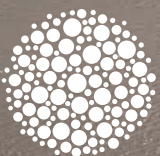


THE OUTLOOK FOR ENERGY AND CARBON MANAGEMENT

≈≈≈≈≈ 2017 ≈≈≈≈≈



energetics[®]

A MESSAGE FROM OUR CEO



Energetics can trace the firm's origins back to the 1979 Second Oil Crisis and a speech President Jimmy Carter gave titled a "Crisis of confidence" in which he outlined his plans to reduce US oil imports and improve energy efficiency across the US. Energetics' founder recognised the critical importance of 'improving energy efficiency' and established Energetics in 1984, helping large energy-using businesses to reduce costs and energy wastage. Carter's speech was about drawing a line and taking control, whilst acknowledging the challenges and opportunities ahead. It was also about the key role of energy in the health of an economy. He said, "The energy crisis is real. It is worldwide. It is a clear and present danger to our nation. These are the facts and we simply must face them."

Here in Australia today there is a 'crisis of confidence' over domestic energy supply and clear leadership is needed. Prices in our eastern and south eastern markets are both high and volatile. The energy mix is changing as innovation and investment have made renewable energy cost competitive. Costs are falling with new utility-scale wind priced more cheaply than new coal fired power stations, and Australia now has the highest penetration of rooftop solar anywhere in the world. Yet our energy market rules and transmission and distribution systems have failed to keep pace and adapt and manage the new energy sources. On top of it all, our Federal and State Governments are at loggerheads over the future shape and form of energy generation.

We also have a gas supply crisis. Despite Australia having some of the world's largest fields, gas is in short supply in our eastern and south-eastern domestic markets with exports of LNG diverting supplies, coupled with a dramatic scaling back of onshore gas exploration and production. The resulting shortfall carries consequences not only for large gas using businesses, but for power prices as the future cost and supply of gas is linked to the future price of electricity.

And while the management of Australia's energy transition is drawing news headlines on a near daily basis, solutions need to be found that support a clean energy future and the achievement of Australia's targets under the Paris Agreement. This is a challenge given the politically fraught nature of climate policy in this country with deep divides not only between the Federal and State Governments, but between the Federal Government and a large swathe of the business community which is calling for a carbon price signal to provide investors with the confidence they need. Our international commitments also sit alongside increasing scrutiny being applied to companies on the management of their climate-related financial risks and social activism that is calling business to act. Consumers want a secure clean energy supply all at low cost.

The "crisis of confidence" in Australia today is driven in large part by short term thinking and a failure of Federal/ State consensus. These are the facts and we must face them now.

2017: ENERGY AND CARBON MANAGEMENT CHALLENGES COMING TO THE FORE. HOW IS YOUR BUSINESS POSITIONED?

Business approaches

In this ebook, we cover energy management challenges and risk management responses that will help your business navigate energy price volatility on the east coast. These responses span strategies for contracting supply, to opportunities to reduce energy demand and achieve new levels of energy productivity, to understanding and accessing Government funding programs available across the country which can support efficiency projects. With best practice energy management, a range of business opportunities can be unlocked.

Emerging issues

We also look at carbon management challenges and opportunities. Off the back of our successful collaboration with the Investor Group on Climate Change (IGCC) and Dr Fiona Wild of BHPB, we were encouraged by the high level of interest in our Sydney and Melbourne briefings on the Recommendations Report of the Taskforce on Climate-related Financial Disclosures, developed by the global Financial Stability Board. It's clear that business increasingly understands that while Australian climate policies are up for review in 2017, they are not in line with the global 2 degree emissions reduction goal and the strongest signals to take action on climate change are coming from other nations, businesses across all sectors and most particularly, the global investment community. We see that Australian business is becoming more confident in understanding the value that can be created with emissions reduction targets, good governance and reporting frameworks – value that spans both sound management of risks and the ability to identify future potential business opportunities.

We hope this ebook supports your business' energy and carbon response to Australia's "crisis of confidence". Energetics will continue to provide commentary and advice as the year unfolds. Please contact me, any one of our authors or your Energetics' account manager, if you have questions or would like to discuss any topic.

Tony Cooper
CEO, Energetics Pty Ltd

OUR EXPERTS

If you would like to know more about the Energetics' experts who wrote the articles in our Summer Reading pack please follow the link to their biography. All authors are listed in order of article appearance.



JOHN BARTLETT

John works out of our Sydney office with Energetics' energy markets team. With over eight years of experience in the energy industry, he has worked with both power generation and energy retail businesses.

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Gilles has strong expertise in providing engineering and economic analysis to support capital investments in energy demand and supply technologies.

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Anita has more than 20 years' experience in energy, banking and management consulting. Prior to joining Energetics in 2011, she held positions with Barclays, IBM and PwC.

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Mary oversees the development and delivery of client solutions that range from strategic and policy advisory services, energy markets forecasting and procurement, efficiency, data management and carbon reporting.

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MICHAEL BOSNICH

Michael Bosnich is responsible for major building, retail and banking clients. Mike plays a vital role in reviewing industry trends, mentoring our delivery teams, our quality assurance systems and ensuring client satisfaction.

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CHRIS MCLEAN

Chris has extensive experience in assisting organisations to manage their information and knowledge, develop and manage technologies and protect and commercialise their intellectual property.

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ENERGY MARKETS

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INTEREST GROWS IN RENEWABLE ENERGY SUPPLY OPTIONS IN THE FACE OF PERSISTENT MARKET VOLATILITY

13 January 2017

Written by John Bartlett, Gilles Walgenwitz, Andrew Tipping and Leigh Rostron

On Tuesday 10 January, 2017 the Australian Financial Review published a story titled "Gas supply terms force buyers to go DIY on energy". Energetics' John Bartlett was interviewed for the story, raising the issues that we've seen working with large industrial and commercial gas users who are struggling to secure 12 month supply contracts.

The challenges facing large gas and electricity users

This is a summary of the issues we're seeing in our daily interactions with our clients and with energy markets.

- Manufacturers are struggling to secure supply contracts for the next twelve months. Businesses are seeking 12 month contracts so that they can re-evaluate their options at the end of those contracts in the hope that competition will return to the market.
- What we are seeing from the retailers are minimum contract terms of 24 months, and in some cases a push for 36 months, which under current market conditions industrial customers have little choice but to accept. Add to this the 'take or pay' conditions which require them to pay for a minimum amount whether gas is consumed or not, and a consumer has their hands tied for two years with high gas bills. So while there is no guarantee that gas prices will reduce in twelve months' time, it is the lack of options for large industrial consumers in the current environment which is of concern.
- The gas supply problem is also increasingly affecting electricity markets in Australia, as the future price of electricity is more and more influenced by the future price and supply of gas. The timing of the closure of coal fired power stations following the commencement of LNG exports has left a void in generation for gas fired generation to fill.
- As electricity markets become more volatile, as seen in 2016, energy companies may well achieve a better financial return per gigajoule of gas in the volatile electricity market by dispatching gas fired generation into high electricity prices, than by competitively offering the lowest possible prices to what were once desirable, large industrial customers.
- Across our business, more than a third of our client base is expressing interest in investigating on-site generation project options in order to minimise their exposure to the energy markets – both electricity and gas.

OPTIONS BEING EXPLORED BY BUSINESS

Direct alternatives to gas

Unlike electricity, there are limited cost effective options to displace natural gas directly, other than the use of waste to generate energy - biogas and biomass. This is being evaluated by businesses with appropriate and reliable fuel sources, particularly in the agricultural and food manufacturing sector. Bioenergy can have the advantage of generating combinations of heat and power and provides an opportunity to reduce waste charges. Recent outcomes from the biomass workshops for the Department of Industry in NSW indicate high levels of interest but a very immature industry which will require significant support to get started.

Solar thermal is another alternative to displace natural gas and is typically focused on producing hot water. Technologies range from upsized household solar hot water systems through to concentrating parabola technologies.

It is worth noting however, that the uptake of bioenergy and solar thermal technologies across the renewable energy market is dwarfed by the relative popularity and scale of the solar PV market.

Sourcing electricity from renewable energy

Energetics sees six main reasons businesses are investigating electricity sourced from renewable energy:

1. Increased volatility in the wholesale electricity and gas markets
2. High price of large-scale renewable energy certificates (LGCs). Businesses are typically purchasing as a pass through cost as part of their retail electricity services agreements. With Calendar Year 2019 LGCs trading at \$88 per certificate currently, and high prices likely to be sustained with the shortfall in certificate generation expected to last several years, more C&I customers are contemplating different options for managing this liability, including self-sourcing and self-generation of renewable energy certificates.
3. Drop in the cost of finance
4. Technology costs are falling and the conversion efficiency is improving
5. Increased pressure from investors seeking responsible management of carbon liabilities and reductions in emissions being pursued.
6. Strong marketing activity from solar manufacturers and solar installers.

For business there are two forms that renewable energy supply can take:

On-site/ behind-the-meter power generation

The interest is predominantly in solar PV systems without battery storage although we are seeing an increasing number of enquiries that include assessments of energy storage options. Financing options, specifically PPAs (Power Purchase Agreements), are increasing the implementation of these technologies amongst our client base where capex budget may not be available for non-core investments such as renewable energy projects.

We have also seen a number of our clients in the mining and resource sector reviewing the contractual terms of their on-site energy supply agreements aiming to transfer more risks and efficiency guarantees to their suppliers.

Long term renewable energy supply contracts

Contracting for supply from an electricity retailer or a renewable energy project, these contracts (known as 'synthetic' Power Purchase Agreements) can provide a partial hedge against future electricity price escalations. This is the type of deal Energetics has been facilitating for a number of clients including City of Melbourne. Synthetic PPAs are becoming increasingly popular overseas - particularly in the United States.

We are also seeing strong interest in renewable energy buying groups because:

- Individual organisations do not have a large enough electricity demand to commission an off-site renewable energy project
- Collective purchasing power of groups can provide members with price benefits
- Members share the procurement costs and also benefits such as time savings
- Sharing the strategic value of access to specialist resources (especially as renewables buying groups are a new concept in the Australian market) which reduces the risk of the renewable energy solution / enhances value for money.

