PROCUREMENT SERVICES

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ADDENDUM No. 1

REQUEST FOR PROPOSALS No.:	**1220-030-2020-005**
TITLE:	**Waste Heat Recovery Study for Surrey City Energy**
ADDENDUM ISSUE DATE:	**September 9, 2020**
CLOSING DATE AND TIME:	**ON OR BEFORE THE FOLLOWING DATE AND TIME (THE "CLOSING TIME"):** **TIME: 3:00 P.M. (LOCAL TIME)** **DATE: September 30, 2020**

INFORMATION FOR PROPONENTS

Proponents are advised that Addendum No. 1 to 1220-030-2020-005 is hereby issued by the City. This addendum shall form part of the contract documents and is to be read, interpreted and coordinated with all other parts. The following information is provided to answer questions raised by Proponents for the above-named project, to the extent referenced and shall become a part thereof. No consideration will be allowed for extras due to Proponents or any sub-contractor not being familiar with this addendum. This Addendum No. 1220-030-2020-005 contains eleven (11) pages including attachment.

QUESTIONS AND ANSWERS:

Q1. The RFP states preference for consulting firm to be a member of the BC Hydro Alliance of Energy Professionals. What would this be in terms percentage points for evaluation. We DO NOT belong to the Alliance but we are well qualified and looking to bid. Would you have preference for a local vendor over out of province?

A1. The intent is for proponents to assemble a team of consultants with expertise in 1) building heating/cooling system design and 2) district energy systems to complete the in-scope activities as described in Section 3 (Project Activities – IN SCOPE) of Schedule A (Scope of Services) of the RFP. Specifically for Sections 1 (Building Archetypes) and 2 (Technical Evaluation Cooling/Waste Heat Recovery Options), it is a requirement for the prime or lead engineer to be a member in good standing with the BC Hydro Alliance of Engineering Professionals with the engineer-of-record registered with EGBC. Proposals

will not be considered unless there is a BC Hydro Alliance registered firm or engineer that acts as the prime/lead for Sections 1 and 2 of the in-scope project activities.

The Alliance member firm is familiar with BC Hydro's Conservation and Energy Management Study Program process, scopes, forms, templates and deliverables.

The consultant may assemble the study team she or he feels appropriate to deliver the scope of work as outlined in the RFP that meets BC Hydro's *Low Carbon Electrification* study guidelines (refer to document below). BC Hydro will accept non-Alliance members, working under the Alliance registered firm or engineer, to sub-contract their expertise to the study team in the proposal. Once the City awards the consultant(s), the Alliance member firm is expected to submit a proposal on low carbon electrification opportunities, study results, and report summary to BC Hydro. A meeting will be arranged between the consultant(s) and BC Hydro at the start to discuss deliverables and expectations.

Refer to BC Hydro's website for additional information on the Alliance including how to become a member, eligibility requirements, estimated time for membership application to be processed:

https://www.bchydro.com/work-with-us/alliance.html

It is not a requirement for the consultant(s) to be local, so long as the prime or lead engineer responsible for Sections 1 and 2 is a member of the BC Hydro Alliance of Engineering Professionals.

Refer to BC Hydro's LCE study guidelines in next page.

All Addenda will become part of the Contract Documents.

- END OF ADDENDUM -

1. Purpose

The purpose of this document is to provide guidance on completing a Low-carbon Electrification Study (LCES) to determine the feasibility of electrifying systems that would normally be powered with fossil fuels. The evaluation includes consideration of incremental capital costs for electrification, operating cost differences and avoided greenhouse gas emissions over a prescribed period following conversion to low-carbon electricity.

The study deliverables include a report and supporting documentation sufficient to bring go / no-go recommendation on low-carbon electrification (LCE) projects and facilitates BC Hydro support. The scope of work, methodology, deliverables and reporting are outlined in this guideline. It is understood that variations may be required, given reasonable consideration.

2. Study Proposal Requirements

The following documentation is required for an Industrial LCES proposal submitted to BC Hydro.

2.1. LCE Pre-Screen Submission:

2.1.1. LCE Project Workbook Section:

2.1.1.1. Pre-Screen: LCE Project details including baseline information and proposed LCE measures.

The Pre-Screen will be reviewed upon submission and if the project advances the customer will be contacted by their BC Hydro Key Account Manager. The customer can then select a consultant to perform the LCE study. The customer will provide the engineering consultant with the completed Low-carbon Electrification Project Workbook Pre-Screen to use in preparing a study proposal.

