CATALYST
ENERGY SOLUTIONS

"Catalyst is staffed with some of the country's leading sustainability and energy experts. For more than 10 years our business has been focussed in energy management, procurement solutions and implementation.

Catalyst provides a blend of consultancy that is rare in our industry, balancing technical expertise with the commercial reality of client requirements.

We get personal; we'll work in partnership with you to understand your business, your ethical perspective and your carbon requirements.

Of course, your future plans are paramount in developing the correct solution or strategy. We set a clear path with targets, review periods and milestones so we can work with you to optimise your energy position."

Saving Water

Evaporative Coolers

Evaporative cooling uses a CREC (Computer Room Evaporative Cooler) system in place of a traditional CRAC (Computer Room Air Conditioning) system. It is a ventilation system carefully sized and controlled to provide a constant flow of fresh air to the IT equipment. A patented attemperation system maintains a constant temperature supply set point. The evaporative cooling is only enabled when the temperature exceeds this set point. With a CREC system, you can achieve a PUE (Power Usage Effectiveness) of 1.1 with 100% ASHRAE compliancy.

Energy saving

The use of a variable speed axial fan allows each cooler to operate using the least amount of electricity possible, ramping up and down only as required. The coolers run off a 240v electricity supply, the equivalent to using 1½ bars on an electric fire. There is no requirement for 3 phase power. Evaporative coolers use 90% less energy than an equivalent refrigeration system. Achieving up to 35Kw of cooling from just 1.5Kw of electricity.

Water Saving

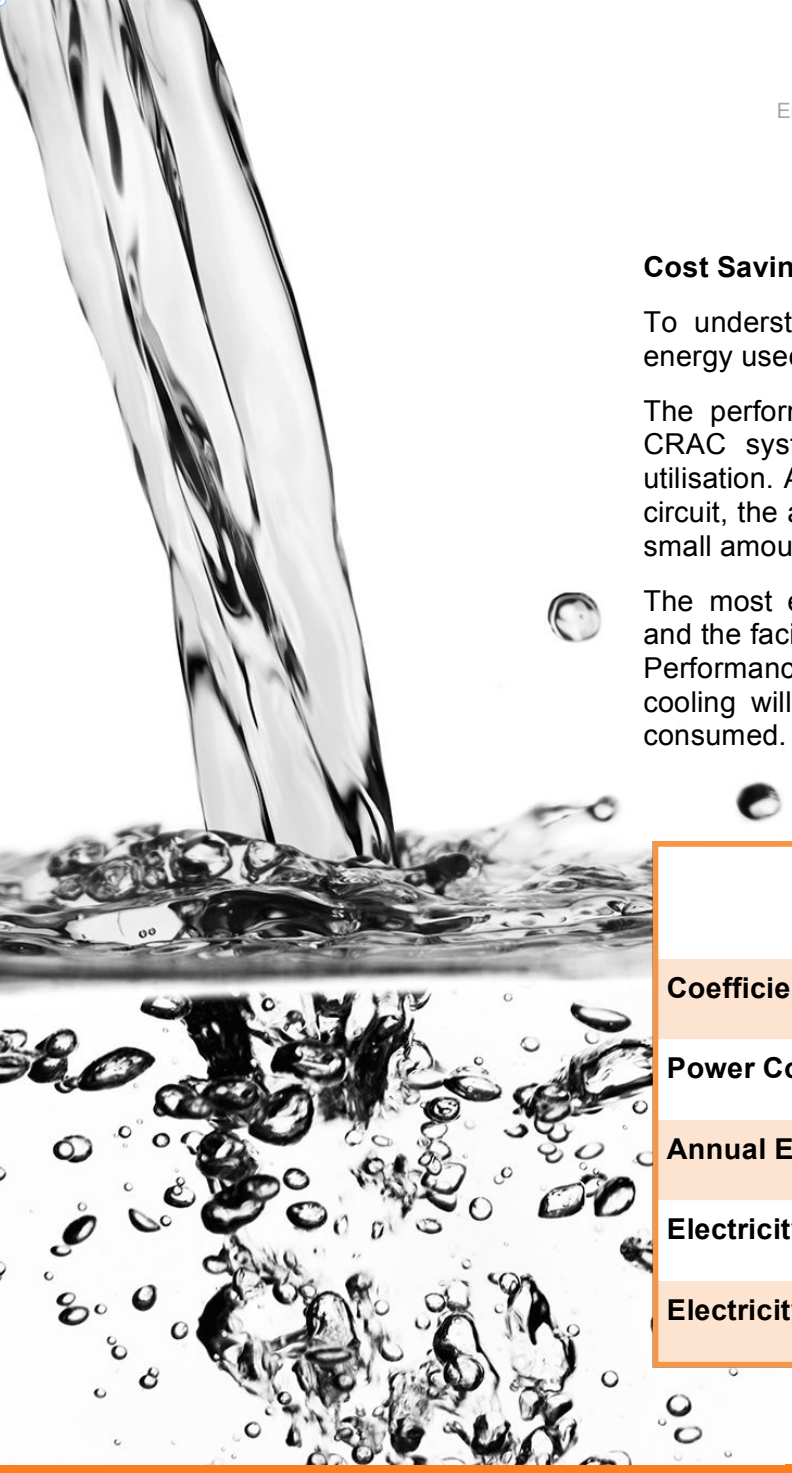
It is estimated an evaporative cooler, installed in the UK will use on average 100 litres per hour on a very hot day. To put this into perspective, taking a bath or a power shower uses 80 litres and washing your car with a hose pipe takes between 400-480 litres.