Typically these Synthetic PPAs see the purchase of either only LGCs (Large Scale Generation Certificates) or a bundled arrangement including the supply of electricity and green certificates. Under a bundled arrangement, the contracting party manages the mismatch between the renewable energy generation project(s)' generation profile and the customer's load requirements.

Over 2017 energy market volatility is expected to persist. Whether contracting advice or assessing the potential of on site generation projects, Energetics can assess the risks and opportunities for your business.

WHAT CAN WE LEARN FROM THE VOLATILITY OF THE PAST 12 MONTHS?

19 January 2017

Written by John Bartlett

Energy prices are renowned for being extremely volatile and unpredictable. Wholesale energy prices are influenced by a range of factors; these include weather, local economic activity, global financial outlook, international prices, resource availability, investment in future resources, government policies, market sentiment, and the physical or mechanical constraints on plant or infrastructure.

The past 12 months have demonstrated how volatile spot and futures markets can be, with 30 to 50 percent increases in futures contract prices in a matter of 6 months, making it difficult to manage budgets and control costs. Time-to-market for procurement exercises is an even more important control point to counter the impact of increasing price volatility. With electricity and gas contract prices on the rise and little sign of relief on the horizon for energy users, Energetics has seen up to \$1m in avoidable costs incurred by businesses which didn't take advice to engage early and accept competitive offers at the right time.

As business looks to plan and budget their energy spend, Energetics considers the impact of decisions taken over the past 12 months and how they could manifest over 2017.

THE CUMULATIVE IMPACT OF A NUMBER OF MARKET RISK FACTORS

In late 2015 a number of events were triggered which over the course of 2016 would drive energy contract prices to unprecedented levels for both electricity and gas.

In October 2015, Alinta Energy announced it would be closing the Northern Power Station in Port Augusta, South Australia. Futures prices rose immediately, raising concerns across stakeholders in the National Electricity Market and throughout the media over security of supply in a state which relies heavily on renewables.

Shortly after, in November 2015, the first Liquefied Natural Gas (LNG) exports left Gladstone, Queensland, commencing what would become a lucrative contributor to national GDP as Australia moves towards being the largest LNG exporter in the world.

Late December 2015, the Basslink cable between Victoria and Tasmania was damaged, cutting off electricity supply into Tasmania which was in a critical state with low dam levels to supply hydro generation, putting Tasmania's energy supply at risk. 200MW of diesel generation needed to be sourced, installed and commissioned in the months that followed, and while successfully rolled out, its requirement for dispatch into the market became unnecessary following the late arrival of much needed rainfall. The event however has left Tasmania determined to avoid a repeat and will likely see the rebirth of local gas fired generation in the next 12 months. In May 2016, Engie's Chief Executive Isabelle Kocher announced that the utility was considering the closure or sale of its Hazelwood coal-fired power plant in Victoria as part of its move away from operating any coal-fired plants.

These events proved to be catalysts for market movements over the 2016 year.

Key events in 2016 which saw step changes in futures pricing began in July with the high price events across the NEM, in particular South Australia, who were now without the Northern Power Station. Driven by high winter demand, low wind generation, planned upgrades on the Victoria to South Australia (Heywood) interconnector and low levels of gas fired power generation coinciding with high priced spot gas, it appeared a number of events were combining to challenge both the energy markets and Australia's energy policy settings.

However, this metaphoric 'perfect storm' in terms of energy costs, momentarily took a back seat to energy supply security in September as an actual severe storm event took out significant transmission capacity in the Port Augusta region, triggering a closure of interregional interconnectors and taking wind generation offline. The South Australian blackout cost the economy a reported \$367m¹.

If the year hadn't been tracking badly enough, the rumours leading into the November announcement of the Hazelwood power station closure in Victoria, again saw prices lift, most notably in Victoria, but also affecting neighbouring states across the NEM via the interconnectors.

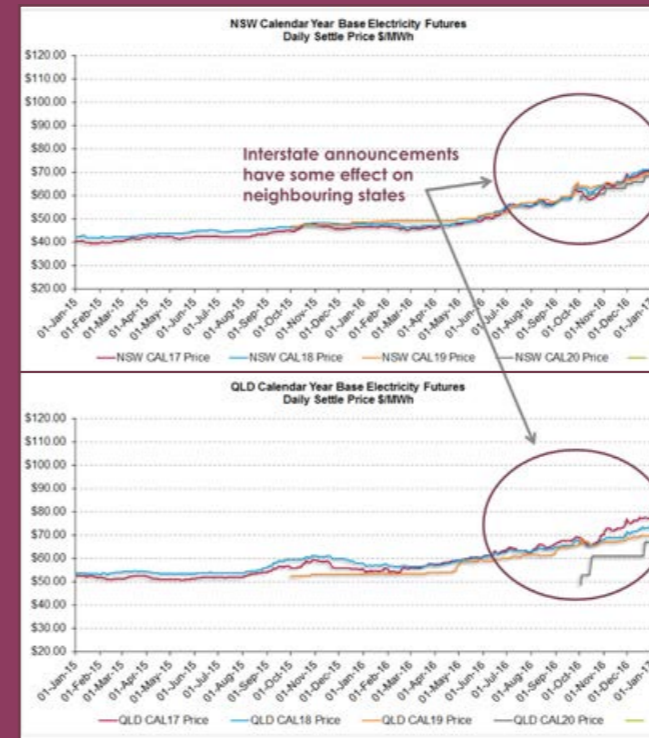


Figure 1-4:

This mix of events resulted in significant uplifts (e.g. \$20 to \$25 per MWh) in a matter of months for the electricity futures derivatives across all NEM jurisdictions as illustrated in figures 1 - 4.

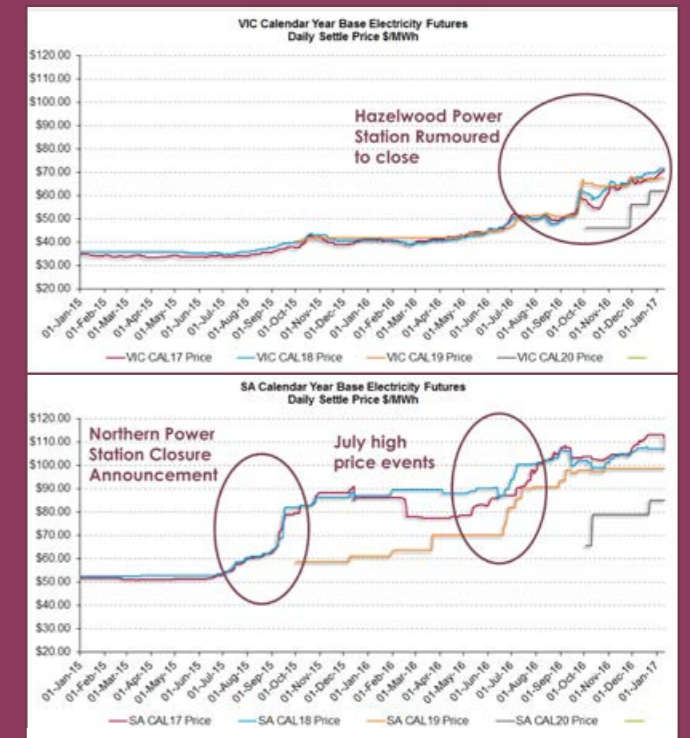
Tighter reserve capacity margins, uncertainties surrounding availability of electricity generation capacity, concerns about the future east coast gas supply and the larger degree of market concentration will likely increase market price variation and volatility.

RISKS NEED TO BE ASSESSED AND MANAGED

With the benefit of hindsight we can reflect on 'what if' scenarios, however what we need to continue to consider are the risks of financial loss brought about by not engaging with the market early enough – in other words, considering your business' options for energy procurement strategies. As mentioned earlier, we are aware of consumers who, in searching for better offers over a period of 3 months, were \$1m worse off than had they accepted the market offers they received at the time of tender.

The short notice at which Victoria's largest generator was removed from the NEM had a bigger, faster price impact in the market than the rumours of plans to build 1600MW of baseload as a replacement. In other words, a market change that provides relief to contract pricing is likely to be slowly factored into the futures market, unlike the rapid price jump seen when supply is removed at short notice.

One of the drivers of the higher electricity prices was the cost of spot gas. The commencement of LNG exports saw Australia exposed to global



benchmarking, tightened supply; and in turn the ability for retailers to competitively contract large Commercial and Industrial (C&I) customers was undermined. High gas spot prices played a part in electricity pricing events in 2016 as the cost to purchase spot gas for electricity generation was high and firm contracts limited in supply. As outlined in recent media, with rising electricity prices, the return on selling a gigajoule of gas into a volatile electricity spot market may prove to be more profitable than competing to win a gas contract by offering the lowest possible price. This has affected C&I customers in terms of market competitiveness resulting in high observed price uplifts and stricter terms and conditions. The fact that those renewing 12 month contracts were only met with offers from a single provider further highlighted the state of the industry at present.

Looking to 2017 and the expected continuation of price variation and volatility, understanding and anticipating the impact of key market fundamental risk factors is critical to restrict your energy price increase:

- Projected supply-demand balance
- Relationship between gas and electricity markets
- Impact of spot market volatility and price trend on the forward curves.

Please contact our Energy Markets team for advice on the right risk assessment approach for your business and the contracting options available to you.

REFERENCES

[1] <http://bit.ly/2le65Ys>

THE 'OTHER' FACTORS DRIVING PRICE VOLATILITY IN THE NEM

25 January 2017

Written by Gilles Walgenwitz and Patrick Booth

One of the more recent developments we've observed in the NEM is the downward trend in gas powered generation, raising concerns as to whether there is more pain to come for east coast industrial consumers. But there are other trends that are creating risks for large energy users. This article steps through these additional influencing factors.