2.2. LCE Study Proposal Submission:

2.2.1. Study Proposal: Typical proposal according to standard business practice.

2.2.2. LCE Project Workbook Sections:

2.2.2.1. Pre-Screen: Completed as per prior submission by the customer. If updates are required, do so with approval of the customer.

2.2.2.2. Proposal: Enter consultant study proposal details including scope and costs.

Proposals will be reviewed by BC Hydro Conservation Energy Management Engineering (CEME) for technical approval. Once the proposal is approved a study funding agreement will be generated by BC Hydro CEM Operations.

Scope

The scope of work is to apply the methodology laid out below to the system described and contained within the system boundary. Collaborations with customers are required as are site visits. Relating to the sections of this document, the work entails but is not limited to:

2.3. Full understanding of the system and operation as explained in section 4.1 and 4.2, titled Project Description and System boundary respectively.

2.4. Developing baselines in terms of production, energy and greenhouse gas profiles, as per section 4.3.

2.5. Evaluating costs and benefits of each electrification option as per section 4.4 through 9.9. Included in the evaluation are interconnection considerations, efficiency upgrades, schedules, risk analysis and final recommendations.

2.6. Statements on accuracy, exclusions and assumptions as per section 5.0 and 6.0

2.7. Preparing deliverables as per section 7.0 and reporting out as suggested in section 8.0 which will meet the customer's needs and facilitate BC Hydro's technical review to meet funding requirements.

3. Energy Engineering Methodology

The study is expected to adopt an approach that is logical and transparent and document assumptions and conclusions. Some studies may require a modified methodology and some items are not relevant in every situation.

3.1. Project description

It is important to develop and communicate a clear understanding of the system to be evaluated in terms of primary equipment, process, product and operating practice.

3.1.1. A good project description is critical to identifying energy and product flows through the system including electricity consumption, fossil fuels, biomass, and other fuels with comparisons to previous years.

3.1.2. Valuable insights may be available from similar or previous work, such as Plant Wide Audits, End-use Assessments and Energy Studies.

3.2. System boundary

3.2.1. The system boundary defines the subject of the study and contains the analysis.

3.2.2. Defining an LCES system boundary may add or remove components/areas from the analysis. While system boundaries may also be used to define distinct energy interactions with other systems within the plant.

3.3. Baseline operations

The baseline reflects the energy usage at a defined level of service such as production, quality, and O&M in the absence of any LCE design and BC Hydro influence or assistance. Historical and planned production and performance are needed to generate a baseline of energy usage and operating profiles which should span at least 10 years.

3.3.1. Determine the system's energy usage within the system boundary with an appropriate baseline (See Document DSM Baseline Eligibility Determination Guideline for more information):

3.3.1.1. *Initial Baseline* is the annual energy consumption of an existing system (pre-retrofit). It may be calculated from metered data or from rated power values and operating assumptions

3.3.1.2. *Adjusted Baseline* is required if the existing system loading will change to accommodate a different level of service, production rate.

3.3.1.3. *Theoretical Baseline* is an energy profile of an equivalent service alternative which is a viable fossil fuel driven system (or modified version of existing system) that provides an equivalent level of service to the electrified system.

3.3.2. Develop the baseline using the following:

3.3.2.1. Energy, demand and greenhouse gas emission profiles must be relative to expected levels of service over time, typically ten years. GHG emissions rate and totals as per Government of BC Regulation (Greenhouse Gas Industrial Reporting and Control Act)

3.3.2.2. Equipment nameplate data and estimates or measurements of equipment and system efficiencies.

3.3.2.3. Control system and operation strategy. Review process and instrument diagrams and control ability and strategy.

3.3.2.4. Compare the system performance with a similar facility where possible.

3.3.2.5. Revise assumptions and estimates until end-use measurements and calculations verify operation and baseline profile. Use actual or planned baseline production of all products. Use assumptions about product type, properties and quality as required.

