MISSION

CRISTAL CONTROLS manufactures energy management systems, low voltage lighting control systems, temperature controls and automation electronic products for manufacturers, specialized distributors, and integrators. We design all our systems and provide the necessary product training.

One of our main objectives is to ensure continued growth by delivering high-quality products within the specified deadline. We maintain close business relations with our customers by bringing them the appropriate solutions that truly fulfill their needs.

VISION

CRISTAL CONTROLS wishes to remain the industry leader in the manufacturing of SCR and SSR power controllers, as well as in the production of lighting control systems and energy management systems. Thanks to its solid reputation and its ability to design and manufacture products of the highest quality, the Cristal Controls' team anticipates a continued business growth and an always increasing presence in the North American and foreign markets.

INNOVATION

Our team of engineers and technicians work every day to develop profitable solutions for our customers. We are ready to react to changes in the industry and to offer to our customers today the products they will need tomorrow.

Energy management system

Our innovative energy management system, the LS-2010, based on the BACNET technologies, represents a complete solution for energy management of buildings.

Save significant amounts of money using a state-of-the-art peak control energy management system that includes heating, ventilation, air conditioning, lighting, process heating, and benefit from financial incentives from your electrical energy provider!

FACTS

- Manage HVAC automatically
- Greater comfort and peak control
- Achieve energy savings and reduce energy bill by 20 to 25%
- Combine thousands of components
- Benefit from the unique advantages of the BACNET and wireless technologies
A positive impact with LEED® Canada-NC & CS 2009

The growing interest for sustainable building design & operations, of which we are part, is embodied in the Leadership in Energy and Environmental Design (LEED®) Green Building Rating Systems in North America.

This document explores the potential contribution for the use of CRISTAL CONTROLS' products for a LEED® Canada-NC 2009 (New Construction and Major Renovations) & a LEED® Canada-CS 2009 (Core and Shell) project.

The CaGBC LEED® Canada-NC & CS 2009 Rating Systems have 110 points divided in seven categories for certifying the design and construction of commercial or institutional buildings and high-rise residential buildings of all sizes, both public and private.

<table>
<thead>
<tr>
<th>LEED® Canada-NC &amp; CS 2009 Summary Table</th>
<th>Energy management system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Prerequisites</td>
</tr>
<tr>
<td>Sustainable Sites</td>
<td>1</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>1</td>
</tr>
<tr>
<td>Energy and Atmosphere</td>
<td>3</td>
</tr>
<tr>
<td>Materials and Resources</td>
<td>1</td>
</tr>
<tr>
<td>Indoor environmental Quality</td>
<td>2</td>
</tr>
<tr>
<td>Innovation in Design</td>
<td>0</td>
</tr>
<tr>
<td>Regional Priority</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>

* It is important to consider that the total amount of possible points reflects the number of achievable points in each credit categories. The product by itself cannot achieve this score, as defined above, but is considered as a beneficial element in order to achieve LEED® credits.
### Prerequisite requirements

The following commissioning process activities must be completed by the project team:

1. Designate an individual as the Commissioning Authority (CxA) to lead, review and oversee the completion of the commissioning process activities.
2. The owner must document the owner’s project requirements. The design team must develop the basis of design. The CxA must review these documents for clarity and completeness. The owner and design team must be responsible for updates to their respective documents.
3. Develop and incorporate commissioning requirements into the construction documents.
4. Develop and implement a commissioning plan.
5. Verify the installation and performance of the systems to be commissioned.
6. Complete a summary commissioning report.

### Commissioned systems

Commissioning process activities must be completed for the following energy-related systems, at a minimum (if they are installed as part of the core and shell project):

- Heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls;
- Lighting and daylighting controls;
- Domestic hot water systems;
- Renewable energy systems (e.g., wind, solar).

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**CRISTAL CONTROLS**

CRISTAL CONTROLS has all required documents regarding LEED® and can rapidly provide information in a certified project.