GAS FIRED GENERATION FOR THE EAST COAST MARKET IS DECLINING

Figure 1 shows a clear recent declining trend in natural gas generation across all jurisdictions. What we see are gas fired generators choosing the most attractive return on limited gas resources. With the exception of events in Tasmania arising from the failure of the Basslink interconnector for all Q1 2016, most jurisdictions registered record low seasonal generation, particularly during Q4 2016 where the approaching summer peak demand was met by hydro generation. Unprecedented domestic summer gas prices during Q4 2016 also led to the curtailment of gas generation.

With gas price forecasts rising off continued tightening of the domestic gas market, combined with the announced withdrawal or curtailment of some larger gas fired generation assets, which have traditionally provided both baseload and additional peaking capacity, clients must carefully assess their price risk exposure. Risks could increase with any delays in procurement if using a traditional all-at-once fixed price and time approach.

VOLATILITY (NOT JUST PRICES) IN THE FUTURES MARKETS IS TRENDING UP – ARE WE SEEING INCREASING PERCEIVED RISKS FOR RETAILERS?

The figure below plots the 'Bollinger bands' of the price of the exchange traded futures contracts for FY18 in NSW. This analysis shows the two standard deviations away from the 21-day simple moving average. Because standard deviation is a measure of volatility, when the markets become more volatile, the bands widen; during less volatile periods, the bands contract.

The significant increase in price volatility, experienced in the futures markets across all NEM jurisdictions (not just NSW) over the last few months, should lead to an increased focus on the development of an electricity sourcing strategy that aims to at least partially hedge this price volatility, and a contracting approach to reduce your retailer's risk premium.

In the 2005 to 2012 period these trading volumes have been increasing despite the vertical integration of generators and retailers, which tends to decrease the volume of traded derivatives, as hedging is undertaken within an organisation.

Over the last three years the volume of forward contracts negotiated via the futures exchange has decreased. This type of contract represents a small proportion of the total trades and it seems that this proportion is declining.

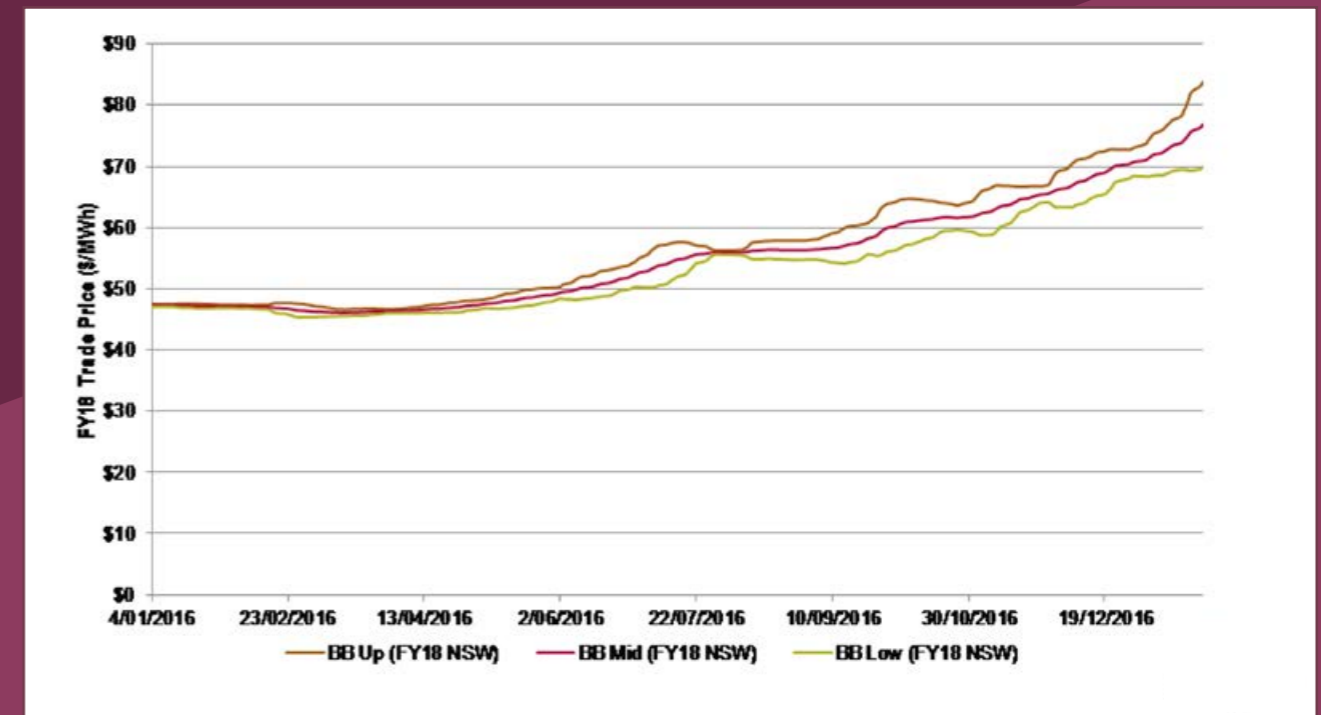


Figure 2: Bollinger bands volatility indicator - NSW FY18 Futures Contracts

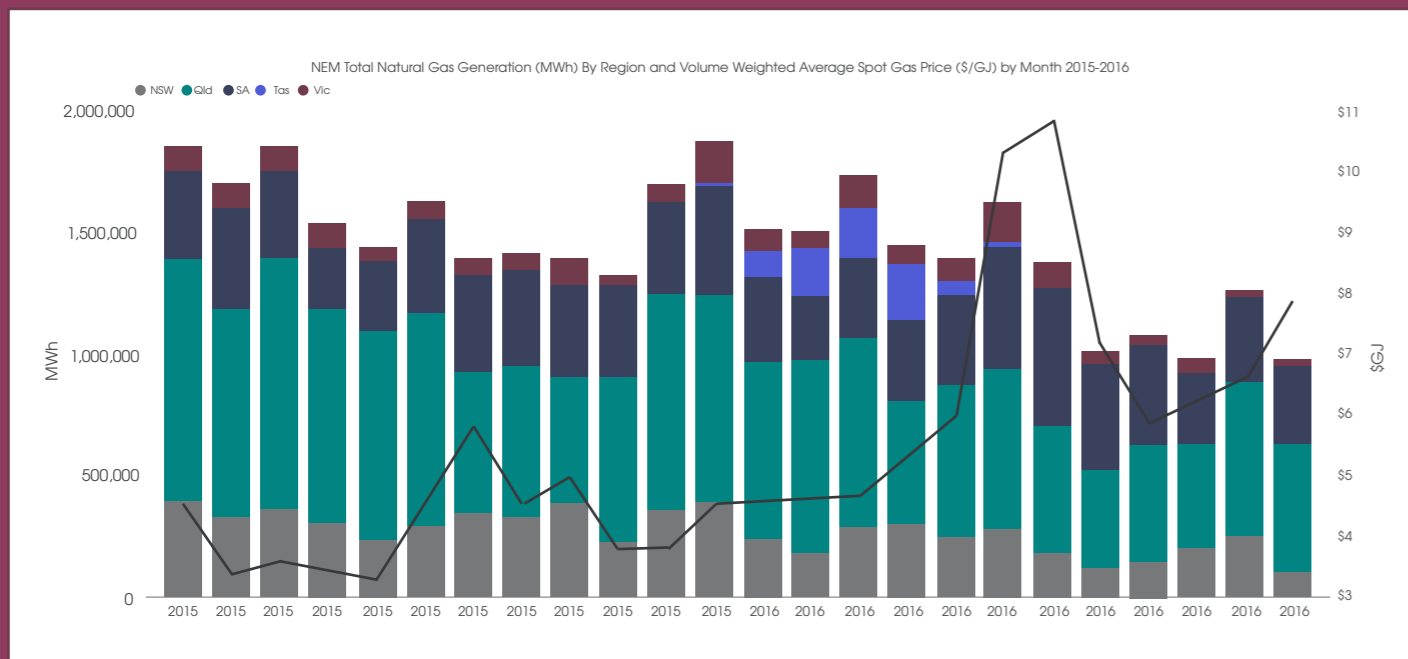


Figure 1: NEM total gas generation (MWh) by region and Volume Weighted Average Spot Gas Price (\$/GJ) by month

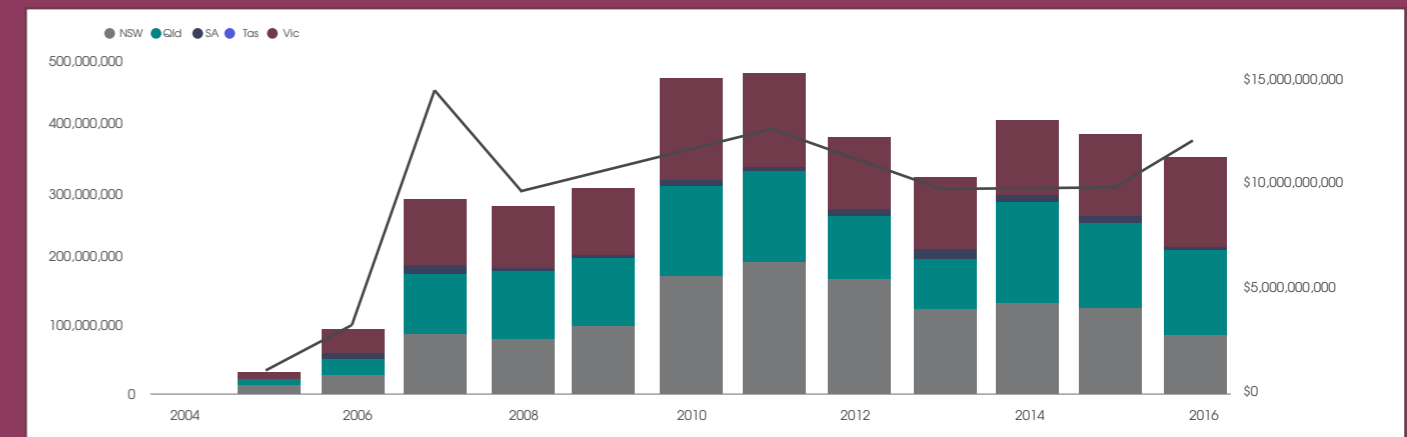


Figure 3: Total volume in ASX Energy futures exchange market

LIQUIDITY ON EXCHANGE TRADED VOLUME IS TRENDING DOWN – IS THERE LESS MARKET TRANSPARENCY?

