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ENERGY

1. ENERGY SUPPLY AND CONSUMPTION

1.1 Energy Supply and Payment

The Authority will from time to time as required enter into contracts with Energy suppliers for the supply of Energy to the Facility, and will be responsible for all payments related to such contracts. Without limiting Project Co's obligations in Schedule 4 [Services Protocols and Specifications], Project Co will administer such contracts, including dealing with suppliers to resolve issues from time to time, and will provide such other reasonable assistance related to such contracts as may be requested by the Authority.

1.2 Recording and Monitoring of Weather Data and Energy Consumption

Project Co will collect Weather Data for the Facility from the Site Weather Monitoring Station and will install equipment to record and monitor consumption of each type of Energy in the Facility which will:

- (a) be suitable and properly calibrated to enable the Authority to undertake real time:
 - (1) collection and monitoring of:
 - (A) Energy trends, including current and historic Energy consumption;
 - (B) consumption of all Utilities, with energy end uses broken down by heating, cooling, heat-rejection, pumps, fans, interior lighting, exterior lighting, hot-water and equipment loads, and including domestic hot and cold water consumption; and
 - (C) all applicable weather data from the Site Weather Monitoring Station;
 - (2) analysis of the data collected, including:
 - (A) graphical comparisons to:
 - (i) historical (year over year) consumption;
 - (ii) weather data;
 - (iii) utility bills;
 - (iv) consumption against declared energy targets; and
 - (v) energy cost by end use against declared energy targets;
 - (3) provide early warning of malfunctions and deviations from norms;
 - (4) be provided in a readable and editable format consistent with industry practice; and

- (5) be remotely accessible by the Authority through a web-based browser and portable devices such as smartphones;
- (b) secure all such properly recorded information so that it is not lost or degraded as a result of any equipment or service malfunctions, and will secure such information from any adjustment, modification or loss from any source.

1.3 Energy Consumption Certificate

Promptly after the end of each month following the Service Commencement Date, Project Co will deliver to the Authority a certificate showing for the Facility:

- (a) the Energy Consumption in Gigajoules for each type of Energy in that month;
- (b) the peak demand date and hour;
- (c) the Weather Data for that month, including the number of Heating Degree Days and Cooling Degree Days;
- (d) building occupancy; and
- (e) any other variable that affects the Energy Consumption relative to the energy model assumptions set out in Attachment 1 to this Appendix.

2. DESIGN AND CONSTRUCTION ENERGY GUARANTEES

2.1 Monitoring of Energy Consumption

During the Test Period, Project Co and the Authority will monitor Energy Consumption in order to determine the Energy Consumption for the Test Period.

2.2 Adjustment to Energy Cost

Within 2 years after Service Commencement, Project Co and the Authority will engage an Independent Energy Consultant to review Energy Consumption data gathered during the Test Period and determine whether and to what extent the Target Energy Cost for Targeted Energy Consumption should be adjusted based on factors which, in the Independent Energy Consultant's professional opinion, are applicable, including actual climate conditions, occupancy, equipment use, utility or energy rates and Authority controlled effects during the Test Period that differ from the factors taken into account in the energy model assumptions set out in Attachment 1 to this Appendix. The adjusted Target Energy Cost for the Test Period is referred to in this Appendix as the "**Adjusted Target Energy Cost**".

2.3 Failure to Achieve Adjusted Target Energy Cost

If the Energy Cost for Targeted Energy Consumption during the Test Period exceeds the Adjusted Target Energy Cost, then Project Co will do one of the following:

- (a) modify the Facility as required so that annual Energy Cost for Targeted Energy Consumption will not exceed the Adjusted Target Energy Cost, subject to compliance

with the Design and Construction Specifications and the approval of such modifications by the Authority, not to be unreasonably withheld or delayed; or

- (b) pay to the Authority a lump sum amount that the Authority agrees, acting reasonably, represents the lesser of \$500,000 and the net present value of the cost to the Authority during the 30 year Operating Period of the amount by which Energy Cost for Targeted Energy Consumption during the Test Period exceeds the Adjusted Target Energy Cost, on the assumption that the excess in the Test Period will continue for the balance of the expected life of the Facility, and if this Section 2.3(b) is applied the provisions of Schedule 9 [Compensation on Termination] will be amended as necessary to ensure that the Authority will not, as a consequence of the application of this Section 2.3(b), face any additional liability upon early termination of this Agreement.

