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ESB Small Producers Energy Efficiency Deployment (SPEED) Geothermal (GSHP) Checklist

March 7, 2022

Version 1.0

EMISSIONS REDUCTION ALBERTA

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INTRODUCTION

This document is intended as a guide to support the submission of accurate and complete Geothermal, also referred to as Ground Source Heat Pump (GSHP), project applications. All applicants with GSHP should ensure the application meets the SPEED Eligibility Requirements set out in the Participant Terms and Conditions, Contractor Code of Conduct and Eligible Measures List. The applicant must submit the requested documentation and answer the questions contained within this document.

This checklist includes guidance for what needs to be entered in each input field at Step 4 and Step 5 of the Application process. Step 5 specifically describes which documents need to be uploaded and their purpose.

GUIDANCE ON APPLICATIONS

The following sections provide guidance on Geothermal (GSHP) applications, ensuring that they are complete, accurate and comprehensive.

The applicant and/or contractor will also need to provide the following information in Step 4 and Step 5 of the application submission, as further described in the tables below.

STEP 4 OF PRE-PROJECT APPLICATION

GEOTHERMAL (GSHP)

Additional information may be requested through an Information Request (IR) to ascertain specifics of the system if not provided in the system design report.

Field	What to Enter	How Data or Input Provided is Used
Quantity	Enter the number of systems being installed. The default should be "1".	• Used to calculate eligible incentive. • Post-project QA/QC.
Is it Retrofit or New Construction?	Select "Retrofit" if the project is being installed on an existing building or the GSHP project is providing heating and cooling to an existing building. Select "New Construction" if it is being installed on a new building or the GSHP project is providing power to new equipment.	• Post-project QA/QC.
Building Type	Select from the list the building type: • Office • Private School • Retail • Theater • Warehouse • Private Healthcare • Industrial • Other	• Post-project QA/QC.
Building Size (Sq ft)	Enter the building size in square footage.	• Used for estimating energy savings achieved.
Existing, Proposed or Back-Up Heat Source	Select from the list the existing heat source (if retrofit project) or proposed heat source (if new construction and GSHP not used): • Electrical Resistance • Natural Gas • Air Source Heat Pump • Propane • Oil • Other	• Used for estimating energy savings achieved.
DHW Existing or Proposed Fuel Source	Select from the list the Domestic Hot Water (DHW) existing or proposed fuel source: • Electrical Resistance • Natural Gas • Oil • Propane	• Used for estimating energy savings achieved.

What Efficiency Measures are in the Building?	If you are implementing other efficiency measures before you design your GSHP project, please select those from the list: • Standard (ASHRAE 90.1) • Energy Recovery Ventilation • Upgraded Glass and Insulation • Energy Recovery Ventilation and Upgraded Glass	• Used for estimating energy savings achieved. • Post-project QA/QC.
Total Capital Costs for Efficiency Measures Selected ($/sq ft)	Enter the total capital costs for efficiency measures selected in the previous field.	• Used for estimating energy savings achieved.
Soil Thermal Conductivity	Select from the list the Soil Thermal Conductivity: • Low (20%) • Medium-High (20% +)	• Used for estimating energy savings achieved.
Borefield Spacing	Select from the list the borefield spacing: • 15’ Spacing • 20’ Spacing • 25’ Spacing	• Post-project QA/QC.
GSHP Efficiency	Select from the list the GSHP efficiency: • Standard (<3.5) • Medium (3.5 - 4.3) • High (>4.3)	• Used for estimating energy savings achieved. • Post-project QA/QC.
GSHP COP	Enter the Coefficient of Performance (COP) for the Geothermal system.	• Used for estimating energy savings achieved.
GSHP Capacity (Tons)	Enter the rated capacity of the geothermal system in tons.	• Used for estimating energy savings achieved. • Calculate eligible incentive.
Drilling Cost Estimate ($/sq)	Enter the estimated cost of drilling.	• Calculate eligible incentive.
Conventional Equipment Cooling Efficiency (EER or COP) (Optional)	Enter the efficiency of the alternative cooling equipment. For retrofit, it would be the existing equipment. For new construction, it would be the building code.	• Used for estimating energy savings achieved.
Conventional Equipment Cooling Efficiency	Select from the list the system type: • Standard for Direct Expansion (DX) • Medium for Air Cooled Chiller • High for Water Cooled Chiller	• Used for estimating energy savings achieved.
Conventional Equipment Heating Efficiency (%) (Optional)	Enter the efficiency of alternative cooling equipment. For retrofit, it would be the existing equipment. For new construction, it would be the building code.	• Used for estimating energy savings achieved.
Conventional Equipment Heating Efficiency	Select from the list the conventional equipment heating efficiency: • Standard for 75% • Medium for 85% • High for 95%	• Used for estimating energy savings achieved.

