

**Embedding energy management**

**Practice Guide – Module 3: Energy procurement**

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# Purpose of this guide

Welcome to the practice guide in energy procurement.

The way a business structures its purchases of electricity, gas, diesel, liquefied petroleum gas (LPG) and coal, impacts its carbon footprint as well as the bottom line.

This guide will demonstrate how understanding resource use within your supply chain can assist in cost-effective supply arrangements. It will also outline procurement practices that consider your carbon footprint and/or potentially reduce direct and indirect costs. You will also learn how to obtain the best price when procuring electricity, gas and other key energy sources.

With this guide, your business leaders will access tools and case study examples to review current energy procurement practices. The guide also enables identification of potential quick wins around better electricity load management or a review of your tarriff structure. In particular, the team will be better equipped to:

* Present information on energy market,s including energy prices and site energy baseline data to inform cost savings opportunities.
* Identify, prioritiseand align energy procurement cost saving opportunities with the current and future energy demands of the site.
* Engage others from within teams and across the site to support the achievement of cost savings.
* Develop action plans to progress procurement cost savings.
* Revisit action plans and monitor progress against targets.

This practice guide is supported by information and tools in the Embedding Energy Management (EEM) workforce development kit. Relevant tools are highlighted in bold throughout the practice guide.The EEM kit is available from the resources section at <http://www.sustainabilityskills.net.au>**.**

# Who will benefit from this guide?

This guide will benefit General Managers, Procurement and Supply Chain Managers, Site Engineers and Managers, and Energy Champions who have the desire to learn more about integrating good energy procurement practices into their general procurement systems.

# Business drivers

Energy costs are some of the most price-volatile but controllable costs for a business, and they present a long-term risk as a result of the introduction of a price on carbon. The business benefits of developing a systematic response to energy procurement include:

1. Energy costs are minimised and risks effectively managed across the business.
2. Securing long-term contracts can provide price certainty.
3. The negotiation of the terms of contract can ensure that risks are shared between the energy supplier and customer.

# Energy procurement – practices for business

This guide presents six key practices that will help business to better understand the opportunities and realise the benefits of a systematic approach to energy procurement for their business, and how they can integrate the objectives of cost minimisation and environmental/carbon reduction goals. These six practices are:

1. Understand energy use, including peak demand and calculate current cost impacts.
2. Use energy market and price trends to inform contract and tarrif reviews.
3. Explore and identify opportunities to reduce energy costs.
4. Investigate contract options and communicate energy market intelligence to others in the business.
5. Facilitate implementation of cost reduction opportunities.
6. Monitor and investigate implementation of novel procurement practices to explore changes in the market.

## Case studies

Multiple sites - but only one rate

Phil , the Procurement Manager realises that one of his sites would save money by moving onto a negotiated contract in the same way that some of his other sites have done. The site in question uses 2,660 MWh of electricity a year.

Whilst he is sure he can get a better deal, he is not confident that his current contract will accommodate any changes. By talking to his retailer, Phil negotiates to include this site on the same contract rates as his other sites. He saves $13/MWh, or $34,580 a year overall, and saves on administration time by having just one electricity supplier.

Given the firm’s new policy on reducing its impact on the environment, Phil decides to use the savings to buy a proportion of his electricity as GreenPower. Again he talks to his retailer about the options and decides to buy 20% GreenPower. The outcome for Phil’s business is good for the bottom line, and good for the environment.

AD Cootes , metal fabricators ,reduce risk and save money

AD Cootes,WA, currently purchases electricity on a contract which is renegotiated on an annual basis. This ‘bundled’ contract currently has a very high unit cost of electricity. This is likely due to the electricity retailer’s perception that the site is a ‘higher than normal risk’ energy user due to the variation in their daily energy use patterns.

The reasons for this may be:

* Electricity use can fluctuate greatly throughout the day.
* The peak/off-peak ratio is greatly in favour of the more high-risk peak period.
* There does not appear to be anyone on site who takes responsibility for energy consumption nor for keeping energy consumption as low as possible.
* Negotiations appear to be last minute and focus solely on what is the best price the site can get, and not on how can they best reduce risk for the retailer.

After the EEM planninmg session for Module 3 was conducted the site appointed the Finance Manager to be responsible for energy management giving the retailer better information on these risks, collaborating on a plan and providing the retailer with greater confidence that the risk is being reduced, an electricity unit cost savings of 20% was negotiated saving the business almost $20,000 per year over two years.

