



## 5 Minute Guide 4.1

**energy+**

Turn energy savings into business power

# Energy consumption and productivity

**This 5 Minute Guide explains how to align the measurement of energy use with the tracking of productivity. Monitoring and managing your energy productivity offers many opportunities to benchmark your performance, engage relevant staff and areas of your business, set up a strategy to continually improve your performance and reduce costs across your business.**

Businesses are increasingly recognising the link between energy efficiency performance and business productivity. Understanding energy use as a function of business output (productivity) can identify productivity improvements through reduced energy consumption as well as provide greater transparency and accountability.

This can often lead to cost savings and business improvements, as well as improvements in material use, water use, and use of other resources.

## Productivity metrics

Productivity is an important factor in the long-term health of any business. Productivity metrics are used by businesses, big and small, to measure and trend efficiency in the delivery of the business's outputs. Standard productivity metrics include sales (revenue), shipments, weight (tonnes or kilograms), volume (litres) or units – depending on what it is your business produces.

You can generate the same types of production metrics using energy consumption – known as 'energy productivity'. This can simply be calculated as facility electricity use divided by production. You can also demonstrate energy consumption using other business metrics as a comparison, for example per employee, per factory area, or per sales.

If you have not previously been tracking your productivity metrics, start by determining what is currently reported and by whom. Developing or accessing your productivity metrics will likely involve a number of people from across the business including representatives from operations, finance and procurement. The engagement required in this process could also be a great tool to facilitate buy-in into the future opportunity to include energy productivity in broader business reporting.



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## Benefits of tracking energy productivity

There are numerous benefits to tracking and trending energy productivity that will ultimately contribute to reducing energy costs in your business:

✓ Improved management reporting	<p>Reporting energy productivity translates energy consumption into business-friendly language that non-technical people can appreciate.</p> <p>It is important to align the reporting with the structure of current business reporting including the need to represent energy productivity as a KPI, in a performance dashboard or as trends over time.</p>
✓ Increased management accountability	<p>A wide variety of people influence an organisation's energy costs including staff in operations, finance and procurement. Developing a clear, shared view on accountability for energy productivity performance across the business is critical to enabling the business to reduce energy cost. These accountabilities should be introduced into staff performance management systems using energy productivity as a metric to strengthen accountability.</p>
✓ Establishment of a performance baseline	<p>The establishment of agreed metrics for energy productivity opens the door to establishing a baseline for performance of the business. This baseline can then be used to set targets and measure future energy performance.</p> <p>Be aware that there are factors that will affect your baseline including ambient conditions, product mix, raw materials and occupancy.</p>
✓ Ability to benchmark performance	<p>Comparing, or benchmarking, your business's energy performance against the industry or against a third party, is an important step in improving your energy performance. For example, for your compressed air systems you could benchmark the best operational performance of the month against your competitors or against best practice for such systems. This opens up what is possible, how big the gap is and often informs the strategy to improve performance.</p>
✓ Increased focus on reducing energy use	<p>An understanding of current performance and benchmarks together with clear accountability will drive increased focus on improving energy productivity performance. To support this, energy management should be introduced into operating and maintenance procedures to support the identification and implementation of energy efficiency improvement opportunities.</p>
✓ Establishment of performance targets	<p>An understanding of performance benchmarks, together with a funded energy efficiency improvement plan, enables you to set energy performance targets for the business. Targets help drive accountability for delivering the energy efficiency improvement plan and support the forecasting of future energy costs.</p>
✓ Opportunities to review energy supply options	<p>An improved understanding of how energy is used in your business will enable you to make informed decisions about investing in alternative energy supply options. For example, installing a solar system when your energy cost reaches a certain level where investment makes business sense.</p> <p>This will also put you in a stronger negotiating position with your energy retailer. For example, you could discuss implementing a load-shedding agreement when energy prices are highest so your business can profit from not operating your plant at that time.</p>
✓ Ensuring new investments improve performance	<p>Informed by business performance targets for energy productivity, all new capital investment assessments should include the impact on energy productivity and the explicit expectation that new equipment will lead to improvements in energy productivity, if not absolute energy consumption.</p>
✓ Increased training accountability	<p>Improved accountabilities for energy management training and awareness for staff are driven by a more transparent understanding of business energy performance.</p>
✓ External reporting capability	<p>Effective external communication of the priority placed on energy management, and the performance and successes of your energy management, strategy will profile your business as being proactive on energy efficiency. This will create business value when responding to tenders or engaging other organisations in your supply chain.</p>

