



Innovative techniques...



A million-dollar case in point

Fusion Energy recently demonstrated yet again the exceptional top performance results to be derived from implementation of the company's patented concept. The client in the case at hand was Laval Transit Corporation (STL), a key urban transport provider based in suburban Laval, North of Montréal. STL officials commissioned *Fusion Energy* to examine the corporation's energy costs, which had surpassed the \$1 million dollars.

Over the years, rapid expansion had compelled STL managers to deal the best they could with facilities designed for a lesser number of individuals and much-reduced fleet of vehicles.

In 2000, the presence of some 300 individuals, and as many buses in the same building, became problematic from the dual standpoint of air quality, and maintenance of a comfortable indoor temperature.

It became imperative to find a radical solution to energy loss owing to the necessity of evacuating large quantity of vehicles exhaust fumes by opening the facility's doors, and letting in massive amounts of outside air. One can well imagine the astronomical costs associated with such an operating practice.

Within an environment crowded with people and vehicles, *Fusion Energy* was mandated to substantially reduce energy over-consumption, effect major changes to air circulation and quality, to ensure that the indoor temperature remained constant and temperate in all areas of the building.

By 2004, the mission of engineers across the entire spectrum of professional involvement had become more challenging than ever before. They indeed found themselves at the forefront of unbridled technological advances, and exponential development the scope of which would have been impossible to anticipate a few decades back. As a result, the challenges with which they were faced far surpassed any attempts to predict what lays ahead in the foreseeable future.

In addition, the complexity of each individual sector of specialization extended well beyond the framework of traditional training and testing procedures. However, by drawing from the essence of accepted scientific knowledge and brilliantly situating themselves in the context, they successfully discovered the key to the new set of challenges they faced.

Such is the backdrop against which *Fusion Energy* operates with astounding success. Through a combination of rigorous analysis and novel outlook, the company became a leader in the optimal management of existing systems and apparatus. Clients who come to *Fusion Energy* seeking radically reduced energy consumption and implementation of efficient control mechanisms invariably achieve unbelievable results.

F*usion Energy* is neither a supplier, distributor nor a retailer of heating or air conditioning equipment. The company does, however, provide leading edge expertise based on an undeniably logical concept backed by a series of analytical diagnostic, calibration and control processes developed entirely in house.

Fusion Energy's intervention in the industrial, commercial and service sectors is so effective that substantial reductions in energy consumption—between 25% and 30% depending on the individual sector—are often accompanied by a notable enhancement of the living environment.



Consumption and temperature

Therefore, *Fusion Energy* sent in a team of experts to assess the situation, identify problematic sectors and configurations, and set up control points. The purpose was to implement programming, formulated and based on the client's parameters, to make appropriate adjustments.

This led to the installation, in the distribution room, of 5 *CS Integrator* digital controllers, and 20 *Valutrac* unit controllers, as well as the addition of a measuring station at the electrical entrance and *SCR* relays on office heating circuits around the rooms and onto the coils.

This station made it possible for the digital controller to limit power demand in kilowatts by pulsing the heating circuits.

Temperature sensors installed on the premises ensure maintenance of the desired level of comfort and control over the ventilation unit.

As these units were all interrelated, they continuously shared a large volume of information, ensuring leading edge management in real time and, at long last, providing for the harmonious monitoring of the performance of all system components.

Ventilation and air quality

To ensure proper air circulation, control apparatus and temperature sensors were installed in all ventilation ducts. Furthermore, "CO" and "NO" sensors were mounted in locations throughout the busses maintenance sector. The controllers on the *HVAC* units were also modified.

The controllers were set to create either negative or positive pressure, depending on the sensitive area, thereby ensuring that the high levels of "CO" and

"NO" emitted by vehicles early in the day were drawn into the evacuators.

Major gains

Intervention by *Fusion Energy* resulted in the enhanced wellbeing of all stakeholders, from maintenance teams to customer service employees, as well as in administration's satisfaction, given the 30% reduction in the Corporation's energy bill!

In conclusion, air quality now clearly exceeds minimum requirements and the indoor temperature can be controlled at all times without the corporation having to rely on additional energy equipment.

Fusion Energy solutions also spawn exponential gains from the standpoint of greenhouse gas emissions. Results obtained in this instance even surpassed the reduction goals set out in the *Kyoto Protocol*.

Award-winning company

Recently, *Fusion Energy* was once more recognized for its distinction for technological performance. The *Laval Chamber of Commerce* awarded *Fusion Energy* the 2003 "Dunamis" Award for Best Technology Company of the Year. Again, in 2003, *Laval Technopole Export* conferred upon *Fusion Energy*, a *MercadOR Award* in the "New Exporter" category. *Fusion Energy* was further nominated for the latest "Energia" Award.

