

## Team Montréal

Team Montréal is a joint venture project that involves three universities: École de Technologie Supérieure, Université de Montréal, and McGill University. For this team, 40 students are working together using an integrated multidisciplinary approach. The team is proudly representing Canada with a house named *Lumen|Essence*.

### What's Different?

- Lumen|Essence is an intelligent house—its automation system was developed by the engineering students of Team Montréal. The system provides real-time information on energy consumption, production, and storage. All the information collected by the “brain” of the house is used to automatically manage some equipment and make recommendations to the user to optimize energy consumption.
- Team members who are participating in the assembly and disassembly of the house have received information on building site security, which is a legal requirement in Quebec to be able to work in the building industry.

### Architecture, Interior Comfort

- A green wall (on the south exterior covering) and a green roof reduce the demand for cooling and allow rain recovery.
- An innovative recycled steel structure allows the house to be built rapidly and precisely. It is possible to use parts from the system to carry out renovations, add an extension, or even relocate the house.
- Each part is made-to-measure at the factory, eliminating the waste materials often found on construction sites. The structural steel frame even makes the house reusable and recyclable.
- Lumen|Essence is insulated with soybeans and recycled plastic.

### Heating and Cooling Systems

- The radiant floor is equipped with heat transfer plates that enhance heat radiation.
- In the event that solar energy is insufficient to meet energy demands, a geothermal heat pump could help fulfill the heating requirements. This water/water geothermal heat pump would also provide cold water for air-conditioning.

### Lighting (including Daylighting)

- At night, the courtyard emits yellow hue that reflects (through the use of a wall washer) from its finishing surface. Conceptually, this suggests the idea of harnessing the sun's energy during the day to be radiated and redistributed at night.
- As a measure of sensitivity for natural life cycles, a red LED nightlight is provided in the bathroom to prevent disturbance to sleeping patterns.
- The home's wide windows are triple-glazed, low-e, and filled with argon.

### PV and Solar Thermal

- Electricity is produced by 40 205-watt Sanyo PV panels that provide enough electricity (8.2 kW) to meet the occupants' needs.
- The house is powered by two systems: AC for the house's general needs and DC for all control and automation systems as well as the team's prototype LED lighting system.
- Hot water for the house is supplied by two Stiebel Eltron solar thermal panels. It should be noted that these thermal panels also function in winter, even under cloudy skies.

### Appliances

- All the appliances are rated ENERGY STAR (Energy Efficiency Certification).

**Communications**

- One of the team's goals was, by publicly presenting the project's economic and energy performance, to help make the citizens aware of the social and economic viability of an environmental approach.
- Team Montréal took the time to establish contact with the public by being active in many far-reaching public events, such as the fair trade in environment (Salon national de l'environnement) that was visited by 30,000 citizens.

**Budget**

- Lumen|Essence is valued at a little more than 300,000 \$CAN.

**Future Plans**

- To meet its educational objective, Lumen|Essence will be presented at the "Biosphère," the Canadian Museum of Environment, for a duration of 5 years. The solar house will be showcased in an organic garden where it can be visited free of charge.
- Upon its return to Montréal, the house will be "grid-tied," meaning that surplus electricity (in summer) will be fed into the Hydro-Québec grid (hydroelectricity supplier in Quebec) and recovered as an energy credit when production is insufficient for occupants' requirements (at night or during winter). Over a year, the energy consumption is expected to be "net zero."

**Team Information**

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