The following graph is plotting the total volume in ASX Energy futures exchange market year-on-year by NEM jurisdictions over the last 10 years as well as the total face value of the futures contracts.

There are likely more over-the-counter (OTC) transactions, with forward contracts directly negotiated between retailers and generators, and not through the Exchange. Another possible explanation is that with increasing spot-market price and volatility, generators may decide to reduce the proportion of their generation capacity that is forward contracted. The generators' motivation for forward contracts is to hedge their risk if the spot-market price is too low and firm up their forward

income stream. With high spot-market prices, the risk hedging is less prevalent and keeping part of the books open, allows the generators' trading desk to generate more profit from short term trades. If this trend is confirmed, we can expect less transparency on retail contract pricing and increasing risk of spot volatility.

With increasing correlation between gas and electricity markets, a continued tightening of the domestic gas market, increased price volatility and decreased liquidity on the exchange traded electricity derivatives, Energetics can advise on the most appropriate hedging strategies with appropriate trade-offs between flexibility in forward purchasing and capping your energy budget risk.

LOOKING TO HEDGE ENERGY CONTRACTING RISKS IN 2017? CONSIDER A CORPORATE RENEWABLE POWER PURCHASE AGREEMENT

9 February 2017
Written by Anita Stadler

For large energy users, energy management in recent times has become fraught with risk. 2016 ended with a near 50% increase in the total cost of electricity in Australia's eastern states. Questions of energy affordability merged with concerns for energy supply security, propelled particularly by the state-wide blackout in South Australia in September 2016. While market regulators pointed to problems with the effectiveness of the transmission and distribution management systems within that state, the headlines chose instead to focus on South Australia's high proportion of intermittent renewable energy sources. As the issue continues to play out, we are seeing acrimony between the Commonwealth and State Governments over the States' renewable energy targets, calls to scrap the RET when ERM Power opted to pay the penalty for purely commercial purposes¹ rather than source Large-scale Generation Certificates (LGCs), and the re-emergence of ultra-critical coal-fired power stations² presented as an option by the Commonwealth to address supply security despite their high costs (about \$A134-203/MWh and rising to \$352/MWh if CCS is added³, which is three to five times the cost of renewables or combined-cycle gas at present). In this article, Energetics argues that the current political discourse should not distract large energy users from considering renewable energy supply options.

THE ECONOMICS SUPPORT FURTHER GROWTH IN RENEWABLES

Most recently we've seen the Australian Energy Council (AEC)⁴ categorically stated that the electricity supply industry has "no current investment appetite to develop new coal-fired power in Australia" and that their investment focus has shifted to gas generation, renewables and enabling technologies like storage. Last week the Business Council of Australia (BCA) and Australia Industry

Group (AiG)⁵ also came out strongly against 'further changes to the RET, which has a key role along-side other policies to facilitate the transformation of the energy sector.

Why the strong support by industry peak bodies for renewables? There are many reasons, but consider that in the roughly five years or so it would take to bring an expensive new ultra-supercritical coal-fired power station on line in the Australian market, the cost of renewables will continue to come down. And perhaps more importantly, the utility of renewables will continue to improve as the cost of many energy storage technologies (for uses ranging from microgrids, distribution substations, frequency control and peak demand management) will fall by ~40% by some estimates⁶.

So there are strong signals that 2017 may be the year where economic considerations, rather than Government policy becomes the major driver of both corporate energy procurement strategies and investment in energy infrastructure. For large energy users this will require a longer term strategic view and the ability to cut through the short term political noise. A renewable energy supply contract – also known as a corporate renewable power purchase agreement (PPA) – is an option for large energy users that provides a hedge against energy market volatility.

2017: THE TIPPING POINT FOR CORPORATE RENEWABLE PPAS?

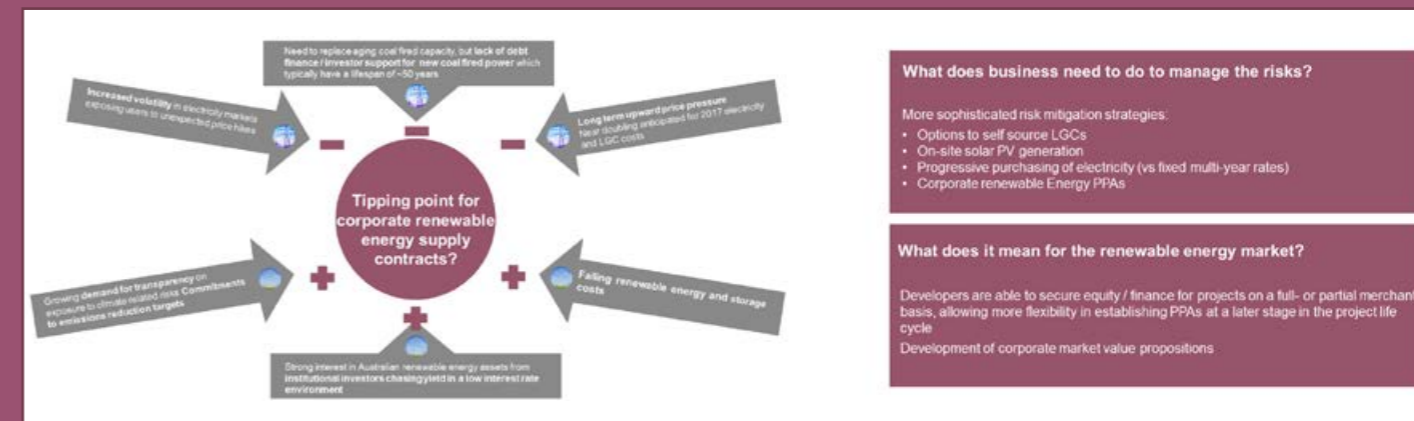
Back in 2014 we advised clients to lock in fixed electricity prices for as long as they could when electricity futures markets were at a low. The maximum term was typically three years, concluding in CY17. This advice served our clients' well, with CY2017 base futures strips currently trading at more than double the average futures contract market prices for the CY15 to CY17 in 2014⁷:

Average futures contract price (\$/MWh)	NSW	Victoria	Queensland	South Australia
CY15 to CY17 in 2014	\$ 39.26	\$ 34.50	\$ 48.14	\$ 49.36
CY17 to CY19 at present	\$ 77.07	\$ 74.09	\$ 82.67	\$ 105.92
% increase	96%	115%	72%	115%
CY2017 base futures strips	\$ 81.98	\$ 76.97	\$ 94.13	\$ 109.36

Our advice to clients approaching the market in 2017 is very different. Aiming to replicate their 2014 electricity procurement strategy is likely to result in the doubling of the cost of electricity and environmental charges. A different strategy is required, not only because electricity futures contract prices are expected to remain high, but also due to the risks associated with increasing volatility in the NEM and emergence of new opportunities to mitigate these risks.

In short, the 2017 energy market is very different from 2014. As illustrated below, a number of local and global⁸ market forces are aligning to make offsite renewable energy an economically attractive option for large energy users.

The rising costs of grid-supplied electricity, coupled with the falling costs of renewable energy production have resulted in a narrowing of the price difference between renewable and traditional energy sources.



For large energy users contracting with a renewable energy generator and / or retailer to meet all or part of your energy supply needs is now a commercially viable proposition.

However, whilst a corporate renewable PPA is a well-established mechanism in the USA and some European markets, there are limited precedents in Australia. Unlike Europe and the USA, regulatory challenges also place some limitations on the implementation of corporate renewable PPAs in Australia without using a retailer. Retailers and generators have however shown interest in a number of large-scale corporate renewable PPAs expected to be concluded in the first half of 2017. This includes the Sydney Metro Northwest and the City of Melbourne's Renewable Energy Buying Group for which Energetics is providing technical and commercial advice. More recently organisations as diverse as the Queensland Government, various local councils and a national retailer have also approached the market for off-site renewable energy supply options to meet their electricity and LGC requirements. Numerous large energy users and renewable energy developers have also approached Energetics with regards to LGC only or LGC and power offtake agreements with large end users.

Interest is certainly growing and unlike a year ago, 2017 will see an increase in the number and diversity of merchant projects in operation. This will not only reduce the risk to corporate off-takers, but also significantly shorten procurement timelines and potentially provide for increased flexibility in procurement terms. Following the conclusion of a few large deals, innovative contracting models will emerge to deal with some of the regulatory challenges and build on the lessons learned by all parties engaged in these transactions.

WHERE ARE THE OPTIONS FOR LARGE ENERGY USERS?

Large energy users have a range of options to improve energy productivity⁹, but here we will focus on procurement strategies to reduce energy costs.

Self-sourced LGCs: Some of the increases in energy-related costs can be attributed to LGC pass through charges. These are estimated to account for a \$10/MWh increase in rates due to the rise in both LGC prices and the renewable energy power percentage (RPP). LGC cost drivers and management strategies were discussed in a separate article in August 2016, titled "Proactive strategies for corporates to drive

down the cost of compliance and voluntary LGCs". It has become standard practice for large energy users to retain the right to self-source LGCs with many now actively exploring ways to exercise that right.

On-site solar PV: Due to high LGC prices, falling component prices and the maturity of the installer market, on-site large (>100kW) commercial solar PPAs can deliver positive cash flows from day one. We are working with a number of clients to run competitive sourcing processes and ensure robust commercial terms that protect the interests of energy users over the term of the agreement.