3. ENVIRONMENTAL CREDITS

3.1 Entitlement to Environmental Credits

The Authority will be entitled to any and all Environmental Credits related to the Facility and its operation and Project Co will use commercially reasonable efforts to assist the Authority in achieving the maximum Environmental Credits available.

ATTACHMENT 1

ENERGY MODEL ASSUMPTIONS

1. General Requirements Of Energy Models And Simulations

Project Co will use one of the following eligible energy modelling software tools for its energy model (the “Energy Model”):

- (a) eQUEST;
- (b) Energy Plus;
- (c) DOE 2.1e; or
- (d) EE4.

Project Co will use a single energy modelling software at all stages of the Project.

Project Co may:

- (a) use additional supplementary software tools, such as RetScreen or Excel, in conjunction with one of the above eligible energy modelling software tools; and
- (b) modify the underlying simulation code for the purposes of modeling systems and energy efficiency measures not managed by the modelling software, in which case Project Co will fully describe and justify any such changes to the Authority.

Project Co will retain an individual on the CaGBC Experienced Modellers List to prepare the Energy Model.

2. Energy Model Assumptions

Project Co will use the following energy model assumptions to determine the Target Energy Cost:

- (a) Take-Offs:
 - (1) Use interior wall dimensions for determining building areas. Wall heights will be full floor-to-floor height. Window areas will represent the total area of the rough opening.
- (b) Location and Weather Files:
 - (1) Set “Swift Current, Saskatchewan” as the selected location and use the associated EE4 default weather file.
- (c) Energy Unit Prices:
 - (1) Electricity Consumption: /kWh
 - (2) Electricity Demand: /kW

- (3) Fuel Oil Consumption: /litre
 - (4) Propane: /litre
 - (5) Natural Gas: /m3
- (d) Occupancy Load and Operating Schedules:
- (1) Define occupancy loads in accordance with the Functional Program. Where a range of occupancy is stipulated, use the highest value.
 - (2) Occupancy schedules will be in accordance with the Functional Program.
- (e) Fan Schedules:
- (1) For all zones, fans schedules are to be set to “on” for all occupied hours (i.e. schedule value equals 100% for all occupied hours)
- (f) Cooling Thermostat Setpoint Schedules:
- (1) Set cooling thermostat set-point schedules for all zones at 24°C unless otherwise specified in Schedule 3 [Design and Construction Specifications]. Apply this setting for all hours.
 - (2) Model zones without cooling based on a cooling thermostat set-point schedule set to 99°C for all hours.
 - (3) Where modeled zones contain spaces with different cooling set-points (based on the requirements set out in Schedule 3 [Design and Construction Specifications]), model the zone using the set-point for the space requiring the lowest set-point temperature.
 - (4) For the purposes of these simulations, “set-back” of cooling temperatures (e.g. during unoccupied hours) is not permitted.
- (g) Heating Thermostat Set Point Schedules:
- (1) Set heating thermostat set-point schedules for all zones at 22°C unless otherwise specified in Schedule 3 [Design and Construction Specifications]. Apply this setting for all hours.
 - (2) Where modeled zones contain spaces with different heating set-points (based on the requirements set out in Schedule 3 [Design and Construction Specifications]), model the zone using the set-point for the space requiring the highest set-point temperature.
 - (3) For the purposes of these simulations, “set-back” of heating temperatures (e.g. during unoccupied hours) is not permitted.

