



Why an Energy Management System?

"Energy efficiency is not just low-hanging fruit; it is fruit that is lying on the ground."

Steven Chu, Former United States Secretary of Energy

This is the first instalment of a series of three articles about effectively introducing an Energy Management System (EMS) into your business. These articles can be found in full at Optergy.com as well as the Optergy LinkedIn business page.

Relentlessly rising energy costs

The cost of energy has been rising relentlessly for many years now. Search for "*increasing energy costs*" and you'll get about 332 million hits. In today's globally connected and competitive world, rising energy costs are a common issue. Given that buildings are by far the greatest consumers of energy in any advanced economy, it isn't surprising that there's a lot of focus on improving building energy efficiency. If you're not improving your energy efficiency, then you're missing out on significant business opportunities.

Governments around the world have also identified energy efficiency as a primary plank in their energy policies. Improving energy efficiency improves economic competitiveness and energy security. It's also the lowest cost way to achieve CO₂ reduction targets. Many governments around the world now run programs to subsidise building energy efficiency improvement.

So how precisely do you go about improving the efficiency of your buildings? The answer is in turning the vast amount of data that is currently swamping your facilities team into useful business information. To do that you need a good Energy Management System. It's the only way you can make rapid and sound business decisions around the operation of your buildings that:

- Significantly improve the capital value of your building.
- Reduced vacancy rates
- Save money immediately.
- Improve the productivity of your workforce.
- Avoid potentially costly unexpected downtime.
- Improve your corporate image.

A well-executed EMS is the enabler to reducing energy consumption. It provides the information to identify optimisation opportunities and projects with paybacks so short you won't believe you hadn't done it sooner.

"At the end of the project the results speak for themselves. The building recorded a saving of 39% between the 2010 and 2012 energy consumption. ...we are on the way to a 5 star NABERS"

Donald Sue-Wing

Engineering Manager, Dexus Property Group



What is an EMS and how does it work?

Buildings are highly complex operations these days. So complex in fact that it's not possible to effectively manage them manually any more. An EMS manages the complexity of the energy consumption and systems in your building in a way that allows you to optimise its operation and make sensible business decisions about how you use it. With a good EMS you can make these decisions in real time from anywhere there's an Internet connection. An EMS isn't just about the technology; it is an indispensable business tool.

An EMS connects, logs and analyses all the key data from electricity, gas and water systems in real time. What it does with that massive amount of real time data is turn it into useful business information so you can make sound decisions. The EMS deals with the complexity of the data internally and presents key information to you in an intuitive format that matches your business needs. A good EMS will connect you with that information anytime, anywhere. It understands how your building should be operating and will let you know if anything isn't on track. It frees your facilities team from constant monitoring and enables them to spend their valuable time on improving your building's performance.

It also uses that vast amount of information to automate some of the increasingly complex multi-dimensional balancing decisions. Fine-tuning many of the multi system operating parameters is impossible to do manually due to the complexity of the interactions. For example, a well-designed EMS is able to find the sweet spot for maximum efficiency between multiple room temperatures, chiller temperature, airflow rate and external temperature. Not just for one part of the building, but for the entire building all at once, all of the time. That just isn't possible to achieve manually.

And while it's doing that, it's also communicating with other key facility systems such as your building management system, your access control system and your lighting system to help optimise these too.



How is an EMS different to a BCMS or SCADA?

Ten years ago, BCMS and SCADA were the systems in commercial and industrial applications that gathered together all of the utility data and were used to manage resources and systems. In the last five years EMS' have been designed to cost effectively manage energy, gas and water use in a way that BCMS and SCADA can't. BCMS and SCADA systems were never designed to handle the emergent complexity of multi system optimisation nor the extremely high volume of data involved. They can quickly reach capacity and upgrades often involve expensive hardware and additional software licenses.

EMS' however are designed to scale cost effectively. A good EMS will also enable you to scale in a flexible and open manner without proprietary system (vendor) lock-in. You choose what system you want to add, how you want to add it and what you want to do with the data.

Significantly improve the capital value of your facility

A well deployed EMS doesn't just save you money on your utility bills. By demonstrably driving down the ongoing cost of running your building, you drive up its asset value and find it easier to find good tenants. A recent Investment Property Databank report found that a high NABERS office building in an Australian CBD had a 3.1 percentage point higher annual growth in capital value than a low NABERS rated building. They also found that buildings with higher ratings are not only lower cost to run for tenants, but they also generate higher basic rent, higher net operating income, lower capital expenditure, lower vacancy rate, and longer weighted average lease expiry.

Where do the savings come from?

System Optimisation: Component based energy efficiency improvement has been a focus for building owners for many years. While component efficiency will rightly continue to be important, system based efficiency can save at least an additional 12 to 22%. As you would expect with any complex systems approach, the savings come from complex system optimisation. You won't even know these potential savings exist without digging into the data very deeply. They're not the sorts of thing you can see walking through a plant room - they're hidden away in the complexity of the data.

Waste: Waste is everywhere you look. In fact, once you start looking for it you very quickly see it everywhere. From dripping taps or leaking compressed air lines through to lighting empty spaces or poorly insulated thermal lines, it's everywhere. An EMS will help you find, prioritise and fix the largest areas of waste. It might be an older part of the building system that's still using the original electric motors and the only way you realise is that your EMS shows you it costs more to run than other comparable systems. Or it might be a pump that's too big for the actual volume it has to pump. When you eliminate this waste, you'll know immediately and precisely just how much impact you've made.

Peak Rates: Many large consumers of electricity pay variable rates depending on the time of consumption. Often the charge for using electricity at a peak load time can be vastly higher than off peak. Some utility providers also calculate their base rates on your peak consumption. If you know what's driving your peak consumption and when it occurs, you can choose to delay some internal

systems from switching on or even ensure that systems switch on and off in sequence to spread the energy use over time and lower the peak.

System Drift: Like any highly complex interdependent system, buildings "drift" over time. That is, they invariably move away from the original optimised efficiency settings from when they were commissioned. The Lawrence Berkeley National Laboratory has found that building drift of 10 to 30% in the first two years of operation is common. An EMS ensures that your building energy systems are maintained at optimum efficiency in real time, all the time.

Essential Business Input: At its heart, an EMS positions energy use as an essential business input. As with any essential business input, you should be able to understand and manage most of it yourself. A good EMS allows you to achieve precisely that. A well designed highly user configurable EMS allows you to operate your buildings from anywhere, at any time, without relying on high priced consultants to interpret the data, diagnose problems, optimise system efficiency or reconfigure the system to suit your changing business needs. The automated reporting systems also enable you to achieve all of this with far less overhead.

Sydney Central, 477 Pitt Street, Sydney reduced their energy consumption 60% and in process lifted their NABERS rating from 3.5 to 5.5 stars.

"Unless you can measure it, you don't know how it is performing and you don't know how you can improve it"

Peter James

General Manager Commercial Services – ISPT Pty Ltd

Improve your corporate image

Corporate social responsibility has become increasingly important in recent years. "Doing the right thing" is now the minimum expected standard for any medium to large organisation. An EMS gives you the ability to clearly demonstrate your Green credentials.

Focus on the business

An effectively deployed EMS allows you to treat energy and utility costs like any other essential business input. You can assign responsibility, set targets and measure performance against those targets just as you would any other input to your business, and you can do it without massive overhead.

Do it now

A well implemented EMS deals with the complexity and volume of data in your buildings. It turns that data into useful business information that will:

- Significantly improve the capital value of your facility.
- Save money immediately.
- Improve the productivity of your workforce.
- Avoid potentially costly unexpected downtime.
- Improve your corporate image.