Alternative electricity procurement and hedging strategies, tailored to the business' specific requirements and tolerance for risk. This includes progressive forward purchasing (ie buying in 'blocks' in advance as discussed in our article, "[A tailored and market driven approach to electricity procurement: it may be your best response to energy market volatility](#)" in September 2016) to enhance budget certainty at times of increased market volatility¹⁰. Businesses are now also advised to consider corporate renewable PPAs for part or total load as a strategy to reduce exposure to electricity price volatility, increase budget certainty, reduce environmental compliance and energy costs, as well as mitigate carbon-related risk exposure. Executing a corporate renewable PPA is not without challenges, but credible counterparties have emerged and the contractual mechanisms exist to govern the successful implementation of such agreements.

Energetics can assist companies with a strategic option assessment, business case development, design of a market offer including key commercial terms, running the procurement process and technical and commercial support with the assessment of market responses. For further advice on Energetics' services and how your business can best manage the risks of buying in volatile energy markets, please contact any one of our experts.

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2

STRATEGIC ENERGY MANAGEMENT

IN THIS SECTION

Energy is a cost you can control

\$31m funding for large energy users in South Australia

Your guide to accessing Government funding programs across Australia

Energy is a cost you can control

12 January 2017
Written by
Leigh Rostron

Increasingly, energy is a risk management issue for business as purchasing and managing energy has become a complex exercise. What can business do? This article examines ways to enhance your understanding of how your business uses energy. By undertaking this analysis, you can target energy savings measures that will deliver the greatest cost reductions and drive efficiencies through your processes. At times of high prices, you can take steps to ensure that you don't pay more than is absolutely necessary.

THREE AREAS OF FOCUS THAT FORM THE BASIS OF PROACTIVE ENERGY MANAGEMENT

Energetics has seen considerable interest from clients in investigating on-site renewable energy generation options. The starting point is to reduce energy demand as much as possible through efficiency programs, and ensure that the energy load profile is predictable and as constant as possible before sizing both renewable generation equipment and back-up storage.

1. Energy conservation and efficiency measures

The first course of action should always be to make sure you don't require the energy in the first place. Related to the reduction of energy demand, some sites have classified their equipment into critical and non-critical loads which allows for sophisticated load management strategies to

shed non-critical load when the energy supply is maxed out. This helps to ensure that businesses don't over invest in idle generation capacity, or alternatively defer costly capital upgrades when energy supply is constrained.

2. Efficiency in site reticulation systems to ensure optimal power supply for installed capacity

Ensuring your site reticulation system is well managed can deliver cost reductions. We have seen sites looking at the power factor delivered up to the point of connection with the network, however, typically not much attention is paid to power factor within sites.

While site reticulation systems are typically well designed initially, over time equipment is added and removed. Each time this happens the electricity flows within the reticulation systems are affected. This can result in very poor power factor performance for the site. If your power factor is low you are losing the capacity of electricity as supplied to the site to do work.

If you improve the power factor within your site you are essentially reducing these power losses.

If yours is an off-grid site, it means that you get more power for the same installed generation capacity. Or, if you are grid-connected, you can get more from your existing mains supply. There are a number of ways to improve the power factor within your site reticulation system.

Mostly capacitance is installed within the system. Optimal placement of these capacitor banks needs to be carefully considered. A load flow analysis can quickly help you determine whether there are power factor correction opportunities within your site.

3. Ensure you are on the best energy supply contract: negotiate charges, look at terms and conditions

There's great information in your energy bill. Examining the terms of your energy supply contract is the best starting point for minimising energy spend. Know the contract details and the sensitivity of energy spend to variables such as time of day or peaks in energy draw, and a wealth of information opens up.

Typical components of an electricity bill are:

- Consumption charges: the payment made for the electricity used, typically 20 to 40% of the total bill, this is the element of the bill which has consideration of time of use charges – peak, shoulder and off peak tariffs. These are split between the retailer and the network provider and are usually calculated relative to kWh consumed.
- Capacity charges: typically 25 to 35% of the total bill, these are charges which relate to the maximum power draw for the site in the month, and are calculated from the kVA for the meter.
- Network charges: these are the costs of running the poles and wires, and are usually around 30% of the total bill. They are calculated based on a combination of usage (kWh) and capacity based charges (kVA). Note that there is a growing trend amongst most network operators to shift their tariffs to be more focused on capacity and less so on consumption.
- Renewable Energy Certificates and other charges: this cost starts in the region of 5%. These cover the RET requirements as well as other environmental and market fees, and they are calculated relative to kWh.
- Fixed charges: typically less than 2% of the total bill, these are usually supply charges and are fixed for each meter used. These can typically only be reduced at the point in time when the contract is negotiated. They are independent of electricity consumption and cannot be controlled through reducing draw (kWh) or demand (kVA).

Fixed charges, RET costs and other pass through charges cannot be readily reduced through energy management programs. However the majority of the bill can be impacted by changing some site operations. The entire bill can be reduced through energy efficiency projects, and there are other opportunities for reducing electricity costs which sites might consider.

Reducing consumption charges

These are the charges which relate to electricity draw and are calculated relative to kWh used by the site. This is the cost which is most directly reduced through the implementation of energy efficiency projects. At the same time, if there are time-of-use charges on your site you

could reduce your energy spend through scheduling when equipment is turned on or off. Scheduling maintenance for the peak cost period (typically late afternoon) can reduce energy costs significantly. There are obviously other considerations such as the timing of shifts to consider here too.

Finally, consideration of peak charge times should be built into the management of any piece of high energy-using equipment. Turning the equipment back on at the wrong time can erase all savings achieved from not having the equipment running.

Reducing network charges

Network charges can be complex in their derivation. Some of charges are calculated relative to demand and/or maximum demand (kW) for your site. Programs which are used to lower capacity charges could reduce network charges as well.

COST SAVINGS + PRODUCTIVITY IMPROVEMENTS + REDUCED DEPENDENCE ON 'BACK UP' FUELS SUCH AS DIESEL

We often see businesses challenged to 'sell' energy savings projects based on cost reductions – the productivity gains are under-valued or not considered at all. Reducing energy consumption goes hand in hand with reducing maintenance costs. There are accepted multipliers in many areas of operations where energy savings are seen as a proxy for cost savings. In the mining sector we see savings on the running of haul trucks which are typically a five times multiplier of the energy savings, and projects that reduce the running of empty conveyors which carry a 7 to 10 times savings multiplier.

And there is another prize: on site renewables can act a partial hedge against future price volatility. Current energy market volatility and persistent high prices, together with the potential for future carbon constraints adds further uncertainty to energy price forecasts and the use of grid electricity, diesel and gas for offgrid sites. Increasingly we see industry turning its attention to behind the meter renewables for grid connected sites and renewable hybrids for off grid sites. Uptake is further driven both by technology improvements in small scale renewable installations and improvements to battery storage.

CONCLUSION: TAKE A CLOSE LOOK AT THE FULL RANGE OF ENERGY PRODUCTIVITY OPPORTUNITIES

There are considerable opportunities for significant cost reductions in energy spend and they are not limited to energy efficiency. However, reducing total demand through energy efficiency programs and managing your on-site reticulation system gives you the flexibility to use more rewarding approaches including renegotiating contracts and considering renewables as a different source of energy supply. Taking an holistic approach to energy and energy management underpins sustainable and ongoing improvements in a site's or building's energy efficiency and energy performance, and can become a source of competitive advantage.

\$31m funding for large energy users in South Australia

15 January 2017

Written by Leigh Rostron

To help large energy users reduce their loads and costs, the South Australian Government is providing \$31m in funding to help address the large increases in electricity prices, and energy supply and security concerns.

It will be rolled out under the South Australian Energy Productivity Program. Funding is available in two forms:

- **Energy Productivity Audit Grant Program:** funding 75% of the cost of a Level 2 energy audit (up to \$15,000) to engage an external energy auditor to identify energy savings opportunities.
- **Energy Productivity Implementation Grant Program:** two streams of funding to implement the recommendations of the Energy Productivity Audit Grant or the outcomes from another recently completed energy audit. The first stream being up to \$2.5m funding for large projects and \$75k for smaller projects.

As the funding applications will be reviewed and awarded on a competitive basis, it is essential that applications clearly address the relevant eligibility criteria. Energetics has a proven track record in supporting large energy users to access funds from competitive, merit based government funding programs. For example under the Clean Technology Investment Program, we helped our clients secure more than \$30m in funding.

A summary of each is provided below.

ENERGY PRODUCTIVITY AUDIT GRANT PROGRAM (OPEN UNTIL 31 MAY 2017)

Energetics has extensive experience in conducting Level 2 energy audits across all industry sectors. Funding for audits requires organisations to provide a 25% minimum contribution towards the audit cost. For example, if an energy audit cost \$20,000 the government will provide \$15,000 in funding. The outcomes an organisation can expect from an energy audit include developing a detailed energy use and cost breakdown at the site, identification of energy productivity measures and associated cost benefit analysis and development of strategic action plan to implement the recommended improvements.

ENERGY PRODUCTIVITY IMPLEMENTATION GRANT PROGRAM (OPEN UNTIL 31 MAY 2017)

Funding is available via two streams:

- **Stream 1** has grants up to \$2.5m with \$1 funded for every \$2 contributed, e.g. \$2.5m funding on a \$7.5m implementation project
- **Stream 2** has grants up to \$75k with \$1 funded for every \$1 contributed, e.g. \$75k funding on a \$150k implementation project.

Energetics can assist businesses throughout the whole project lifecycle, starting from the funding application, the energy audit process, project procurement and implementation, measurement and verification and any ongoing reporting requirements under the funding agreement.

See the [South Australian Energy Productivity Program website](#) for more detailed information.



NORTHERN TERRITORY

SMARTER BUSINESS SOLUTIONS

Grant funding to install renewable energy systems, implement energy savings projects and install energy monitoring equipment.

REGIONAL ECONOMIC DEVELOPMENT FUND GRANTS

Funding for a wide range of projects which contribute to local employment, business growth, support local partnerships, provide local infrastructure, or improve regional capability.