Permanent monitoring and warnings

Far from turning the page once a mandate has been completed, *Fusion Energy* proposes permanent, ongoing monitoring of energy efficiency by means of a program capable of adapting all systems to current conditions.

From a database which can be accessed from the Web, clients enjoy a right of entry to a continuous flow of information pertaining to temperature, pollutants, actual energy consumption and consumption history.

This post-intervention service includes a warning system with alarm messages that can be transmitted over the Internet, by fax or via text messaging. These alarm messages advise clients when normal energy levels are exceeded.

Post-industrial, avant-garde concept

The original, rigorous and clearly economical concept advocated by *Fusion Energy* makes the company one of the cutting-edge leaders in its sector of activity. *Fusion's* niche is solidly rooted in an enhanced understanding of operating systems and a highly economical calibration process, now a must, given the high cost of energy today.

In energy consumption



The table below outlines key STL data which clearly illustrates the efficiency of Fusion Energy's intervention, calibration and monitoring concept.

Results for first 12 months

Annual savings	
Electricity – consumption	31,47%
Electricity – demand	24,86%
Natural gas	26,14%
NEW COST PER SQUARE FOOT	\$1,47
Initial energy cost per square foot	\$2,22
Savings over 12 months	\$227 577
CO level	
Maximum 30-minute peak	21 ppm
Average	2 ppm
Actual amortization period	1.32 yr

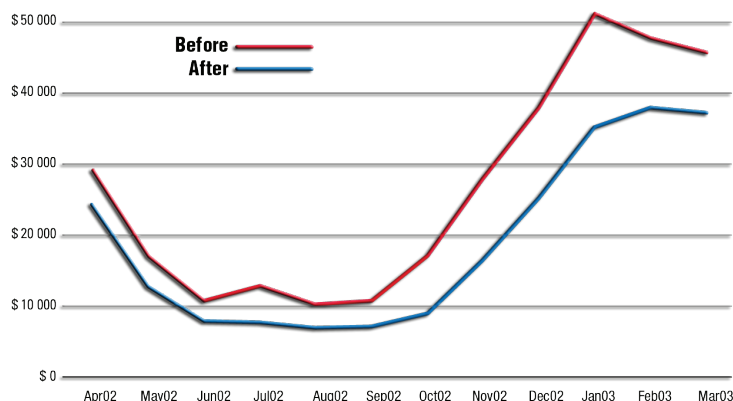
Permanent monitoring tools

Automated management of internal environment adjusted to current conditions.

Hourly monitoring of internal environment via the Internet

- Temperatures
- Pollution levels
- Actual consumption and consumption to date
- Warning system
- Warning message transmitted via the Internet or by fax, pager, e-mail or text messaging whenever normal energy levels are exceeded or when an equipment failure occurs.

Energy consumption in dollars



Context and parameters

Total floor space	305 000 Sq'
Indoor parking	205 000 Sq'
Workshop	60 000 Sq'
Offices	40 000 Sq'
Total staff	650
Total Buses	300
Energy sources	Electricity
	Naturas Gas
Initial energy cost per square foot	\$2.22

Goals

- Reduce energy consumption;
- Maintain constant indoor temperature;
- Lower carbon monoxide level.

Timeframe

December 2000 to March 2001.

Equipment

- 5 CS Integrator digital controllers;
- 20 Valutrac unit controllers;
- 1 measuring station at the electrical entrance;
- SCR relays:
 - On office heating circuits around rooms;
 - On electric coils;
- Temperature controls;
- Temperature sensors;
- CO sensors;
- NO sensors;

Validation tool

Respec mathematical model;

Measures short listed

- Power factor correction. Lighting reorganization.
- Installation of Management System conditioners.
- Load control – Heating and air conditions.
- Air quality measurement.

Project value;

	\$300 000
Guaranteed savings over 12 months;	\$150 000
Guaranteed amortization period;	2 years

NOTE - After 9 months of regular operations during the second year of implementation of the Fusion Energy concept, savings proved to be of the same order as during testing in the spring of 2001.

Greenhouse gas emissions*

	Before	After	Kg Δ	% Δ
Electricity	1 958 781 Kg	1 342 417 Kg	-616 364 Kg	-31%
Gas	2 325 483 Kg	1 717 609 Kg	-607 874 Kg	-26%
	4 284 264 Kg	3 060 026 Kg	-1 224 238 Kg	-29%

* Reductions clearly surpass goals set out in the Kyoto Protocol

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