## Tracking energy use

Businesses have accounting protocols to track cash, expenditure and assets. However, while a \$20 receipt for a taxi fare is tracked, often businesses do not understand or examine where their \$100,000 in annual energy expenditure goes. If money is worth tracking, then so is energy. As energy costs rise, it becomes even more important to monitor it.


Energy comes in many forms, for example, electricity (kWh), natural gas (MJ), LPG (MJ), diesel (L), petrol (L), fuel oil (L), coal (kg) and steam (MJ). Monitoring energy use can be undertaken in a number of ways. Each gives a greater level of resolution and therefore increased ability to make informed decisions about energy use and cost. Figure 1 outlines four approaches to tracking energy use (see page 4).

When starting to track energy use against business performance, use existing business metrics. Whether your business tracks performance by sales, revenue, per tonne of product, per unit, per head of staff, billable hours or other metrics, it is best to seek to align energy use with existing reporting metrics. This enables your business to start understanding the amount of energy against a metric that means something to your business.

When considering more detailed levels of energy monitoring, start thinking about how you are going to track, record and manipulate the energy use data into useful reports that enable the measurement of absolute energy use and trending of energy use over time. There are management systems that can do this for you including:

- Smart meters that give you access to energy usage at the site-supply point.
- Data loggers which can collect data from equipment or processes to be accessed later.
- Application management systems (such as c-Bus for lighting control).
- SCADA / BMS<sup>1</sup> systems that collect, display and trend real-time data.

When assessing the level of monitoring you will use on your site, it is critical to think through the use of the data. Remember you can only manage what you measure. However there is little use in collecting information if you are not sure what you want to do with it.



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Remember to  
**refer back to your  
energy plan regularly.**  
Go to the PACIA energy+  
portal for help in setting  
up your plan.

**Figure 1: Energy use monitoring options**

<b>Cost</b>	Use your accounting systems to track energy cost (\$) across your different energy invoices. Usually on a monthly basis.
<b>Site use</b>	Use your energy bills to determine your energy consumption in kWh (electricity), MJ (gas) and litres (fuel) for the whole business or for each individual meter that is detailed on your bills. Usually on a monthly basis. Better practice would include reading your own meters on a weekly basis to add greater resolution.
<b>Process use</b>	Use power and flow meters to measure energy consumed by a production process or zoned part of your facility. Frequency is production-cycle dependent so comparisons are useful (for example daily or weekly). Calculate energy cost over the period using energy bill data.
<b>Equipment use</b>	Use power, flow and runtime meters to measure energy consumed by individual pieces of equipment or systems. Frequency is based on the usage profile of individual equipment but can be tracked by the minute if useful. This would usually require a facility or process management system (such as SCADA) to convert the data into a useful report and trend data.

<sup>1</sup> SCADA (supervisory control and data acquisition) systems and BMS (building management systems) are both programmable computer-based control systems that take information from sensors around a process or facility and control it to meet operational requirements. These systems can also store and represent the state of the process or facility at point-in-time or report on a trend of performance over time (for example over a shift, day, week, month or year).

### **This is just one piece of the energy efficiency puzzle!**

There are many other areas that you should also consider. PACIA energy+ covers the key topics and provides you with the tools and information you need to improve your energy efficiency and reduce costs. PACIA energy+ has been designed specifically for businesses in the chemicals and plastics industry.

**Go to the PACIA energy+ portal for more: [www.paciaenergyplus.org.au](http://www.paciaenergyplus.org.au)**



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