Electricity Price ($/kWh)	Enter the electricity cost in $/kWh.	• Used for estimating energy savings achieved.
Heating Fuel Price ($)	Enter the cost of heating fuel price in $.	• Used for estimating energy savings achieved.
Heating Fuel Units	Select from the list the heating fuel cost units: • Electricity – kWh • Gas – GJ • Oil or Propane – Gallons	• Used for estimating energy savings achieved.
Heat Pump Specification Sheet	Upload the specification sheet for the heat pump along with the warranty information. Indicate/circle which specific equipment is being used for project.	• Post-project QA/QC.
In-Ground Items Specification Sheet	Upload the specification sheet for the in-ground items along with the warranty information. Indicate/circle which specific equipment is being used for project.	• Post-project QA/QC.
System Design Report	Upload the system design report approved by an engineer licensed in Alberta. The System Design Report must include an annualized system sizing analysis providing the thermal load calculations, other system sizing considerations, approved borefield location and layout, equipment specifications, facility integration within existing equipment, requirements for additional (backup) heat sources and economic analysis.	• Post-project QA/QC.
Energy Model Output	Upload the modelled energy output of the system. Include Hourly energy loads of the building based on proposed building construction, occupancy and mechanical system design. There should be several iterations of the energy model clearly showing efficiency measures used to balance energy loads to and from the ground.	• Used for estimating energy savings achieved.
Field Site Plan/Layout	Upload a site layout plan clearly showing the site and location of proposed system.	• Post-project QA/QC.
Equipment & Material Costs	Enter equipment and material costs as indicated on the invoice / final quote.	• Calculate incentive cap. • Post-project QA/QC.

Labour Cost	Enter labour costs as indicated on the invoice / final quote including drilling costs.	• Calculate incentive cap. • Post-project QA/QC.
Design Cost	Enter design costs and include all other costs as indicated on the invoice / final quote.	• Calculate incentive cap. • Post-project QA/QC.

STEP 5 OF PRE-PROJECT APPLICATION: ALL GEOTHERMAL (GSHP) MEASURES

Field	What to Enter	How Data or Input Provided is Used
Cost Quote	Quote or invoice should be itemized to include quantity, brand, model numbers for equipment, applicant name, contractor name, facility address and date (Sample quote provided in the Appendix). Costs should be indicated separately for: • Equipment and Material • Labour • Design and Others • Taxes	• Cross-reference against provided costs. • Calculate incentive cap. • Post-project QA/QC.
Electricity Bill for Facility	Upload the most recent electricity bill available for the facility.	• Ascertain rate class.

POST-PROJECT APPLICATION

Note that for the post-project application, you will be required to confirm that no changes were made from the pre-project application, unless an Application Change Approval Notice was issued by ERA. In terms of documents required, you will need to provide evidence of the following:

- Invoice for Project Costs
- Proof of Payment for Project Costs
- Electrical and Installation Permits
- Occupancy Permit (for new construction or major renovation projects)
- Post-Project Photo
- Any conditions stated in the Notice of Pre-Approval

Participant may be subject to a QA/QC check and may be asked for additional documentation and facilitate a site visit.

APPENDIX

SAMPLE INVOICE / FINAL QUOTE

Quotes should be itemized to include quantity, brand, model numbers for equipment, applicant name, contractor name, facility address and date. Costs should be indicated separately for:

- Equipment and Material
- Labour
- Design and Others
- Taxes

A sample quote is provided below:

Company Logo

Company Address:	xxxx
Website:	xxxx
Phone:	xxxx

	PROJECT NAME:	XXXX	**Project Start Date:** xxxx
			Project Completion Date: xxxx
Applicant Company:	xxxx		
Applicant Name:	xxxx	**Quote #:**	xxxx
Facility Address:	xxxx	**Date:**	xxxx
Phone:	xxxx		

Measure #1			
Fixture Description	LITHONIA CPANL 2X4 40/50/60LM 40K M2	**DLC**	PMS5PPS6
Measure Description	LED 2x4 Recessed Light Fixture - 4,500 – 5,999 Lumen Output	**QTY**	63
Measure Equipment/Material Costs			$ 6,538.71
Measure Labour Costs			$ 13,251.74
Measure Design/Other Costs			$ -
		Measure Total Costs	$ 19,790.45

Measure #2			
Motor Description	ILA7080-H Siemens Semiotics 10 hp		
Measure Description	Premium efficient motor –ODP-10 hp	**QTY**	1
Measure Equipment/Material Costs			$ 934.10
Measure Labour Costs			$ 123.11
Measure Design/Other Costs			$ 50.00
		Measure Total Costs	$ 1,107.21

Measure #3			
Sensor Description	Occupancy Sensor		
Measure Description	Fixture Mounted Sensor	**QTY**	305
Measure Equipment/Material Costs			$ 15,250.00
Measure Labour Costs			$ -
Measure Design/Other Costs			$ -
		Measure Total Costs	$ 15,250.00

Total		
Total Equipment/Material Costs		$ 22,722.81
Total Labour Costs		$ 13,374.85
Total Design/Other Costs		$ 50.00
	Total Project Cost	$ 36,147.66
	GST	$ 1,807.38
	Total Cost w/ GST	$ 37,955.04