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**Comments**

**CRISTAL CONTROLS** can contribute to prerequisite EAp1 since they offer several services in order to facilitate the commissioning of the building energy systems:

- Professional training for the installer
- On site commissioning and calibration of the installed systems
- Verification and analysis of the energy consumption data, which allows the optimization of the system, if needed.
- Production of an operating manual
- Service contract for the building’s useful life

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**Vertima record number:** FVERT-13-1043-02-AN  
**In effect since:** November 2013  
**Last update:** November 2013  
**Technical Data documented and validated by:** www.vertima.ca
### PREREQUISITE REQUIREMENTS

**Select 1 of the 3 compliance path options described below.**

**Chosen option must also be used for EA Credit 1.**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Whole building simulation: Either Model National Energy Code For Buildings (MNECB) or ASHRAE 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential Buildings. In comparison with the reference building performance rating, demonstrate a 23% cost improvement in the proposed building performance rating for new buildings or a 19% cost improvement in the proposed building performance rating for major renovations to existing buildings, for the MNECB or 10% cost improvement for new buildings or 5% cost improvement for major renovations to existing buildings for ASHRAE 90.1-2007.</td>
</tr>
<tr>
<td>2</td>
<td>Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope, for one of the following path: for Small Office Buildings 2004 or for Small Retail Buildings 2006 or for Small Warehouses and Self-Storage Buildings 2008 or for K-12 School Buildings.</td>
</tr>
<tr>
<td>3</td>
<td>Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance Guide developed by the New Buildings Institute.</td>
</tr>
</tbody>
</table>

### CREDIT REQUIREMENTS

**Select 1 of the 3 compliance path options described below.**

**Comply with EA Prerequisite 2 (Minimum Energy Performance).**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | Demonstrate a percentage cost improvement in the proposed building performance rating compared with reference building performance rating, according to the chosen path in EA Prerequisite 2. Up to 19 points (NC) or 21 points (CS). **MNECB**

One point (1) LEED® NC and three (3) points LEED® CS for an expected cost reduction of 25% (new buildings) or 21% (existing buildings renovations).

**ASHRAE 90.1-2007**

One point (1) LEED® NC and three (3) points LEED® CS for an expected cost reduction of 12% (new buildings) or 8% (existing building renovations). |
| 2      | Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide (1 point) appropriate to the project scope, for one of the following path: for Small Office Buildings 2004 or for Small Retail Buildings 2006 or for Small Warehouses and Self-Storage Buildings 2008 or for K-12 School Buildings. |
| 3      | Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance Guide developed by the New Buildings Institute. For this credit, additional points must be obtained with this option (3 points maximum). |

### CONTRIBUITION AND COMPLIANCE

**ENERGY MANAGEMENT SYSTEM**

The energy management system by CRISTAL CONTROLS can contribute to prerequisite EAp2 and to the credit EA 1 since it includes several functionalities that may help the building achieve a higher energy efficiency.

**Management of energy schedules**

This system allows the creation of energy schedules. The energy management system enables the reduction of ambient temperature during night time or outside of regular business hours, in order to decrease the energy consumption related to the building heating. Moreover, the temperature difference between the indoor and the outdoor air is reduced and the heat loss is therefore limited. The heating or cooling systems start up can also be programmed during off-peak periods in order to benefit from the energy providers' reduced electricity rates.

**Power demand control and load-shedding**

The energy management system by CRISTAL CONTROLS can provide continuous monitoring of the building’s energy consumption. Prioritization strategies, power demand control and load-shedding can be implemented in order to reduce the energy peaks. For example, the energy management system can slightly delay the start off of certain heating devices to ensure that the predefined maximum energy consumption level is not exceeded.

**Outdoor temperature sensor**

Outdoor temperature sensors are also available and allow the automatic control of heating and cooling systems, in connection with outdoor conditions. For example, it is possible to program the energy management system so that the air conditioning devices are automatically turned off when the outdoor temperature falls under the selected minimum value. The building cooling would then be achieved by an increase in outdoor air ventilation. This functionality can provide tremendous energy savings. The outdoor temperature sensors also enable the bypass of the energy peak control system. For example, when the outdoor temperature falls under a predefined value (ex: -20°C), the load-shedding strategies are dropped and the heating devices can be used at their maximum power, even if the energy consumption peaks are exceeded. This therefore ensures the comfort of building occupants.

**Selection of minimal and maximal adjustments**

This functionality enables the building manager to set the minimum and maximum temperatures that can be selected by the occupants, thus allowing significant energy savings to be achieved.

**Energy consumption data saving, production or energy reports**

The energy consumption data can be computed and saved by the energy management system. The usage history as well as energy consumption reports can then be produced.

CRISTAL CONTROLS has all required documents regarding LEED® and can rapidly provide information in a certified project.
Credit requirements

**Credit requirements**

- **Option 1**

  The M&V period must cover at least 1 year of post-construction occupancy.

