

3 HIDDEN WASTES IN ELECTRICITY BILL YOU NEED TO KNOW

Application Note

Are you looking for ways to reduce your electricity bill? Don't know where to start in energy management? Unsure about the large scale energy saving investment with questionable ROI?

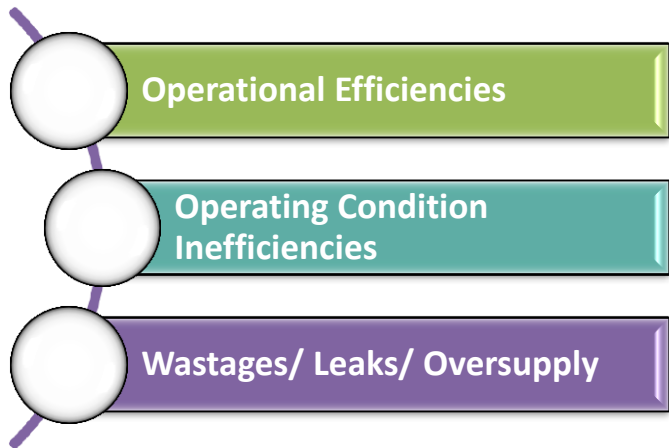
Forget about the complications of energy management. In this application note, we will see how easy it is to make decision based on real information on energy consumption and wastages.



*Fluke 435-II
Power Quality Analyzer*



Fluke Ti400 Thermal Imager



The three most common energy wastes are:

- **Operational efficiencies:** higher cost of electricity bill due to operational arrangement such as peak demand charge, time of use and unwanted consumption.
- **Operating condition inefficiencies:** losing operating efficiency due to overheat, excessive friction, unbalance etc...
- **Wastages/ Leaks/ Oversupply:** undetected losses lead to oversupply of resources to compensate

Operational Efficiencies

Start with your utility bill. The utility bill tells you how much energy you're using – but only if you have read it. However, it doesn't tell you where or how that energy is being used and/or at what time of day. Without knowing how much each of your production, building systems and operations cost to operate now, you can't really make informed decisions on what to change, fix, or upgrade.

"If you can not measure it, you can not improve it." – Lord Kelvin



Fluke 1730 Energy Logger

The sum of electrical energy (kWh) used by your facility can be the same, yet you may have to pay for higher electricity bill. How can it be?

There are other charges inside your utility bill such as peak demand, time of use and power factor.

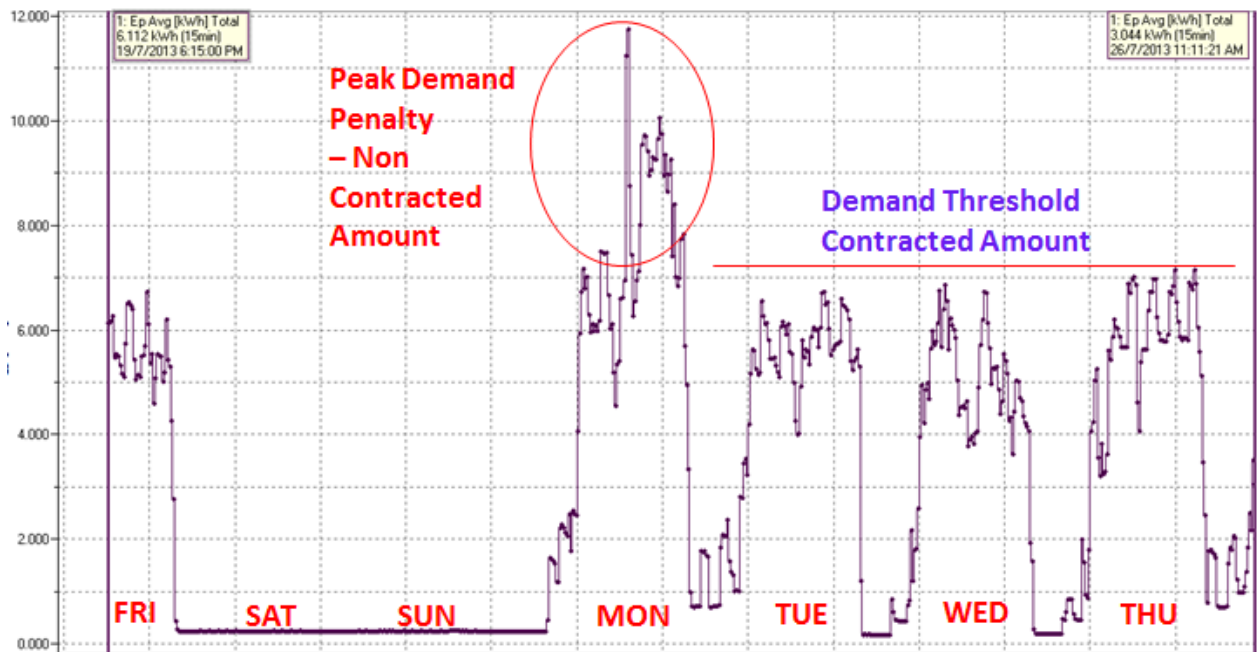
Peak demand is the highest power demand (kW consumed) during any interval in a billing cycle.