- (h) Lighting, Receptacle, and Service Water Heating (“SWH”) Schedules:
- (1) For all zones, set the lighting schedules to the best matching MNECB Schedule based on space function.
 - (2) Standard Residential Homes and Hospice House: Receptacles shall be assumed to require 5 W/m² of power and shall follow MNECB Fractional Operating Schedule ‘G’ Receptacles. Service water heating shall be assumed to require 500 W/person and shall follow MNECB Fractional Operating Schedule ‘G’ Hot Water.
 - (3) Neighbourhood Hubs: Receptacles shall be assumed to require 1 W/m² of power and shall follow MNECB Fractional Operating Schedule ‘C’ Receptacles. Service water heating shall be assumed to require 45 W/person and shall follow MNECB Fractional Operating Schedule ‘C’ Hot Water.
 - (4) Community Centre: Receptacles shall be assumed to require 1 W/m² of power and shall follow MNECB Fractional Operating Schedule ‘G’ Receptacles. Service water heating shall be assumed to require 30 W/person and shall follow MNECB Fractional Operating Schedule ‘G’ Hot Water.
 - (5) Services Building: Receptacles shall be assumed to require 2.5 W/m² of power and shall follow MNECB Fractional Operating Schedule ‘H’ Receptacles. Service water heating shall be assumed to require 90 W/person and shall follow MNECB Fractional Operating Schedule ‘H’ Hot Water.
- (i) Equipment Loads:
- (1) Use equipment information regarding equipment to model the effect of equipment on energy usage and, if the equipment is located within the conditioned building envelope, any effects on interior heat gain. Plug, non-regulated loads, or process loads for equipment located outside of the building envelope are to be calculated separately if not supported as an exterior load within the modelling environment. Any energy cost savings claimed for plug, non-regulated loads, or process loads, must be substantiated by comparison against a recognized third party standard, for example the most current ASHRAE 90.1 standard for exterior lighting or Energy Star Minimums for computer equipment. All annual energy costs resulting from equipment loads are to be included in the Target Energy Cost.
 - (2) Standard Residential Homes and Hospice House: Equipment shall follow MNECB Fractional Operating Schedule ‘G’ Receptacles.
 - (3) Neighbourhood Hubs: Equipment shall follow MNECB Fractional Operating Schedule ‘C’ Receptacles.
 - (4) Community Centre: Equipment shall follow MNECB Fractional Operating Schedule ‘G’ Receptacles.

- (5) Services Building: Equipment shall follow MNECB Fractional Operating Schedule 'H' Receptacles.
- (j) Ventilation Rates:
- (1) The Design will comply with current ASHRAE 62 or superseding standard ventilation requirements as required.
 - (2) The ventilation rates will be the same in the proposed and reference cases except as follows. Designs that utilize excessive ventilation rates (i.e. 20% or more above the required rates as defined in ASHRAE 62 or superceding standards) will be modeled with the energy penalty described in NRCan's "Modeling Guide for EE4 Version 1.7" (February 2008)".
 - (3) Demand controlled ventilation (DCV) will only be used as an energy efficiency measure where permitted. Model designs using DCV in accordance with the CaGBC's "LEED Canada 2009 Supplementary Energy Modelling Guidelines".
- (k) Windows, Glazing, Curtainwall and Spandrel Walls
- (1) In accordance NRCan's "Modeling Guide for EE4 Version 1.7" (February 2008)", the U-value for windows, glazing, curtainwall or spandrel walls must include the thermal bridging impacts of framing.
- (l) Motor Power:
- (1) Modelling of motors must include total power requirements and not brake power.
- (m) Fixed Parameters:
- (1) lighting area factor (must be 1.00);
 - (2) desired winter temperature;
 - (3) desired summer temperature; and
 - (4) any EE4 inputs marked by the "non-compliance input" symbol (i.e. red circle and slash).
- eQUEST or other software inputs will follow the same intent as EE4 fixed parameters.
- (n) Miscellaneous Modeling Requirements:
- (1) Where redundant equipment capacity has been provided, only model or calculate for the number of pieces of equipment intended to operate under normal conditions.

- (2) For simulation purposes only, no zone is permitted to have unmet heating or cooling load hours in excess of 100 per year (excluding zones with no cooling requirements).