- **Option 2**

  The M&V period must cover at least 1 year of post-construction occupancy.

The energy management system by **CRISTAL CONTROLS** can contribute to credit **EA 5** since it can provide data on the use and energy consumption of the HVAC systems. It is thus possible, without any additional control system, to supervise the energy use of the lighting, heating and air conditioning devices as well as the electric plugs in order to know if an adjustment or optimization of the system is necessary.

The data recording systems can measure:

- The energy consumption peaks of the main electric current
- The energy consumption for each sub-group (consumption loop)

It is possible to measure the energy consumption of the entire building as well as the energy consumption of the different HVAC systems for a specific zone.

**CRISTAL CONTROLS** has all required documents regarding LEED® and can rapidly provide information in a certified project.
### Potential Contribution and Compliance

#### Energy Management System

<table>
<thead>
<tr>
<th>Credit</th>
<th>Durable Strategies</th>
<th>Potential Points</th>
<th>Credit Relevance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA 5.1</td>
<td>Measurement and Verification: Base Building</td>
<td>0 points (NC) 3 points (CS)</td>
<td>Direct</td>
<td>The energy management system by CRISTAL CONTROLS can contribute to credit EA 5.1 since it can provide data on the use and energy consumption of the HVAC systems. It is thus possible, without any additional control system, to supervise the energy use of the lighting, heating and air conditioning devices as well as the electric plugs in order to know if an adjustment or optimization of the system is necessary. The energy consumption peaks of the main electric current and the energy consumption for each sub-group (consumption loop) are possible to measure. It can also measure the energy consumption of the entire building as well as the energy consumption of the different HVAC systems for a specific zone.</td>
</tr>
</tbody>
</table>

#### Interior Environmental Quality

<table>
<thead>
<tr>
<th>Credit</th>
<th>Durable Strategies</th>
<th>Potential Points</th>
<th>Credit Relevance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEQ 6.2 (NC)</td>
<td>Controllability of Systems: Thermal Comfort</td>
<td>1 point</td>
<td>Direct</td>
<td>The energy management system by CRISTAL CONTROLS can contribute to credit IEQ 6.2 since the building occupants can adjust the temperature of their respective work space to fit their specific individual needs. Moreover, the JASPER centralised platform allows the building occupants to adjust the temperature via their computer. The local control of temperature by the occupants is also possible from adjustable thermostats.</td>
</tr>
</tbody>
</table>

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**Credit requirements**

**PATH 2 : Exemplary performance**

Achieve exemplary performance in an existing credit that allows exemplary performance as specified in the LEED Canada Reference Guide for Green Building Design and Construction. An exemplary performance point may be earned for achieving double the credit requirements and/or achieving the next incremental percentage threshold of an existing credit in LEED.

One point is awarded for each exemplary performance achieved. No more than 3 points under IDc1 may be earned through PATH 2—Exemplary Performance.

**Credit requirements**

**Up to 3 points for Regional Priority Credit 2 may be proposed for this credit that is intended to allow adding point emphasis to recognize one OR more issues that have additional regional environmental importance.**

To achieve a Regional Priority credit, the applicant must identify LEED® credits which have additional regional environmental importance.

A project must achieve the base credit and then propose that credit as a Regional Priority credit.

The energy management system by CRISTAL CONTROLS can contribute to credit ID 1—Path 2 since it can help achieve exemplary performances in the following credit:

**EA 1** - Demonstrate a minimal percentage improvement in the building’s performance, as defined in the table below:

<table>
<thead>
<tr>
<th></th>
<th>MNECB</th>
<th>ASHRAE 90.1-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>New building</td>
<td>58%</td>
<td>50%</td>
</tr>
<tr>
<td>Renovation of an existing building</td>
<td>54%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Please refer to the Advantages and Aspects to Consider section of the Regional Priority credit.

For a list of applicable credits, please refer to the CaGBC website [www.cagbc.org](http://www.cagbc.org), under the LEED® tools section for the LEED® Canada-NC 2009 & CS 2009 Rating Systems.

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The ENERGY MANAGEMENT SYSTEM by CRISTAL CONTROLS can contribute up to a total of thirty-one (31) points for a LEED® Canada-NC 2009 project & thirty-three (33) points for a LEED® Canada-CS 2009 project.

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