



Topic

Turning Data into Meaningful Information

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In the face of rising energy costs, carbon taxes, and more stringent environmental legislation, regulation and corporate responsibility, businesses operating refrigeration plant face some serious challenges. Metering, monitoring and analysis can help businesses simultaneously ace all of the above challenges with round the clock remote monitoring and analysis of industrial refrigeration systems.

There are many systems available that can collect data. The difficulty lies in finding a software, particularly in industries where mechanical cooling accounts for a high percentage of the energy bill, which can put the collected data under meaningful analysis as well as offer advice on operational inefficiencies. The International Data Corporation (IDC) estimate that only 0.5% of data collected is ever analysed. Collecting data for no specific purpose is a pointless exercise but it is unfortunately endemic in the refrigeration and heating industry, where a sense of comfort is derived from perfunctory measuring.

The monitoring of correct parameters with simultaneous pertinent analysis to produce advice and transparency on energy consumption for the customer or plant operator has traditionally been a major challenge within the industry. Ready access to this kind of information, along with guidance to what it means has been substantially absent on refrigeration plant until this point.

Refrigeration plant performance is very sensitive to temperature lift. As a rule of thumb an extra 1 degree Celsius of energy lift will waste between 2% and 4% of energy consumption. It is therefore vitally important that operators are aware of how their plant should be performing at any given time and how it is actually performing. Reasons for any deviance from the expected operating parameters should be flagged, immediately rectified and acted upon. This is not straightforward because a refrigeration plant is a operating. This will indicate any potential inefficiencies.

The final aim of any data collection software should be to investigate why the plant has deviated from the optimum conditions. This could be for a whole host of reasons including something as simple as human error where someone erroneously changes the operating set points. Additionally, it easy for a refrigeration plant to drift from the design operating conditions and it is often allowed to run uneconomically for long periods of time, while unnoticed. Incorrect set points, non condensables in the system and fouling of heat exchangers are some of the many inefficiencies that can be introduced after commissioning of the plant. For this reason, if constant energy monitoring is enacted at the outset it can catch the drift before a significant increase in energy consumption occurs.

Up to 90% of the energy costs in the Cold Storage sector can be attributed to refrigeration so there is major potential to achieve energy savings by ensuring that the cooling plant is operating efficiently 24 hours per day, 365 days per year. Similarly, production processes for breweries, dairies, pharmaceutical and HVAC industry can account for a large portion of their site energy consumption. Saving money on energy bills is obviously a huge advantage – but businesses will also be reducing their carbon footprint. Pressure is growing, especially in the industrial sector, to reduce carbon emissions and operate sustainably. Using optimisation and energy management systems designed to identify, analyse, report and provide advice on corrective actions resulting from inefficiencies found in the system is one way to prove to suppliers, customers and shareholders that the business is taking action in accordance with climate change targets to reduce greenhouse gas emissions by 20% of 1990 levels by 2020.

Enhanced remote monitoring systems are currently used across a number of sectors such as process cooling and food manufacturers to achieve optimum plant performance and lower

running costs. In the cold storage industries for example, Tesco was one of the first operators to demand analytical data to improve plant reliability and safety and cut maintenance costs. They used remote monitoring specifically designed for refrigeration applications at all their UK distribution warehouses. Following the implementation of measures derived from full data analysis of their refrigeration plants they saved an average of £100K a year per site.

Establishing load profile is often difficult. Monitoring and analysing with an energy management system designed for refrigeration plant can produce graphs of loads over periods of time. If the profile is known the optimum plant selection can be made for new systems. Knowledge of the profile also enables the deployment of demand side management and can let the customer know if they can take advantage of the savings offered for coming offline. Energy companies can better manage their demand at peak loads if flexibility is introduced and they are encouraging industry, with financial incentives, to come offline at these times. This better balancing of supply and demand on the national grid negates the requirement for paying for standby capacity from large powerplants.



An Ethos dashboard

Star Refrigeration’s consultants, Star Technical Solutions (STS), refrigeration plant optimisation and energy management system, Ethos, remotely monitors and analyses data and identifies corrective actions which are proven to save electricity. It also provides data on available plant capacity which facilitates future investment planning. It can also provide the kind of load

profiling necessary for demand side management of the electricity supply.

To enable the service STS install sensors and an Ethos panel to the cooling/heating system. This sends information via the built-in 4G mobile connection to a web portal. This information is displayed on a computer or mobile phone in the form of an online dashboard which gives details on plant performance and current operating conditions.

Ethos represents a completely new way of looking at energy efficiency in cooling systems. It takes an in-depth look at the energy aspect of the plant rather than refrigeration specific values such as ambient temperatures. The unique methodology behind the Ethos system is a game-changer for the cooling industry as it creates a model of the customer’s plant and calculates the savings, opportunities and inefficiencies to provide insight into what exactly needs to be change/fix and how much money will be saved as a result.

Ethos can identify inefficient operations and provide “insights” on how to achieve better performance from refrigeration equipment explained in graphical format. Typically achievable energy savings are between 10% and 30% without any significant capital investment. By using Star’s energy management system Ethos, the customer is provided with the information to give total control over performance and efficiency. Our refrigeration consultants remotely analyse the data derived from the system, then report back. The information is explained in simple terms and recommendations are given for maintenance and investment to save money on electricity.

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