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NATIONAL

EMISSIONS REDUCTION FUND (ERF)

Implementation of projects which are covered by one of the approved project methods. Examples include equipment or vehicle replacement or upgrades, renewable energy installations, vegetation management, and change in waste treatment/landfill diversion activities.

RENEWABLE ENERGY TARGET (RET)

Establishment or expansion of large scale renewable energy power stations to produce Large-scale Generation Certificates (LGCs). Small scale solar, wind and hydro installations to generate Small-scale Technology Certificates (STCs).

RESEARCH AND DEVELOPMENT TAX INCENTIVE

Provides tax offsets for some of the cost of doing R&D activities which are core to their business (e.g. testing of a new product, device, process or service) and for other supporting activities.

LOW INTEREST LOANS

The Clean Energy Finance Corporation (CEFC) and banks provide access to low interest loans, leases and hire purchase agreements for energy efficient equipment (including renewables, fuel efficient vehicles, lighting upgrades etc.) via several major banks.

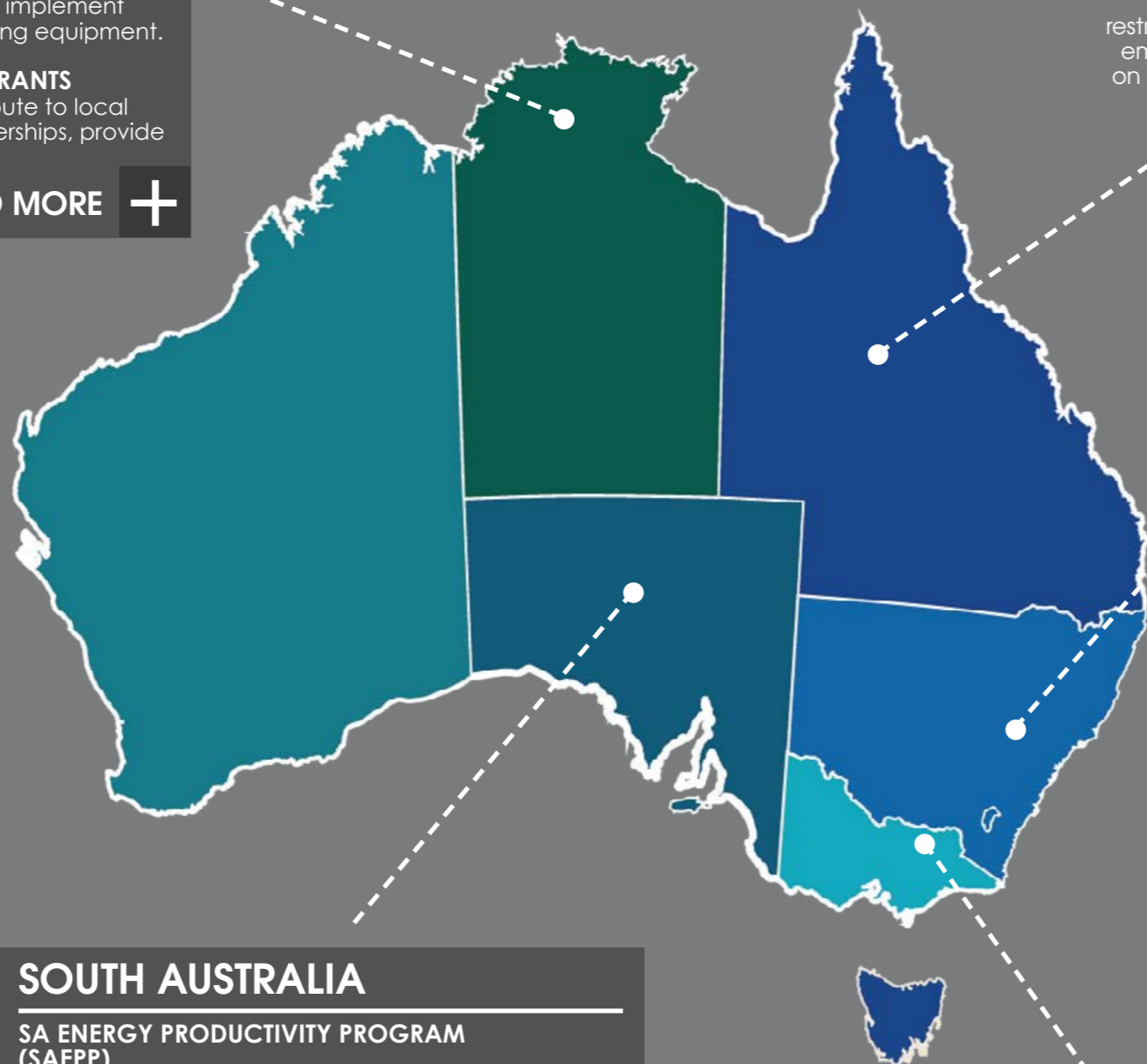
CLEAN ENERGY INNOVATION FUND

The fund will help emerging clean energy technologies make the leap from demonstration to commercial deployment.

AUSTRALIAN RENEWABLE ENERGY AGENCY (ARENA)

Large scale funding for renewable energy projects with a focus on advancing existing technologies, achieving commercial readiness, removing barriers to entry and development of capability.

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SOUTH AUSTRALIA

SA ENERGY PRODUCTIVITY PROGRAM (SAEPP)

Level 2 energy audit to identify energy productivity opportunities. Implementation of energy productivity opportunities, identified through the above audit or other recent audits.

BUILDING UPGRADE FINANCE (BUF)

Assists building owners to access secured, lower interest loans to improve the energy, water and environmental efficiency of existing commercial buildings (including renewable installations). Also provides a framework for tenants and owners to share the costs and efficiency gains.

RETAILER ENERGY EFFICIENCY SCHEME (REES)

Discounted upgrades to commercial lighting, and new high efficiency refrigeration and freezers.

BIOENERGY FEASIBILITY FUND

Feasibility assessment of bioenergy projects.

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QUEENSLAND

ENERGEX POSITIVE PAYBACK BUSINESS

Installation or upgrade of equipment or appliances that lower onsite peak electricity demand, including lighting, refrigeration, power factor correction, demand management systems and motor use.

ENERGY SAVER PROGRAM

Level 2 energy audits for the agriculture sector.

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NEW SOUTH WALES

ENERGY SAVINGS SCHEME (ESS)

Installation, improvement or replacement of energy saving equipment. Projects must utilise one of the ESS calculation methods to determine energy savings.

ENERGY SAVER PROGRAM

Subsidised energy audits, implementation support, measurement and verification, and training programs are anticipated under the Draft Plan to Save Money and Energy.

GAS EFFICIENCY FUNDING

Maintenance of gas equipment including replacement and repair of steam traps, stall lagging on steam and hot-water pipes, valves and tanks.

ENVIRONMENTAL UPGRADE AGREEMENTS

Assist building owners to access secured, lower interest loans to improve the energy, water and environmental efficiency of existing commercial buildings (including renewable installations). Also provide a framework for tenants and owners to share the costs and efficiency gains.

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VICTORIA

ENERGY ASSESSMENT GRANT

Energy assessment grants and implementation support for projects which reduce energy costs and improve productivity.

ENERGY SAVER INITIATIVE (ESI)/VICTORIAN ENERGY EFFICIENCY TARGET (VEET)

Discounts and special deals may be available for businesses upgrading energy saving products (for example lighting, heating and cooling, refrigeration, and motors).

SECTOR GROWTH PROGRAM

Grant funding for scoping, planning, feasibility and implementation of projects aligned with the future industries strategies. This includes projects that drive new energy technology development and implementation.

NEW ENERGY JOBS FUND (ROUND 2 – INDUSTRY STREAM)

Support to renewable energy generation projects which will provide positive economic outcomes and job creation. This includes manufacture of new technologies/components, energy storage, implementation of proven renewable technologies, and skills and capability building.

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3

2017 Climate Policy Review

IN THIS SECTION

The link between energy productivity, reducing demand and the closure of coal fired power stations

Unlocking offset opportunities across Australia's land sector

Updated national emissions forecast shows the value of early climate action

The link between energy productivity, reducing demand and the closure of coal fired power stations

11 January 2017

Written by Dr Gordon Weiss

It's well known that efforts to drive improvements in the way energy is used, produce great outcomes for business, the broader economy and the environment. But what is not well understood is that lifting energy productivity, and thereby reducing the demand for energy, also supports the uptake of renewables.

New modelling by Energetics demonstrates that across a range of national energy productivity targets, from the current, arguably weak, 40% target through to a 100% improvement target, a reduction in brown coal fired power generation is achieved. In this article, we explain our findings.

As we look to 2017 and the upcoming climate policy review, one policy measure that's likely to be at forefront is the National Energy Productivity Plan. In Energetics' analysis conducted for the Department of the Environment in May 2016, we identified significant emissions reduction potential that could be delivered through improvements in Australia's energy productivity – 44% of all available emissions reduction opportunities available across the economy can fall under this policy umbrella. Furthermore, the attractiveness of energy productivity targets and measures is enhanced as it is relatively low cost and delivers significant co-benefits for business including reduced exposure to volatile electricity and gas markets.

However, what is perhaps not well understood is the relationship between the better, more productive use of each unit of energy and the impact that has on energy demand nationally. When demand for energy falls, the outlook for different forms of generation changes. A key influencing factor is that utility scale renewable energy is supported by the national Renewable Energy Target - it will grow in order to meet the 2020 RET of 33 TWh. As such, the various forms of renewable energy generation have very low marginal costs of generation and are preferred in the 'merit order' of bidding within the National Electricity Market (and the Western Electricity Market). With a nationwide energy productivity drive, the resultant fall in overall demand for energy would see renewable energy generation grow in the market, leaving traditional fossil fuel generation assets operating well below capacity.