Managing electricity via a procurement strategy source ‘Guide to energy efficiency opportunities in Canadian Foundries’

*Energy Efficiency Opportunities in Canadian Foundries* is a joint project of the Canadian Foundry Association and Natural Resources Canada through the Canadian Industry Program for Energy Conservation (CIPEC).

The effort to save electricity at a foundry could start with examining the components of its electricity bill. Often these are not fully understood and consequently advantages of available savings are not utilised. A foundry can lever this knowledge profitably in managing electricity use on site and in negotiating with energy companies in the new, deregulated electricity market in Canada.

The electricity has four components:

* 1. **Consumption charge** – the kWh consumed in a given period multiplied by the set rate, in ¢/kWh. A second consumption charge may apply in time of use and seasonal rates situations. These pricing schemes offer lower rates to customers who can shift high-demand operations away from the periods when the utility receives its peak demand for energy. The utility benefits from a more consistent daily load pattern, and the customer pays less.

Savings can be achieved by:

* reducing the total electricity consumption (in kWh) in the facility
* shifting energy consumption to a time when energy costs are lower.
  1. **Demand charge –** the maximum power level used by the foundry, in kW or kVA, is also called peak demand. The demand varies throughout the day depending on what electric equipment is running concurrently. The electric company typically measures the demand in 15-minute intervals. The maximum demand recorded in the month sets the demand rate (up to $20 or more per kW) to be applied to the electricity bill for the entire month or year. This effectively means the electricity utility finances its investment in supplying the required power to the foundry. If the foundry has its own transformer, it may negotiate a discount. Some billing practices obscure the penalties involved. For example, if the demand charge combines the monthly demand with a percentage of maximum monthly demand in the past 12 months, then a foundry is penalised when no production takes place (holidays or poor business).

Savings can be achieved by:

* **reducing peak demand:**
  + load-shedding, switching off non-essential electrical equipment
  + load-shifting, rescheduling operations so that some activities take place during off-peak periods
  + process improvements, which reduce electrical power requirements
  + negotiating, if the utility allows it, for a 60-minute demand-setting period, instead of the 15-minute period.
* **controlling demand with demand controllers:**Devices that reduce potential peaks and make a foundry’s operations add load to the low spots. If you already have a demand controller, examine its function relative to a frequency of load factor peaks. Demand can also be controlled in multi-furnace operations by staggering operations and using new-generation power packs, which can split the power between the furnaces to control the demand effectively.
  1. **Power factor charge** – a penalty that the electric company charges to customers for poor utilisation of the power supplied. The charge acts as a measure of efficiency. It is expressed as a ratio of the power passing through a circuit (apparently supplied, in kVA), to actual power used (work performed, in kW). Utilities penalise customers with a power factor less than a set level, usually 90%. Deregulation will likely increase this and other penalties. Sometimes, kVA is used in the capacity charge. This is a charge intended as payment for the costs of supplying the service to the site, and represents the maximum demand from the supply system.

Savings can be achieved by:

* **power factor improvements:** controlling items that generate inductive loads, such as transformers, lighting ballasts, and electric induction motors (especially under-loaded ones)
* **installing capacitors in the electric system:** the thing to watch for is that harmonics from electric furnace AC-DC-AC converters may trip or destroy the protection.
  1. **Inducements** – offering different rates for blocks of consumption based on demand (e.g. 9¢/kWh for the first 100 000 kWh \_ demand, 6¢/kWh for the next block, and so on).This may penalise single-shift operations and those with a poor load factor. Load factor is the monthly consumption divided by the product of maximum demand and the billing-period hours. At other times, utilities may offer better rates for off-peak hours in an effort to encourage a foundry to switch to melting at night, for example.

Savings can be achieved by:

* **examining your electricity bill and try to renegotiate**
* **examining the economics of a different production schedule:**   
  Most industrial and commercial facilities are billed for electricity according to a general-service rate schedule in which the customer pays for the peak power demand (kW/kVA) and energy consumption (kWh). Most general-service rate structures also impose financial penalties on plants that have a low power factor.

Some utilities now offer their major customers *real-time pricing*, a scheme in which, each day, the utility gives the customer the rates proposed for each hour of the following day. A large foundry in Ontario joined a real-time pricing program. Each afternoon, the foundry gets the price of kWh for the next day, starting at midnight. The operators enter the price into the system and then consider the quantities of iron in holding furnaces against the production schedule to decide on hour-by-hour usage targets. Since the power is (in this jurisdiction) at its most expensive between 10 am and 11 am and between 7 pm and 8 pm every day, they schedule melting to suit, e.g. shifting it to night melting, with corresponding reduction during the daytime.