To understand peak demand, imagine a pipe of water which can supply a fix amount of water in certain time. If you are consuming a huge amount if water in 15 minutes, your supplier needs to upgrade his pipe and his water sources. So he will charge you additional for this cost. This is peak demand charge.

In electricity bill, peak demand charge is the most expensive energy you have to pay or can avoid.

The first waste in electricity bill is over-charges due to peak demand or other operational arrangement inefficiencies.

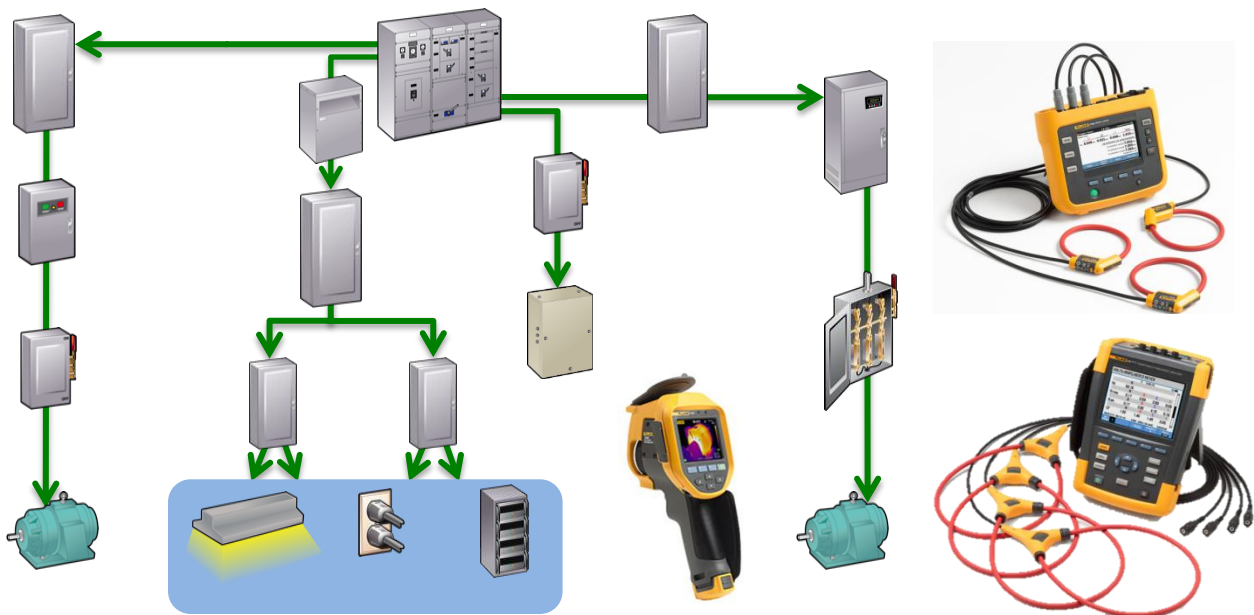
Peak demand optimization to avoid and reduce peak demand penalty is not a myth. The myth is the lack of real information on power (kW) consumption at loads to optimize. If you can have real information on power (kW) consumed overtime at the loads in your production and building systems, you can find solutions to optimize operational efficiencies.



Energy Measurement and Peak Demand Optimization with Fluke 1730 Energy Logger

With Fluke 1730 Energy Logger, you can find out your peak demand penalty easily. The next step is to drill down into your major production lines, big loads and finally secondary loads to log energy consumption and demand graph to optimize. Time of use and power factor optimization have the same nature as peak demand optimization.

There is a common misunderstanding that once you have an online power meter system, you don't need an Energy and Power Logger Tool any more. Online power meters can only provide you high level, general energy information usually at plant room level. However, we can see clearly that energy optimization is performed and achieved at loads level. You need to have information at production lines and loads level to optimize operational efficiency. The disparity in information hinders effective and meaningful actions to reduce your energy bill.



Fluke Tools for Electrical Energy Management

Wastages/ Leaks/ Oversupply

An example will be compressed air system. Some companies do not operate at night or over the weekend but such system are left idling or not completely turn off. Many people assumed that if they do not use the compressed air, there are no usage or charges but this often turn out to be a big mistake that you might want to verify.

In a compressed air system, often there are leakages and such leakages can be significant and cause a lot of energy wastage. Fluke 1730 Energy Logger is specially design for such application. The technician can seamlessly set up the Fluke 1730 Energy Meter tools to do the logging for their energy waste and consumption. This will help to justify for an automated system to switch the system off during non operating hours and to switch on the system 1 to 2hours before the operation start.

