approximately 50 buses for Nevis. It is estimated that at least 60 additional buses will need to be created for St. Kitts.</p>
<p>5. The RFQ references up to four (4) expansion plans. If known, how many individual resources are associated with each expansion plan? A typical number is sufficient.</p>	<p>Each expansion plan will be associated with 4 – 7 individual resources, comprising of existing and future generation options.</p>
<p>6. May we assume that all training will be done virtually, and that no travel is required? We are happy to do so should it be requested, but would need to understand this as part of our bid.</p>	<p>All training will be done virtually. No travel is required.</p>