Practice steps

| Practice steps | Description |
| --- | --- |
| 1. **Understand energy use and calculate current cost impacts.** | A thorough understanding of how energy is used is needed if you want to achieve the best possible supply deal. Some of the key things you can do to aid understanding include:   * Review current invoices and other metering data to determine total usage on a daily, weekly, monthly and annual basis. Collect at least 12 months of data where possible. Data is available from energy invoices (usually on a monthly basis). For data on a shorter time period (hourly or daily), speak to your supplier to determine whether your installed metering captures data that can show energy usage patterns. * Determine any expected changes over the next 1-2 years. Examples include any program or initiative that has a targeted decrease in energy usage/carbon emissions, or the planned purchase of new equipment that will change energy usage or peak demand. Discussions with a range of site and corporate personnel (where applicable) should occur. * Review the working hours of major equipment or lines. Does the large energy-using equipment need to work all at once, and/or at peak times, and are any major changes planned (eg. increasing number of shifts, moving some production to off-peak times) that will affect energy use patterns?   It is essential that the total cost of the fuel is understood for any analysis. The total cost is usually made up of three key components:   * the cost of the physical item (commodity cost) * the cost of transportation/distribution * any other regulated or market charges.   When comparing offers from energy suppliers you need to be aware of those components that are variable across the range of suppliers, and those components that are fixed costs. For instance, while you may have a choice of retailer for the supply of your electricity, the transportation charges are the same regardless of your retailer. However, for LPG and coal, the transport costs are dependent on your supplier and may be bundled with your commodity cost. |
| 1. **Use energy market and price trends to inform business planning of future costs.** | Access information about energy prices to inform budgets, business plans and capital works. Energy prices may be influenced by world commodity markets, as well as local conditions in some cases. Existing and potential suppliers are a good source of information as well as industry associations. When reviewing future prices, the trend is more important than the exact price given the volatility of the market and the uncertainty beyond the short term.  The cost of carbon is not usually included in the commodity cost quoted by the various markets and should be undertaken as a separate analysis. This is largely due to the uncertainty of the application of carbon pricing in the economy and may change depending on future government policy.  When undertaking price trends and financial analysis it is important to review how consumer price index (CPI) is reflected in the models, as often future price forecasts do not include allowance for CPI or the time cost of money.  It is good practice to also utilise energy price and price trend (including carbon) information to inform new capital works or equipment replacement projects. Energy costs over equipment life usually exceeds the cost of the equipment, so selecting efficient technology at the beginning, informed by accurate price trend data, can generate significant cost savings over the long term. |
| 1. **Explore and identify opportunities to reduce energy costs.** | A range of opportunities can exist to optimise your current energy agreements, including:   * For electricity and natural gas, review opportunities for moving to a lower cost tariff. Tariffs are the regulated component of the supply and can cover either the total cost or the network cost alone. Often there are a number of different tariff structures available for a site and, depending on your usage profile across the day, week and year, some tariffs are less costly than others. * Some electricity suppliers provide incentives for end users to turn off large energy using equipment during times of peak load on the electricity network. Not only will you save money by not using electricity, but you will be paid additional money to offset for the inconvenience. Speak to your electricity retailer and electricity network provider to determine whether they offer a load curtailment or load shedding program or incentives to permanently reduce your peak demand. * If you have a contract, ask your supplier if you can have a discount for a new contract, or for extending an existing contract. * For natural gas, one of the larger components of cost is the Maximum Daily Demand (MDQ). By analysing your profile, and determining the scheduling of equipment, the MDQ can be reduced. * Where electricity demand is charged in MVA or kVA units, check the power factor of your supply. This is sometimes shown on the invoice. Otherwise talk to your retailer. If the power factor is less than 0.98, then there may be benefits by installing power factor correction. Ask your retailer or network service provider, or search the internet for potential suppliers. |
| 1. **Facilitate implementation of cost reduction opportunities via contract reviews and tarriff analysis.** | Obtain competitive offers for supply using a structured tendering process. It is important to keep to the process and the timeframes outlined. Most energy sources are based on commodity prices that vary each day. Step 1 is particularly important when reviewing the market and gaining information; you need to understand the price drivers for suppliers. For instance, electricity pricing offers for large users is often only valid for a few days, possibly a week. If your tender timetable requires offers to be valid for two weeks, then you may receive uncompetitive offers.  The emission factors for most fuels will vary by state rather than supplier. This means that regardless of who your electricity supplier is, your carbon content will be the same for your location. There may be some cases where using the coal from one mine, or one supplier, varies from another mine or supplier, but this is very hard to verify.  If the tariff analysis showed that there are more *cost-effective tariffs*, contact your supplier and ask them to firstly confirm your assessment and then change the tariffs over.  Key risks to review when negotiating energy contracts are:   * make sure the contract term covers the period of any risks identified in the market review, but not beyond your reasonable business planning period * understand under what circumstances either party can terminate a contract * understand whether there are any usage restrictions on a daily, monthly or annual basis * understand what the supplier can do if the meter is not read or deemed incorrect * check whether the supplier can guarantee supply. Note that many retailers are not responsible for the infrastructure to get electricity and natural gas to sites, and therefore cannot guarantee supply * understand what the pass-through costs are in a contract, and under what circumstances they can change. |
| 1. **Monitor and investigate implementation of novel procurement practices to explore changes in the market.** | Once the contract is in place, it is important to *understand any restrictions* within the supply agreement and ensure that you do not breach those conditions. Electricity and gas tend to have a maximum amount per day or year, and diesel, coal and LPG often have a minimum amount to take within a certain contract period (referred to as ‘take or pay’).  Keep abreast of changes in the market through the same channels as was used in Step 2 when identifying market issues and trends. Keep in constant contact with your supplier and various industry associations. |