3.4. Electrification Opportunity Identification and Evaluation

Identify and evaluate potential Low-carbon Electrification opportunities to a cost and savings confidence necessary for decision making on recommending actions. Accurate operating characteristics and conditions lead to an understanding of system requirements and corresponding control strategies for each opportunity. Identify and evaluate low-carbon electrification opportunities as the difference between anticipated electricity usage and the baseline fossil fuel usage; including the reduction in greenhouse gas emissions.

3.4.1. Energy usage of the electrified option versus the fossil fuel baseline. Include energy usage reduction due to electric versus thermal efficiencies if applicable.

3.4.2. Greenhouse gas emission reduction due to use of low-carbon electricity. Determine GHG emissions as per Government of BC regulation requirements (Greenhouse Gas Industrial Reporting and Control Act)

3.4.3. Retain a description of methodology and assumptions used to calculate savings and all data collected and used in the analysis, and instruments used.

3.4.4. Perform cost and benefit analysis - develop the following for each low-carbon electrification opportunity

3.4.4.1. Generate a capital cost estimate for the electric option and selected baseline. Determine the incremental cost which is the cost of the LCE measure, minus the baseline cost (initial, adjusted, or theoretical baseline).

3.4.4.2. If baseline conditions are for an existing system (*Initial Baseline*), the baseline capital cost estimates may be $0.

3.4.4.3. Electricity cost vs fossil fuel cost (baseline) at current and projected rates. Consider inflation at 2%/yr. and carbon tax growth as currently proposed.

3.4.4.4. Greenhouse gas emissions for electricity usage vs fossil fuel. Using fossil fuel efficiency and usage profiles.

3.4.4.5. O&M costs for electric vs fossil fuel (baseline): labour, materials, and rebuilds, etc. If fossil fuel equipment is to remain in place include the cost of care and maintenance.

3.4.4.6. Total project implementation cost estimate for the electric option vs baseline. If fossil fuel equipment is to be removed include the salvage value.

3.4.4.7. Based on the final economic and financial results identify if there is there a role for BC Hydro in providing financial incentives to improve the feasibility of this project. If so, explain and quantify?

3.4.4.8. Simple payback period in years (Incremental cost / Savings).

3.4.5. Quantify non-energy benefits, improvements in quality, reliability, and serviceability and production capacity. Where applicable include changes in fugitive emissions and waste products. Comments related to safety, comfort, ease of operation and labour intensity are all valid benefits.

3.5. Electrical interconnection

At the time of evaluating low-carbon electrification project feasibility there may be relevant interconnection information and discussions with BCH Interconnections group to consider.

3.5.1. Review the incremental electric demand (kW) and energy (kWh) increase on the customer electrical service. Verify the total annual peak and average demand at the customer site will not exceed the limits of their ESA (Energy Service Agreement). If so contact BC Hydro Industrial Connections. Industrial Connections

3.5.2. Confirm and mark up single line drawing as required. (i.e. Line size, protection and controls upgrades, etc.)

3.5.3. Identify metering requirements where applicable.

3.5.4. Review interconnection and facility study results to date.

3.5.4.1. Feasibility, system impact and facility studies may be required where sites intend to increase electricity demand beyond existing Energy Service Agreement.

3.5.4.2. More information on electrical service upgrade is available from BC Hydro's Load Interconnections group. Industrial Connections.

3.5.5. Include a capital cost estimate for electrical service upgrade which includes all costs that may be associated with an increase in demand (i.e. line size, protection and control upgrades, etc.).

3.6. Facility energy efficiency upgrades

3.6.1. Identify energy efficiency updates that may be considered for implementation along with low-carbon electrification; including associated demand and energy savings (kW and kWh/yr.)

3.6.2. Energy efficiency can only be included in an electrification project if it comes with no incremental cost to the electrification project and is only available at the time of electrification. In addition, if it comes at an incremental cost the customer may include it at their cost.

3.6.3. In the case of a new facility the incremental cost of energy efficiency may be eligible for New Plant design incentives. If available after time of electrification and comes at an incremental cost the customer may apply for BC Hydro incentives via a BCH funded energy manager.

3.7. Project Schedule & Risk Analysis

3.7.1. Develop a schedule overview including all key deliverables and major milestones.

3.7.2. Produce a project risk analysis and mitigation strategy.

3.7.3. Layout a strategy ranking priority of major tasks.

3.8. Recommendations

3.8.1. Qualify Electrification Opportunities in terms of first costs, operating costs, energy costs, greenhouse gas emissions, probability of implementation and risks.