IMPACTS OF DIFFERENT ENERGY PRODUCTIVITY TARGETS

- **Economic outlook:** the anticipated growth in Australia's GDP through to 2030 is 54%. This is a key consideration in understanding the outlook for energy demand
- **Climate targets:** our National Determined Commitment for 2030 is a 28% reduction in emissions on 2005 levels. This is not in line with the Paris Climate Agreement of containing warming to within 2 degrees on pre-industrial temperature levels, or the aspirational target of 1.5 degrees
- **Comparative position on energy productivity:** Australia lags other developed economies.
- Energetics assessed three energy productivity improvement scenarios. With each scenario we assume that the nation is working to meet its national 2030 emissions reduction target.

Scenario 1: Little change on 'business as usual'

Target: 40% improvement in energy productivity relative to 2015 by 2030

Additional assumptions	Emissions reductions	Variable renewable energy penetration	Impact on the generation mix
<ul style="list-style-type: none"> No coal phase-out No targeted adjustments to mix of fossil-fuel generators 	21% (falling short of national target and international obligations)	21%	<ul style="list-style-type: none"> The increase in utility scale renewable energy is driven by the current RET The growth of cost effective solar PV sees gas generation reduced by 45% This is not considered a realistic outcome due to the imminent closure of the Hazelwood power station. It also fails to meet the national climate objective.
<ul style="list-style-type: none"> All brown coal fired generation is retired and replaced with a similar quantity of natural gas fired generation Some black coal generation is retired 	26%	21%	<ul style="list-style-type: none"> While electricity demand increases, black coal fired generation experiences an 11% fall due to the preference for renewable energy generation driven by the RET.
<ul style="list-style-type: none"> The RET is increased to 56 TWh to force out additional black coal fired generation. Two brown coal fired power stations are retired Demand is met by a similar quantity of gas generation. 	28%	29%	<ul style="list-style-type: none"> This scenario meets the national emissions reduction target through the introduction of additional renewable energy. This in turn increases the penetration of renewable generation in the national electricity mix to 29%. Several states will have renewable energy penetration close to or exceeding 40%.

On its own, the 40% energy productivity target delivers very little. In fact it creates problems. Energetics' modelling shows that national emissions are only reduced by 21% on 2005 levels by 2030 and therefore we miss our national target. Also with the forecast expansion in the economy through to 2030 in the order of a 54% increase in GDP, demand for energy will actually rise by an estimated 9%.

Also, if the 40% energy productivity target is maintained and we assume that as a nation we push through other policy measures to deliver emissions reductions to meet our 28% goal, the use of renewables will expand and therefore the volume of coal fired generation must reduce - especially brown coal fired generation.

Scenario 2: Bridging to decarbonisation

Target: 76% improvement in energy productivity relative to 2010 by 2030

Additional assumptions	Emissions reductions	Variable renewable energy penetration	Impact on the generation mix
<ul style="list-style-type: none"> No coal phase-out No targeted adjustments to mix of fossil-fuel generators 	28%	23%	<ul style="list-style-type: none"> Market forces see around 25% brown coal fired generation and around 50% of gas fired generation removed Black coal fired generation remains constant The rise in renewable energy generation through the current RET and the expansion of rooftop solar PV see a slight increase in the penetration of renewable generation.

Energetics has considered a 76% target because, under this scenario, national demand for energy is held largely constant through to 2030. The result is the national emissions reduction target is achieved without requiring the Government to take specific disruptive measures to force changes to the generator mix. However, market forces will see 25% of brown coal fired generation being retired and 50% of gas fired generation may also be forced out of the market.

A 76% uplift in energy productivity is a significant increase over business as usual and it is reasonable to expect that a range of policy interventions will be needed to achieve this goal.

Scenario 3: Commitment to a low carbon future

Target: 100% improvement in energy productivity relative to 2010 by 2030

Additional assumptions	Emissions reductions	Variable renewable energy penetration	Impact on the generation mix
<ul style="list-style-type: none"> No targeted coal phase-out Market forces used to remove old generators 	36%	26%	<ul style="list-style-type: none"> The rise in renewable generation due to the current RET plus the fall in demand squeezes out around 40% brown coal generation and around 50% of natural gas generation is removed.
<ul style="list-style-type: none"> The RET is expanded to pursue the 2 degree world objective No targeted coal phase-out 	45%	42%	<ul style="list-style-type: none"> Black coal generation falls by 20%.
<ul style="list-style-type: none"> Natural gas replaces coal for all baseload generation 	44%	26%	<ul style="list-style-type: none"> The scenario significantly exceeds the current climate objective, and approaches but does not meet the emissions reductions required for the 2 degree world objective.

The 100% improvement in energy productivity allows the nation to achieve the deeper cuts in emissions required by the 2 degree world objective. Our modelling indicates that this will be accompanied by extensive displacement of coal fired generation, which could extend through to the complete elimination of coal fired generation. We could then see either additional natural gas fired generation (leading to pressure on already constrained east coast gas supplies) or more renewable generation.

IMPROVING ENERGY PRODUCTIVITY IS CRITICAL FOR CLIMATE GOALS AND THE NATION'S PROSPERITY

Our analysis shows that increasing energy productivity is essential if the national emissions reduction target is to be achieved, with the additional, significant advantage of offering a relatively low cost way of driving down energy demand.

Energetics recommends:

- **Lifting the energy productivity target:** Our analysis shows that the current 40% target is barely above business as usual and is inadequate for meeting the current INDC.
- **Funding the National Energy Productivity Plan:** Any increase in energy productivity that is consistent with the emissions reduction target will be well beyond 'business as usual', and therefore policy interventions will be required to drive the necessary improvements. The 2017 Review should discuss the potential policy interventions required to drive increases in energy productivity and the level of funding necessary to implement these policies.
- Finally, as decarbonisation of Australia's energy generation is well underway, the 2017 Climate Policy Review will need to consider the levels of support required for a **managed transition to an energy mix with a high level of renewables penetration.**

Unlocking offset opportunities across Australia's land sector

14 December 2016

Written by Sally Cook

Global emissions reduction targets are expected to increase the demand for credible offsets making a strong case for linking Australian Carbon Credit Units with international markets and presenting an opportunity for the land sector as an offset provider. Several studies have demonstrated how Australia can evolve to net zero emissions within a few decades¹ based primarily on significant decarbonisation of the electricity and transport sectors and by employing offsets from land use, land use change and forestry. And we will need to do so. Four of our state and territory governments (ACT, SA, Victoria and most recently NSW) have announced targets of achieving net zero emissions by 2050. Australia has a target to reduce emissions by 26-28% below 2005 levels by 2030, through our commitment to the Paris Agreement. This target and those of many other developed countries fall short² of the requirements to limit warming to 2°C and to meet the commitment to a 2 degree world under the Paris Agreement. It's reasonable then to expect that in time our national target will be strengthened.

Over the next few decades our Federal and state governments will have the task of facilitating significant decarbonisation and removing barriers to change through policy measures, targets, incentives or subsidies, and market mechanisms. Of these market mechanisms, the creation and trade of emissions abatement via Australian Carbon Credit Units (ACCUs) has potential to evolve. Currently ACCUs can be generated from eligible offset projects including sequestration in soil and vegetation, and traded domestically either with Government (via the Emissions Reduction Fund (ERF)) or on the secondary market. At present, demand for ACCUs on the secondary market is limited to:

- Facilities which will exceed their emissions baseline under the safeguard mechanism
- Businesses failing to achieve their contracted emissions reductions under the ERF
- Entities purchasing offsets to meet voluntary emissions targets or carbon neutral commitments.

The value of abatement under ERF contracts is estimated the order of \$10-15/ per tCO₂e (\$11.83 on average in late 2016³). Although land based projects are generally considered to be low-cost when compared to other abatement activities, prices in this range are unlikely to generate significant additional investment or land use change. The CSIRO⁴ found that no substantial increase in the supply of land based offsets would occur at prices under \$50/tCO₂e. However this study finds that once this threshold is reached, sequestration becomes financially competitive with alternative land uses and supply could steadily increase.

At the higher carbon prices under the CSIRO's

strong abatement scenario⁵ there is potential for the land sector to achieve almost 3 billion tCO₂e of abatement by 2030. Energetics' analysis indicates that approximately one third of this (900 million tonnes cumulative abatement⁶) will be needed to meet the national emissions reduction target of 26-28% by 2030. This leaves a potential 2 billion tCO₂e in offsets in excess of domestic requirements which could be produced between 2020 and 2030. Exporting these offsets could deliver significant value to the national economy and to regional areas in particular. However, ACCU prices are unlikely to be high enough to unlock this investment in the short term. Our modelling indicates that the \$50/tCO₂e threshold to stimulate additional land sector offsets may not be reached until 2027 (or later, depending on demand and the extent of international linkage), at this point ACCU prices begin to converge with international pricing. The graph below shows the US and EU ETS prices could approach \$50/tCO₂e (US\$37 at the current exchange rate) by 2025.



Figure 1: Price and coverage of carbon trading scheme scenarios in 2025⁷

International demand for offsets is expected to strengthen over the next decade. Many countries have targets under the Paris Agreement and they may look to the global offset markets to provide the lowest cost abatement.

Other emerging schemes, such as the Carbon Offset and Reduction Scheme for International Aviation (CORISIA) which will begin a pilot phase in 2021, are also expected to increase the demand for credible offsets.

However, to maximise the carbon benefit and economic opportunities from our domestic land sector there are several barriers which need to be addressed:

- Facilitating international linkage of offset schemes
- Encouraging investment in land based projects
- Reducing emissions through complementary policies.

Facilitating international linkage of offset schemes The Clean Development Mechanism (CDM) and Joint Implementation (JI) schemes are the frameworks currently available to developed countries to generate international carbon offsets for trade. However, the future of these credits is unclear beyond 2020 when the Kyoto Protocol draws to a close. Article 6 of the Paris Agreement provides a framework for 'Internationally Transferred Mitigation Outcomes' which may develop into a new offset protocol for the post-2020 period. Australia will have a seat at the negotiation table when the details of Article 6 are discussed at COP (Conference of the Parties), the mechanism through which many international commitments to reducing climate impacts are delivered) meetings over the coming years. There is an incentive for us to support any developments which allow for the trade of domestic offsets under an international scheme.

