



## Tip 1) Metering

Metering - are you monitoring the total load consumption of your building, when the building is not occupied why is the chiller still running, why is the primary pump still working and even more importantly you don't know what you can save unless discover what you are spending and where the energy in your building is going. I have one particular building manager who was adamant the chiller in my building switches off at 18:00 hours my BMS says so, once we metered the supply we found the chiller together with the pumps were running all evening, instant saving to the client £7000, cost of metering £12,000 payback less than 2 years!!!

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## Tip 2) Power quality

Power quality - by metering you can ascertain the following key elements:

- Phase imbalance
- High Neutral Currents
- Harmonic distortion
- What you are actually being billed for
- Power Factor

I had one client in a typical office block 100, 000sq ft with the following load profile:

- Phase L1 - 312 amps
- Phase L2 - 298 amps
- Phase L3 - 178 amps
- Neutral - 200 amps
- Power factor 0.85
- Harmonic distortion 7.8%

The metering supplier bills the client at the peak load 312 amps, they further penalise you for high neutral currents, in addition the power factor being at 0.85

means that the actual load the electricity board are billing the client for is closer to 330 amps.

What did we do help:

- We balanced the phases cost £1000 saving in year 1 £6000 absolute no brainer!!!!!!!
- We installed power factor correction cost £10,000 saving £2500 per annum

### Tip 3) Installation of LED lamps

Installation of LED lamps as opposed to halogen fittings, I will offer you a very simple spreadsheet below based on 25 fittings:

50 w halogen burning 12 hours per day @ 0.13p per kWh				LED DATA burning 12 hours per day @ 0.13p per kWh				Cost Savings							Total Cost Saving over life span (Including installation cost)
Light Fitting Type	Lamp cost	Useful Life hours	Annual Electricity Cost (0.13p Kwh)	LED Equivalent W	LED Lamp Cost	Useful Life	Electricity Cost PA @ 0.13p	Electricity Cost Saving Per Annum	Maintenance Cost of halogen	Maintenance Cost of LED	Labour	Labour Coefficient	Total Electricity Saving	Total Maintenance Saving	
Low Voltage Halogen	£2.50	2500	£711.75	9	£19.00	15000	£128.12	£583.64	£1,500.00	£620.00	15	7.5	£3,501.81	£880.00	£4,381.81

### Tip 4) Installation of PIR's

Installation of PIR's (passive infra red detectors) to control lights, the trick is to replace the switches with key switches therefore preventing users of the room to override the sensor, we recommended this in one school with over 30 classrooms in one year the saves £2000 per month. Capital Cost £8000!!!! Payback period instant!!!

### Tip 5) Replace normal pumps with inverter pumps

Replace normal pumps with inverter pumps, The motive power can be reduced when the speed of the fan and pump is reduced to control the air volume and flow rate.

Example of the machine for which the frequency inverter can save energy.

*Feed water pump, air conditioning pump, plant water pump, drain pump, boiler water pump, etc.*

*Ventilation fan, cooling tower cooling fan, air conditioning (air supply and exhaust) fan, etc*

The motor speed is controlled by changing the frequency. The lower speed of the fan and motor decreases the required motive power, thus saving energy for operation when a frequency inverter is adopted.

In one building we fitted an inverter to a 26kW pump serving a chiller we saved £5000 per year cost of inverter and pump £12,000, 2 year payback period!!!!

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## Tip 6) Photovoltaic

Photovoltaic, a 10 panel photovoltaic system will cost £8000, this will provide you 1.8kw per hour of electricity, the government will give you a 41.3 pence contribution to this for 25 years, you will not pay any electricity for the supplies the PV panels are connected to. Payback period is between 5 - 7 years, however the trick here is that you will still receive the 41.3 pence allowance for 25 years which equates to approx £1700 per year.

To put this into perspective, if you bought a property for £70,000 and borrowed £50000 on a 25 year repayment at 6% interest you would payback £96,645 which is £322 per month, if you rented it at £300 per month would return you a 5% yield.

If you buy a 10 panel system for £8000 and borrowed all the money at 6% over 25 years you would payback £15,462, however you will be generating an income and saving of £1700 per annum for 25 years so you will receive £42,500, this represent a 21% yield on your investment after 6 years you are in profit.

ABSOLUTE NO BRAINER!!!!!!!!!!

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## Tip 7) Heat Recovery Systems

Heat Recovery Systems - Heat recovery captures waste heat energy and reuses it by returning it to systems or processes. This can include heating space and water. The cost benefits of a heat recovery system depend largely on the type and scale of the installation, but heat recovery can give substantial long-term energy savings. It often reduces the need to generate heat in the first place, making further energy and cost savings. We have used a Daikin Heat Recovery VRV system at our own offices Heat recovery offers a low carbon and energy efficient approach to heating and

cooling a building and can provide significant improvements in HVAC system efficiencies.

Waste heat recovery involves reclaiming exhaust heat from one area of a building and transferring it to another where warm air or hot water is needed, thus providing a low cost, low carbon way of utilising heat.

Heat recovery VRV systems offer a significant step towards the goal of zero heat rejection.

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### Tip 8) Voltage Optimisation

Voltage Optimisation - reduces the amount of voltage that is supplied to a building to 220volts. On average most buildings are provided with 242volts in the UK, which by making the reduction saves you on average 20% money and Carbon output.

The equipment is eligible for an 100% interest free Carbon Trust Loan which is paid back by the savings made, meaning the installation of equipment can benefit your profitability and cash-flow from the moment it is installed.

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### Tip 9) Water Management Systems

Water Management Systems can account for considerable savings within a building, these systems include :

- Enhanced Scale inhibitors to water systems provides a reduction in limescale to heating surfaces by 80% this prevents limescale formation, it helps keep systems free flowing , reduces energy consumption and Co2 emissions it also reduces the need for water softeners.
- PIR Sanitary Water Shut-Off Valves
- Anti-Ligature Washroom Controls
- Water Flow Regulators
- "No-Touch" Sensor Controls for Taps / WCs / Urinals / Showers etc
- Water Conditioners

As an example a simple water flow regulator can achieve up to 70% Water Savings:

- Even water distribution
- Lower capital costs (potential savings on smaller pipework & water heating systems etc)Anti-Ligature Washroom Controls
- Reduced "Peak Demand"

- Maintenance free. Low cost solution
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### Tip 10) Building Management System

Is your building fully integrated domestic or commercial, it should have a Building Management System (BMS) or some level of controls to the various HVAC services, control and optimisation of main plant will enable the building to run at its optimum control, BMS looks at the building's requirements as a whole in order to integrate heating, cooling, ventilation and hot water in the most efficient way possible.

Systems linked to a BMS typically represent 40% of a building's energy usage; if lighting is included, this number approaches 70%. BMS systems are a critical component to managing energy demand. Improperly configured BMS systems are believed to account for 20% of building energy usage.