3.8.2. Identify and describe potential barriers to implementation and recommend how to overcome. Including incentives where needed.

3.8.3. Lay out an implementation strategy ranking priorities and major tasks.

3.9. Verification

3.9.1. Develop measurement and verification recommendations reflecting the low-carbon electrification impacts and performance gains if applicable.

3.9.2. New facility baselines may be verified annually where loads are expected to vary over time. A single verification will be undertaken after a period of stable operation when loads are expected to remain constant.

4. Accuracy

4.1. Recommendations for implementation typically require an energy and GHG impact evaluation with confidence interval of ±10%, also see 4.4 below.

4.2. Estimate implementation costs in compliance with Class 3 of Association for Advancement of Cost Engineering International, Recommended Practice No. 18R-97 found at www.aacei.org.

4.3. Implementation costs and benefits need to be at an accuracy that encourages decisions to on how to proceed with implementation of Electrification Opportunities.

4.4. Indicate confidence interval immediately after values that fall outside described ranges.

5. Exclusions and Assumptions

5.1. Logical assumptions are necessary to contain investigations and analysis. Similarly, they are needed to support related energy and GHG claims. Document as required.

5.2. Evaluation of some opportunities may lead to a recommendation not to proceed.

5.3. The details of a low-carbon electrification opportunity must not be so specific as to exclude all vendors and manufacturers but one, unless the measure requires a new technology that is only available from one source.

6. Deliverables

6.1. Report as per section 8, below

6.2. For each electrification option complete a “Low-carbon Electrification Project Summary Table”, see example in Appendix I.

6.3. Related files used in conducting study and analysis, including calculation spreadsheets.

6.4. Optional Presentation or wrap-up meeting on or off site

7. Recommended Report Content

7.1. System background and description of primary equipment, product and production along with any other relevant information.

7.2. Energy end-use quantities, greenhouse gas emissions and costs for energy and demand and consumption of fossil fuels, biomass and others. Also, include energy balances and verification measurements

7.3. Baseline Operating Profiles. If applicable include self-generation profiles, generation assets, spare capacity and annual operating profiles and include fuel supply details etc.

7.4. Comment on the impact of past study results on the current baseline operating profiles.

7.5. Electrification recommendations including summary of priorities, next steps and experienced-based comment:

7.5.1. Energy, demand and anticipated GHG reduction associated with each measure.

7.5.2. Cost and benefits at a confidence sufficient for decisions on implementation.

7.5.3. How to verify impact of low-carbon electrification implementation.

7.6. Risk assessment and probability of recommended actions proceeding.

8. Conservation and Energy Management Review

8.1. The Low-carbon Electrification study results will be reviewed by the Conservation & Energy Management Engineering Industrial team which will look for reasonable assumptions, appropriate methodology and results that are consistent with sound engineering judgement and similar project experience.

8.2. The Conservation & Energy Management team will not analyse the reported results in enough detail to verify all calculations. If gross errors are discovered the customer/consultant will be informed and given every opportunity to revise the report.

8.3. The customer/consultant retains all responsibility for content including conclusions, recommendations and claims contained in the reported results.

Appendix I – Sample of Low-carbon Electrification Project Summary Table Required for Low-carbon Electrification Feasibility Study

Low Carbon Electrification Project Summary Table

BCH Project Number:
Project Title: **Sample LCE T Project**
Customer:
Customer Representative: Name:
Position:
Company:
Date:

Canadian Dollars only

Baseline (Existing or New Plant)					LC Electrification Project			
	Estimated Cost Range				Estimated Cost Range			
Initial Capital Costs (New plant Only):	Low ($)	Best Estimate ($)	High ($)	Comment	Low ($)	Best Estimate ($)	High ($)	Comment
Capital cost (Baseline and LCE):								
Equipment	$70,000	$80,000	$90,000		$70,000	$100,000	$130,000	
Installation	$7,000	$10,000	$13,000		$10,000	$15,000	$20,000	
Commisioning	$1,000	$1,500	$2,000		$1,500	$2,000	$2,500	
Training								
Interconnection Cost (LCE Only / excl. study costs):								
Equipment					$4,000	$5,000	$6,000	
Installation					$1,500	$2,000	$2,500	
Commisioning								
Other initial cost (1) (name)								
Other initial cost (2) (name)								
Capital Cost Sub Total	$78,000	$91,500	$105,000		$87,000	$124,000	$161,000	