The standard industry figure for the carbon cost of water is 0.298g per litre. When you consider 1 KW of electricity takes 620g of carbon to produce, you could have 2,080 litres of water for that same 1 KW in carbon terms.

We have several measures in place to ensure water is not wasted.

The amount of water used in our cooler is kept to a minimum by the use of a unique level probe system which prevents the system overfilling. This coupled with a sophisticated control device which detects faults and signals an alarm light on the control panel, alerting the user to a water supply or drainage problem. The problem can then be corrected as quickly as possible to avoid wastage.

Water is only used when the ambient temperature goes above a given set point, to cool the air before it enters the building. A unique scale control device allows accurate measurement regarding the build-up of solids, allowing water to be recirculated up to the point where the evaporation is compromised. At that point, the tank is drained and refilled. The drained water can be used for grey water usage, such as toilets.



Cost Savings

To understand the savings we need to look at the energy used by a traditional CRAC system.

The performance of a traditional refrigeration based CRAC system varies according to the design and utilisation. A CRAC uses electricity for the refrigeration circuit, the air distribution fan, the condenser fan and a small amount for the control systems.

The most efficient CRACs, with variable speed fans and the facility for free cooling will have a Coefficient of Performance (CoP) of 3.7. This means that 3.7kW of cooling will be produced for every 1kW of electricity consumed. This does not include the cost of humidification. A CREC consumes 1.5kW of electricity to support a load of 35kW. **This is equivalent to a CoP of 23.8 giving a saving of 85%.**

In practice most CRACs are not fitted with the energy saving options and have a CoP of 2. In many cases this is not achieved and the true operating CoP is closer to 1 meaning that the same amount of energy is put into the cooling system as is taken by the IT equipment. The table below shows the typical savings for a 100kW server room using various cooling solutions based on 8p/kWh and 0.53702 kg/CO2 per kWh. Note that the water usage would be approximately 160 cubic meters per year for a 100kW CREC system.

	Evaporative Cooling	CRAC With Free Cooling	Standard CRAC	Typical CRAC
Coefficient of Performance	23.8	3.7	2	1
Power Consumed kW	4.2	27	50	100
Annual Electricity Use kWh	36,792	236,757	438,000	876,000
Electricity Saving kWh	n/a	199,965	401,208	839,208
Electricity Cost Saving	n/a	£15,997.00	£32,097.00	£67,137.00