

Continuous Optimization Program

Real Time Energy Management—service provider scope of work

FROM THE C.OP “REAL TIME ENERGY MANAGEMENT” AGREEMENT:

5. RTEM Service Provider Scope of Work

This Scope of Work sets forth the professional services and technical assistance the RTEM Service Provider will supply for the Program. The RTEM Service Provider and RTEM System Vendor are to work together to provide an integrated solution to the Facility. The RTEM Service Provider is to take the lead role in providing the required BC Hydro deliverables.

If the Applicant has entered into a prior Program Services Funding for Commercial Buildings Agreement with BC Hydro (the “First Agreement”), any historical Continuous Optimization project documentation from activities undertaken under that First Agreement will be used to guide activities under this Agreement. The Applicant acknowledges and agrees that ascertaining the condition of and re-establishing the successful operation of previously installed measures under the First Agreement (the “Round 1 Measures”) is an important aspect of matters undertaken under this Agreement. The Applicant will report to BC Hydro on all Round 1 Measures in its reporting under this Agreement. If Round 1 Measures are no longer operational, the cost of re-establishing the Round 1 Measures may be included as part of the Bundle of Measures contemplated under this Agreement.

5.1 RTEM System Deployment

The RTEM Service Provider’s role in the deployment of the RTEM System is to be determined between the RTEM Service Provider and the RTEM System Vendor.

5.2 Investigation Phase

The RTEM Service Provider will conduct a rigorous and comprehensive investigation and analysis of the building operations, seeking to identify deficiencies and potential optimization in the operation of the building energy consuming systems and related controls. Although the identification of major retrofits is encouraged, the goal of the Program is to optimize existing equipment through the use of RTEM System and associated analysis.

The tasks include, without limitation:

- (a) arrange a kick-off meeting with the Applicant and appropriate facility staff to discuss any facility access and security issues, and to communicate the approach for the investigation process, including data acquisition.
- (b) gather facility documentation (plans, equipment schedules, schematics, specifications, operations and maintenance manuals, testing and balancing reports) and associated Building Automation System (“BAS”) documentation (sequence of operation descriptions, architecture descriptions and layouts).

- (c) use the RTEM software tool to investigate, and analyze the general types of systems:
- (i) Central Plant(s) including the following general types of equipment:
 - Chillers
 - Cooling towers
 - Boilers
 - Pumps
 - Control systems
 - (ii) Central Air Handler(s)
 - Fans
 - Chilled water coils and valves
 - Hot water coils and valves
 - Dampers
 - Control systems, including VFDs and outside air and economizer control
 - (iii) Zonal HVAC
 - HVAC delivery to the space (air and/or water distribution, whether dual duct, VAV terminals with re-heat, hydronic, etc.)
 - Control systems for HVAC delivery and zonal temperature control
 - (iv) Major Unitary Systems
 - Water source heat pumps
 - Rooftop package units (15 tons or over)
 - Controls
 - (v) Lighting Systems
 - Interior lighting controls
 - Exterior lighting controls
 - (vi) Refrigeration Systems
 - Controls
 - (vii) Domestic Hot Water Systems
 - Heaters/boilers
 - Controls
- (d) use the RTEM System to assess equipment operation and to identify deficiencies and measures for improvement.
- (e) track investigation activities using the *Recommissioning Workbook* provided by the Program and report progress to BC Hydro and the Applicant.
- (f) use engineering calculations or simulation models to estimate the potential energy and demand impacts of implementing the identified measures for each utility (electricity, gas, steam, etc.), according to the Program's *Documentation Guidelines*.
- (g) record and track investigation findings using the *Recommissioning Workbook*. From the *Recommissioning Workbook*, produce an Investigation Phase Summary Table including potential measures for implementation, energy savings, estimated implementation costs, and initial payback calculations.
- (h) submit *Recommissioning Workbook* to BC Hydro. Support each finding with data that clearly indicates the deficiency or problem, including engineering calculations, trend or portable logger data plots and files, functional test results, site visit reports, and photographs, as appropriate. These should be generated during the investigation process.

- (i) meet with the Applicant and the BC Hydro Program Representative (optional) to present the *findings* and assist the Applicant in selecting measures for implementation.
- (j) using the Program's template, produce the *Recommissioning Report*, further detailing the actual measures that were selected for implementation. The *Recommissioning Report* should provide information to assist the Applicant with implementation, including: recommendations for how to implement the selected measures, budget estimates or bid costs from contractor(s) for the selected measures, proposed RTEM Service Provider assistance (if chosen by the Applicant), and the appropriate methods for verifying measures are operating as intended (refer to *Documentation Guidelines*).

5.3 Implementation Phase

Note: Program funding is not available for activities undertaken during the Implementation Phase.

- (a) if engaged by the Applicant, the RTEM Service Provider should develop an Implementation Plan, to establish the level of additional RTEM Service Provider assistance desired or warranted for each potential measure. Additional implementation assistance may include; preparing detailed scopes of work, writing detailed control sequences and schematics, working with in-house staff to implement and optimize measures, or providing full turn-key implementation services. As appropriate, total estimated costs should detail out the Applicant contractor costs and RTEM Service Provider implementation assistance costs. It is encouraged that the basis for cost calculations be documented.
- (b) prior to work starting, review the contractor bids ensuring that the contractor scope of work adequately reflects the intent of the original recommendations developed by the Applicant and RTEM Service Provider, and include verification of performance sufficient to meet the Applicant's requirements for proof of improvement. If needed, answer questions that arise during implementation and provide clarification or advice on measures being implemented.
- (c) provide field review for all implemented conservation measures.

5.4 Completion Phase

The tasks for the Completion Phase include, without limitation:

- (a) verify completion of each measure and update *Recommissioning Workbook* with final implemented measures including final savings, costs, and payback calculations. To support the *Completion Phase Summary Table* (included in the *Recommissioning Workbook*), selected measures with significant savings potential should have verification data demonstrating that the measures are operating as intended along with updated savings calculations. When feasible, verification data should include trends or functional test results, though other methods, such as copies of invoices, site visit reports, and before/after photos, may be acceptable.
- (b) Conduct an in-house training presentation for the Applicant and the appropriate building operations personnel covering the new documentation, measures that were implemented, and requirements for ongoing maintenance and monitoring. Document the attendance of the building operations staff.
- (c) submit the updated *Recommissioning Report* to document the implemented measures, including, but not limited to: date of completion of each measure, new or improved sequences of operation, the energy savings impact of the measures, the requirements for ongoing maintenance and monitoring of the measures, and contact information for the RTEM Service Provider, in-house staff, and contractors responsible for implementation.

6. RTEM System Vendor Scope of Work

This Scope of Work sets forth the professional services and technical assistance the RTEM System Vendor will supply for the BC Hydro Continuous Optimization Program Services.

6.1 RTEM System Installation

Work with the RTEM Service Provider as required installing and configuring the software, including confirming and inputting building system and/or component characteristics, and mapping data points from the BAS (and other building systems) to the RTEM solution.

6.2 BAS Data Access

Provide or secure any required hardware, software and labour to gain access to the required BAS or other building system data in the form required by the RTEM System solution. Also provide or secure any changes to the BAS system (e.g. programming additional trends) to facilitate the flow of data.

6.3 RTEM Software Configuration

Activate available analytics or create new analytics to suit the building's systems and operation. Calibrate and commission the solution as required. Set up associated reporting.

6.4 Training

Provide training to building operations staff.