Production and O&M:	Low ($/yr)	Best Estimate ($/yr)	High ($/yr)	Comment	Low ($/yr)	Best Estimate ($/yr)	High ($/yr)	Comment
Incremental Production Revenue (LCE Only)								
Maintenance Labour Cost	$18,000	$20,000	$23,000		$5,000	$6,000	$7,000	
Operation Labour Cost	$5,000	$8,000	$10,000		$4,000	$5,000	$6,000	
O&M Cost Sub Total	$23,000	$28,000	$33,000		$9,000	$11,000	$13,000	

Baseline (Existing or New Plant)

ELECTRICITY RELATED GHG EMISSIONS

Electrical Energy	Quantity	Units	Rate ($/unit)	$ per Year	E_Factor tCO2e/GWh	GHG emissions (tonneCO2e/yr)
Purchased	**8,760,000**	kWh/yr	**$0.08**	700,800	10.67	93
Generated	-	kWh/yr	**$0.10**	-		
Peak Demand	**1,000**	kW	**$7**	84,000		
Average Demand	**900**	kW				
			Totals:	**#####**		

STATIONARY END USES (ie. Motors, pumps, etc)

Fuel Type	Quantity	Units / yr	Rate ($/unit)	$ per Year	kWhe_input / year	E_Factor kgCO2e/GJ	GHG emissions (tonneCO2e/yr)
Natural Gas	**162,500**	**m3**	**0.00**	$0	1,753,646	49.87	314.84
Gasoline			**1.33**				
			Totals:	**$0**	**1,753,646**		**314.84**

MOBILE END USES (ie. Transport)

Tranport Mode	Fuel Type	Quantity per year	Rate ($/unit)	$ per Year	kWhe_input / year	GHG emissions (tonneCO2e/yr)
Light Duty Vehicle	**Gasoline (L)**		**$1.33**	-	0	0.00
			Totals:	**$0**	**0**	**0.00**

Additional Benefits	Description	Value ($)
Carbon Tax Credits		**####**
Community/Environmantal Benefits		
Other		

Estimated Incentive Required $60,000

Energy Summary

Net Electrical Energy Increase (kWh/y)	1,752,000
Net Electrical Ave. Demand Increase (kW)	200
Net GHG Reduction (tonneCO2e/yr)	314.84

Project Costs

Net Incremental Capital Cost ($)	$ 32,500
Net Incremental O&M Cost ($/yr)	$ (17,000)
Net Incremental O&M Cost ($/yr)	$ 156,960
Estimated Project Life (yrs)	20
Total Baseline Cost	$ 16,347,500
Total LCE Option Cost	$ 19,179,200
Incremental Cost ($)	$ 2,831,700

Notes:

LC Electrification Project

ELECTRICITY RELATED GHG EMISSIONS

Electrical Energy	Quantity	Units	Rate ($/unit)	$ per Year	E_Factor tCO2e/GW	GHG emissions (tonneCO2e/yr)
Purchased	**10,512,000**	kWh/yr	**$0.08**	840,960	10.67	112
Generated	-	kWh/yr	**$0.10**	-		
Peak Demand	**1,200**	kW	**$7**	100,800		
Average Demand	**1,100**	kW				
			Totals:	**941,760**		

STATIONARY END USES (ie. Motors, pumps, etc)

Fuel Type	Quantity	Units / yr	Rate ($/unit)	$ per Year	kWhe_input / year	E_Factor kgCO2e/GJ	GHG emissions (tonneCO2e/yr)
Natural Gas	**0**	**m3**	**0.16**	$0	-	49.87	0.00
			Totals:	**$0**	**0**		**0.00**

MOBILE END USES (ie. Transport)

Tranport Mode	Fuel Type	Quantity per year	Rate ($/unit)	$ per Year	kWhe_input / year	GHG emissions (tonneCO2e/yr)
Light Duty Vehicle	**Gasoline (L)**		**$1.33**	-	0	0.00
			Totals:	**$0**	**0**	**0.00**