



The issues

Energy is vital to nearly all aspects of our daily lives and while its consumption is ever increasing, we rarely stop to think about how to use it efficiently. As the price of energy continues to rise, now is the ideal time to consider what you can do to save more energy, help reduce the depletion of the earth's natural resources and combat global warming reducing CO2 emissions.



Project



Guild House is five storey office block, consisting of two separately serviced wings. The building is served by two supply Air Handling Units (AHU's) and two extract AHU's, located in the roof plant room. Fresh air supply is tempered to the occupied spaces where fan coil units (FCU's) provide local cooling or heating with two boilers serving the AHU's, fan coils and circulation space radiators.

The building was built in 1999, it consists of 5 floors (including ground), with a treated floor area of 175 000 square feet (over 16 000 m² for both blocks), and underground car park which has the same surface area as an occupied floor.

The building is composed of two nearly identical blocks, A and B. Block. Each block has its own set of equipment: 2 AHU's, 2 boilers, 1 chiller. All located on roof Level.

The building currently holds around 1100 people, distributed reasonably evenly across each floor
The BMS system consists of Trend IQ2 Controllers with IQI controllers on the floors to control the Fan Coil Units

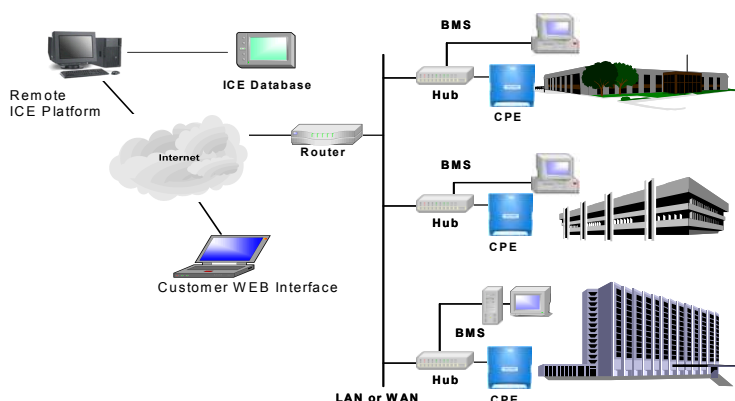


Solution:

Lightwave Technologies have developed technology using artificial intelligence that has potential to save up to 35% of the global commercial energy consumption and benefit the environment.

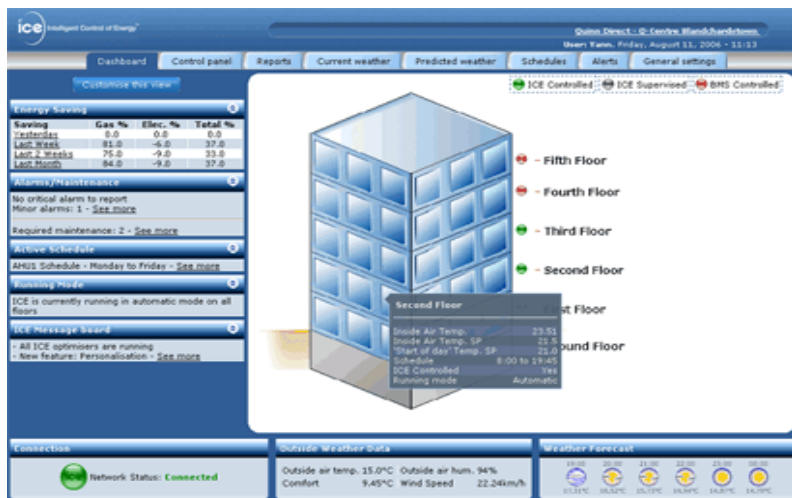


The flagship product, Intelligent Control of Energy (ICE) provides real-time web-enabled energy saving solutions for Commercial Buildings. It works by remotely collecting data from the customer's existing building management system (BMS) and forwarding it, via the Internet, to our remotely located ICE server where complex data pre-processing and analysis is executed by using artificial intelligence and forecasted weather feeds. ICE is a fully automatic artificial intelligent system working 24/7 to save energy in the world's largest buildings using the latest technology and sending back reasoned plant sequencing times and temperature set-points to minimise the buildings energy demand while maintaining existing comfort levels.