## Supporting tools and templates related to the practice steps

The EEM tools are available from [www.sustainabilityskills.net.au](http://www.sustainabilityskills.net.au)

| Tool or template | This tool is useful if… |
| --- | --- |
| **Energy procurement presentation** | You need to work out if your site is contestable.  See the contestability thresholds in ‘procurement presentation’. If you are above the thresholds or in states where there is full deregulation, then you can shop around for a better deal on electricity and gas. |
| **Energy procurement presentation** | You want to understand the various components of your energy bill and evaluate opportunities.  Note that there are a wide variety of bill types and every retailer has a different format of presentation. |
| **Energy procurement presentation** | What principles should I employ when contracting for energy supply?  You need to contract for energy supply and want to understand your options and tips for negotiating a favourable agreement for your site. |
| **Tariff and power factor analysis** | You want to understand tariffs and power factor correction to determine whether your electricity account is on the best tariff. Note that it is beneficial to use this tool in conjunction with the ‘procurement presentation’ to understand terminology and key aspects of the invoice. |
| **Energy baseline tool** | Load profile analysis - you want to review the half-hourly data from a smart meter in a simple and graphical format. |
| **Energy procurement facilitator runsheet**  **Energy procurement presentation** | You want to run anenergy procurement planning forum to develop a plan to exploit those aspects of the market that might provide immediate cost savings for the site.  You want to develop an executive brief to make systematic changes to procurement practices so that the site continues to pay the ‘right’ price for energy. |

## Additional websites for reference /general knowledge

The following websites are recommended for background knowledge and further reference.

| Website link | This website is useful because… |
| --- | --- |
| **The Energy Users Association of Australia (EUAA)** | It provides information on a range of issues affecting large energy users. While the association is a membership-based organisation, there is a significant amount of information available to non-members that will assist with gaining a greater understanding of the energy market and issues affecting future prices.  [www.euaa.com.au](http://www.euaa.com.au) |
| **The Australian Energy Regulator (AER)** | The AER determines the price increases for all regulated gas and electricity tariffs across Australia. They took over from state/territory-based regulators in 2010.  [http://www.aer.gov.au](http://www.aer.gov.au/) |
| **Consumer information/assistance** | These are useful sources for identifying potential electricity and gas suppliers. Some of these websites also give tips on negotiating with suppliers and contract traps to be careful of.  [www.industry.nsw.gov.au/energy/customers/choosing-supplier](http://www.industry.nsw.gov.au/energy/customers/choosing-supplier)  [www.esc.vic.gov.au/Energy/Consumer-Information/Energy-Retailers-Choosing-a-Retailer](http://www.esc.vic.gov.au/Energy/Consumer-Information/Energy-Retailers-Choosing-a-Retailer)  <http://www.deedi.qld.gov.au/energy/tips-elect-retailer.htm>  http://www.escosa.sa.gov.au/consumer-information.aspx |
| [**LPG**](http://www.lpgaustralia.com.au/index.php?option=com_content&view=article&id=50&Itemid=55) **market** | It provides information about LPG and the market drivers for the LPG price.  <http://lpgaustralia.com.au/site/index.php> |