ENERGY LOSS CALCULATOR

DEMO 0:02:13					
		Total	Loss	Cost	
Effective	kW	187	kW 15.6	Eur 2.33	/hr
Reactive	kvar	25	kW 0.3	Eur 0.04	/hr
Unbalance	kVA	22	kW 0.4	Eur 0.07	/hr
Distortion	kVA	35	kW 1.6	Eur 0.24	/hr
Neutral	A	38.0	kW 0.1	Eur 0.01	/hr
Total			kEur	23.64	/y
10/28/12 13:41:08 230V 50Hz 3Ø WYE EN50160					
LENGTH	DIAMETER	METER	RATE	HOLD	
200 m	50 mm ²		0.15 /kWh	RUN	

With Fluke 1730 Energy Logger, you can:

- Understand where your energy dollars are going
- Identify inefficiencies and opportunities to improve
- Measure and log most energy parameters such as: kW, kWh, A, V, frequency, power factor with flexible interval, data recording and transfer, large memory for long term and multiple sessions use.

Moving beyond operational efficiency in electrical system, there are also undetected wastages which are now visible on Fluke 435-II Power Quality Analyzer in Energy Loss Calculator function.

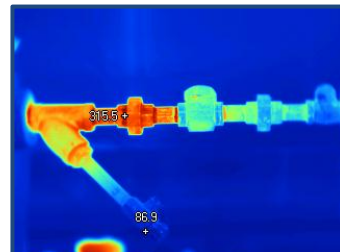
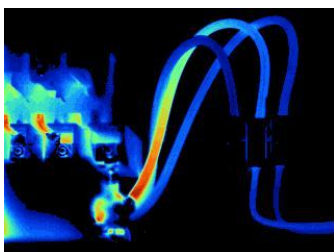
Fluke 435-II provides the complete view of Power & Energy System. Not only including all functions of Fluke 1730, Fluke 435-II also analyzes and captures bad power condition such as voltage & current fluctuation, harmonics, unbalance, inrush and so on. The unique Energy Loss Calculator based on IEEE 1459 measures Energy Loss in the modern electrical system such as loss due to Unbalance, Harmonics distortion and Neutral current. The losses are quantified in dollars based on entered tariff rate. Never before, it is so clear and easy to have a complete look of energy losses to optimize.

Fluke 1730 is the front line energy tool for anyone who is interested in saving energy. Fluke 435-II is the preferred tool for complete and committed energy management.

Operating Condition Inefficiencies

When electrical equipment and components are working, they convert or transfer power to perform designated work. They would heat up in the process to their operating temperature. Overheating of equipment and components is the symptom of operating condition inefficiencies. It means that electrical power is being wasted as thermal power. Overheating of components such as fuse boxes, cables & connection, relays/switches, insulators, capacitors, circuit breakers, transformers, battery banks and so on can add to energy losses in the electrical system.

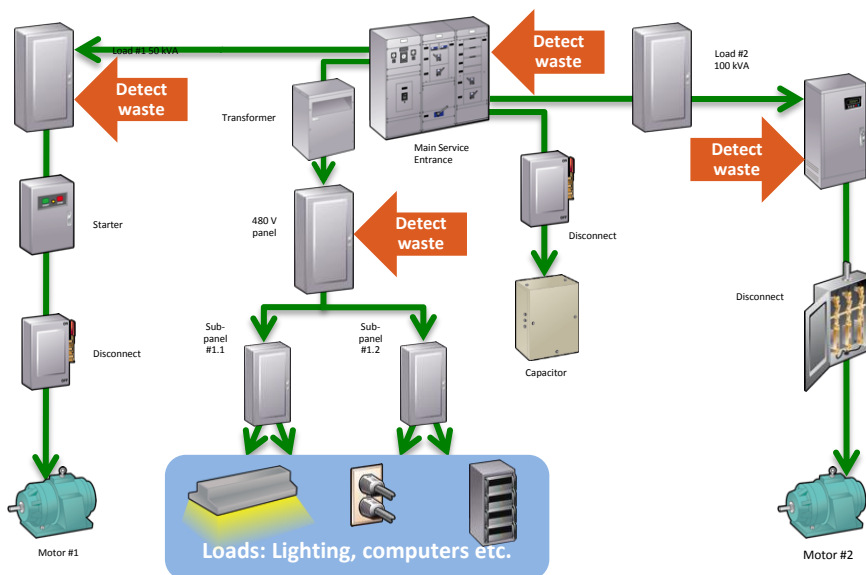
Overheating is also an indication of potential failure in electrical components and operation. Fortunately, such waste and risk can be detected easily with infrared scanning or thermal imaging.



The thermal imager offers a quick, non-contact method for scanning critical components, both within the electrical distribution system and at major loads. Many forms of energy waste manifest as excessive heat.

All electrical and electro-mechanical equipment gives off heat as part of normal operation. The creation of heat in panels and equipment comes from the electricity powering the equipment: the hotter the panel, the more energy is being used.

The purpose is to discover anomalies. Higher temperature can indicate circuit overloading, and other types of equipment malfunction that leads to inefficiency. In essence, for some reason, the equipment is consuming more energy than it should to create the same amount of work, and the excess wasted energy is often manifested as heat – heat that a thermal imager can identify.



Fluke Ti400 Thermal Imager

Energy Management should not be complicated and confusing as long as you approach it in the correct way. Focus on these 3 areas of improvement and get real information to help you make informed decision. Your decision to start taking charge of managing energy will be many times more rewarding.

Fluke. *Keeping Your World Up and Running.*

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