The aims of the system installation in Guild House were:

- Reduce energy consumption
- Protect the environment by reducing CO
- Improve occupant comfort
- Allow for better, faster and reduced maintenance frequencies
- Give information on a building's performance



Installation:

Step 1	Control & Energy Audit	<ul style="list-style-type: none"> • Determine the presence of a BMS system in the building. • Determine the number of sensor inputs to the BMS • Physical inspection of customer premises and building plant • Write up Audit Report and issue to client
Step 2	Installation of ADSL	<ul style="list-style-type: none"> • An ADSL Line will be required to the part room where the ICE Panel is to be installed.
Step 3	Hardware Installation	<ul style="list-style-type: none"> • Installation of the ICE CPE Control Panel and access to the BMS and communication checks that data is being sent.
Step 4	Additional Utilities Installation	<ul style="list-style-type: none"> • Installation of the following equipment: Solar Index Sensor, Gas meter, Electricity meter
Step 5	BMS Engineering	<ul style="list-style-type: none"> • Engineering of BMS to allow ICE to control Plant
Step 6	Testing of Control	<ul style="list-style-type: none"> • Testing of controls to confirm correct operation of plant and failover procedures
Step 7	Software Integration	<ul style="list-style-type: none"> • Data Collection & Monitoring • Data Pre-processing to determine the building's thermal characteristics, and send to Neural Network • Supervisory Mode, where ICE algorithms use thermal characteristics to enable optimal predictive start/stop functionality fed to the BMS
Step 8	Ongoing Energy Saving	<ul style="list-style-type: none"> • Full Automatic Mode, where Neural Network relays information back to database continuously adjusting and refining accuracy of energy saving

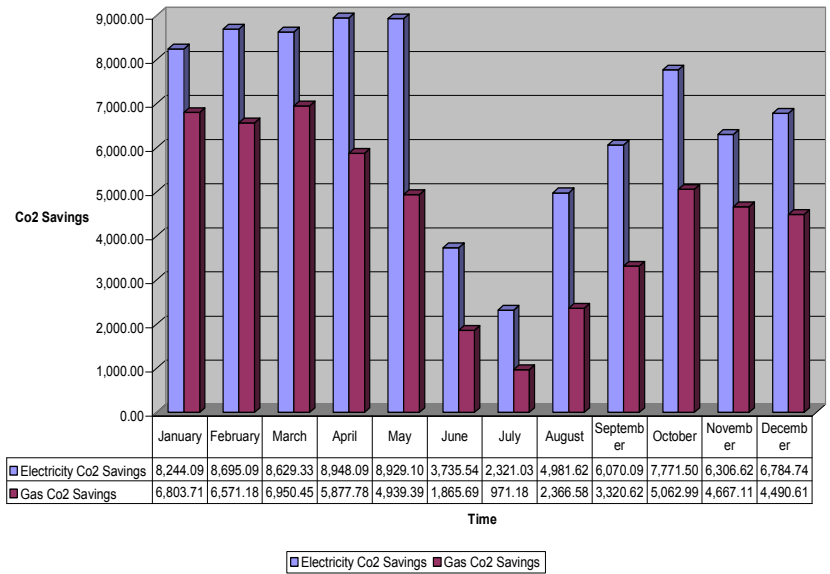
Advantages:

- Swift & simple installation
- Reduces HVAC Energy Demand up to 35%
- Payback period between 4-9 months
- Simple & easy to use
- Interoperable with all makes of BMS
- Web enabled, remotely accessible
- Assists with remote maintenance Monitoring

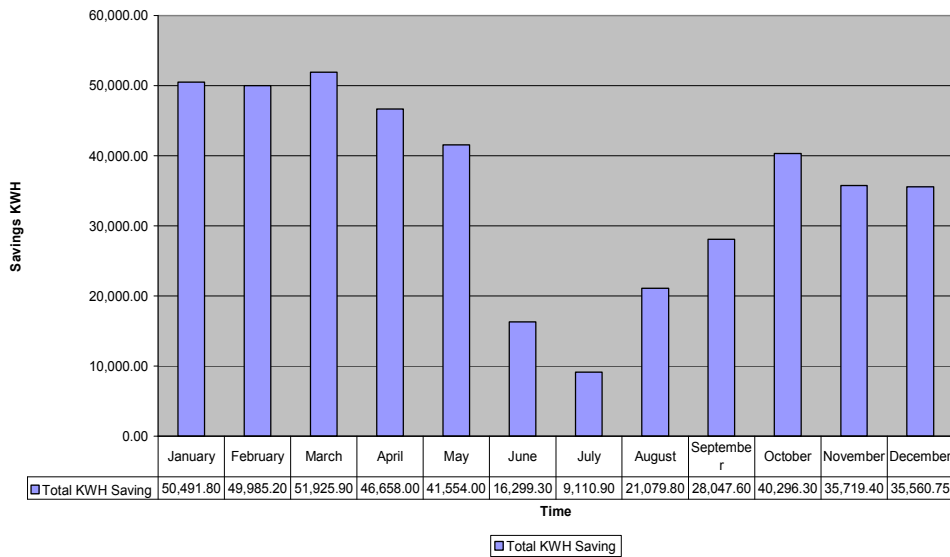
Savings Conclusions

ICE is able to make significant saving using artificial intelligence and forecasted weather feeds.

Guild House Co2 Savings



Guild House Total KWH Saving



Based on the monitored data, it was calculated that Gas consumption was reduced by 17.7%

Based on the monitored data, it was calculated that the Chiller electrical consumption was reduced by 14.2%

Based on the monitored data, it was calculated that the HVAC electrical consumption was reduced by 18.6% electricity use on the primary plant, excluding the chiller.