As our Government embarks on their 2017 review of climate policies we have recommended that they consider:

- How methods available to generate ACCUs from the land sector can be aligned with international standards
- How the Paris Agreement could enhance integration of markets and open up export market opportunities for ACCUs.

Encouraging investment in land based projects Work by the CSIRO suggests that the abatement potential in the land sector is very high: up to 13 billion tCO₂e by 2050⁸. This abatement will be an important part of Australia's achievement of its future climate change targets. Our modelling indicates that 900 million tCO₂e of this will need to be unlocked by the end of 2030, and based on work by CSIRO, we expect that short term ACCU prices (\$10-15/tCO₂e) are unlikely to stimulate additional investment in land sector offsets, with much of the necessary abatement requiring prices of the order of \$25/tCO₂e to be realised.

As part of the 2017 Review we have recommended

that the Government consider how Australia's agricultural sector and land holders can be encouraged to utilise a large amount of marginal land to sequester carbon and create quality credits. Reducing emissions through complementary policy In addition to being a carbon sink, the land sector is also a large source of emissions primarily due to land clearing. The most recent national emissions accounts show that the land use, land use change, and forestry (LULUCF) sector was a net emitter of 913 ktCO₂e in 2014⁹. Actual emissions due to land clearing were 33.6 million tCO₂e, and these emissions were offset by other activities such as forest management that contributed 32.7 million tCO₂e of sequestration¹⁰. Recent efforts by the Queensland Government to tighten the laws on onus of proof for illegal land clearing did not pass after failing to achieve majority support in parliament. Wherever possible the states should encourage complementary policy for afforestation, reforestation, and avoidance of clearing.

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Updated national emissions forecast shows the value of early climate action

8 February 2017

Written by Dr Gordon Weiss

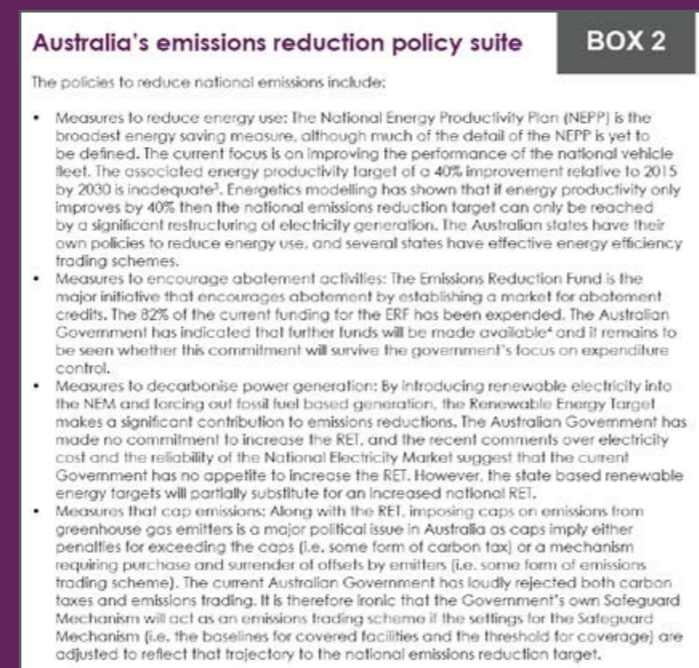
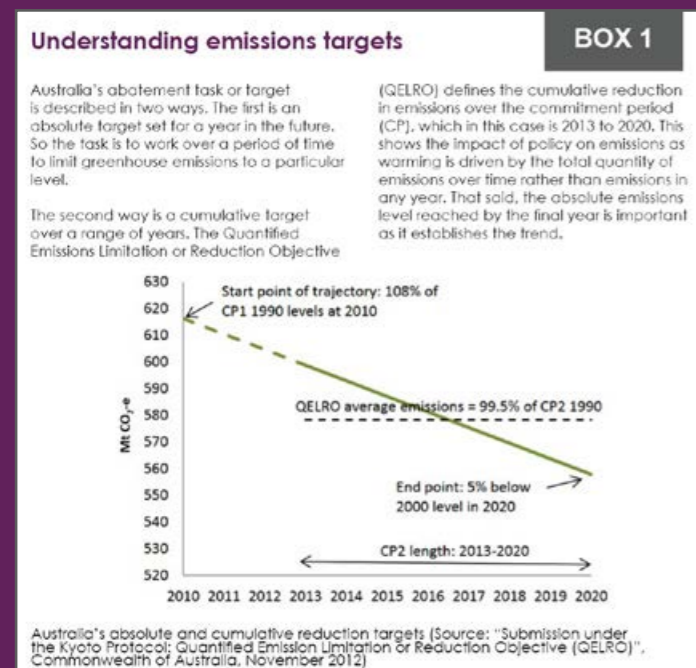
Australia has a major emissions reduction challenge if the 2030 target is to be achieved. Energetics' revised modelling of the emissions reduction trajectory shows that the cumulative abatement task of just over 1 billion tonnes CO₂-e is equivalent to almost two years of business as usual emissions. In addition, emissions across the economy are currently rising, making the challenge of meeting the 2030 target substantially more difficult. The Safeguard Mechanism has the potential to significantly reduce emissions provided the government reduces baselines at an appropriate rate.

The major challenge will always be electricity, and the current sector wide baseline of 198 million tonnes of CO₂-e will need to be significantly reduced and

in a way, that encourages the closure of some of Australia's older high emissions intensity coal-fired power stations. This article outlines Energetics' modelling which supports the case for early action to address rising emissions.

OUR 2020 CUMULATIVE ABATEMENT TARGET WILL BE MET, BUT EMISSIONS ARE CURRENTLY ON THE RISE

The Commonwealth released its latest projection of Australia's greenhouse gas emissions late in 2016¹. This projection confirmed earlier work by Energetics that showed how Australia will meet its 2020 cumulative emissions reduction target and will do so without requiring the use of offsets carried over from the 2012 target (see Box 1).



TAKING ANOTHER LOOK AT THE 2030 ABATEMENT CHALLENGE

In the Commonwealth's latest emissions revision we saw the inclusion of a number of factors that are expected to drive down emissions compared to earlier projections. These include:

- Abatement over the period 2021 to 2030 from existing and anticipated contracts under the \$2.55 billion ERF
- The large-scale Renewable Energy Target (RET) of 33,000 GWh
- The anticipated closure of Hazelwood power station in Victoria in April 2017

Flatter electricity demand driven by:

- Improvements to energy efficiency
- Additional behind the meter solar PV
- Lower production levels in the non-ferrous metal manufacturing, coal and LNG industries.

Energetics' estimates that inclusion of the ERF contracts alone reduces the projected emissions to 2020 by 50 Mt CO₂-e and projected emissions to 2030 by 120 Mt CO₂-e. Overall, the Commonwealth estimated that emissions under 'business as usual' will be 592 Mt CO₂-e in 2030 and that cumulative emissions will exceed the 2030 target by 1055 Mt CO₂-e². Energetics' own modelling suggests that Australia will exceed its cumulative target by 1042 Mt CO₂-e under the current suite of policy measures (see Box 2).

However, the Commonwealth's projection also confirmed that Australia's emissions are now rising,

and that meeting the 2020 target will be due to the good work done over the period from 2013 to 2016 rather than the result of activities from 2016 through to 2020. As a result, by 2020 emissions will be more than 5% higher than those in 2000 despite meeting our cumulative target. It is therefore clear that as we look to the 2017 Climate Policy Review our focus needs to be on reversing the current upward trend in emissions and the actions required to meet the 2030 reduction target. In this paper we both review the emissions trajectory and demonstrate that action taken now to reduce emissions is far more effective – and economically responsible – than action taken closer to the 2030 deadline.

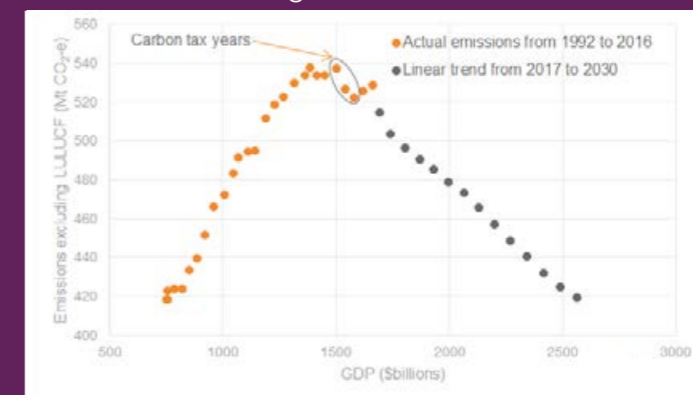


Figure 1: Australia's emissions excluding LULUCF and GDP to 2030: actual to 2016 and potential through to 2030 if policies can deliver the same rate of reduction achieved between 2012-14.

The figure above demonstrates the emissions reduction task against the backdrop of a growing economy. Two interesting features stand out:

- From the period from 1992 to around 2012, Australia's emissions usually rose from year to year. The major departures from this trend – times when emissions were basically constant corresponded to periods of global economic slowdown - the recession at the beginning of the 90s, the 'tech wreck' period around the turn-of-the-century and the Global Financial Crisis
- The years from 2012 to 2014 essentially spanned the period of the carbon tax and the figure shows a rapid fall in emissions over that time. Since the repeal of the carbon tax, emissions have risen at basically the same rate as they did from 1990 to 2008.

So what insights do we gain for the 2017 Climate Policy Review? What we see is that the emissions reductions achieved during the period of the carbon tax essentially align with the rate of reduction required to meet the 2030 target. For policy makers this offers an indication of the level of policy intervention that may be required to achieve the national target in the years through to 2030.

For every tonne of abatement achieved prior to 2020, Australia's emissions reduction task to achieve our 2030 target is reduced by a factor of three. If key policies and programs are brought forward, Energetics found that they must deliver around 106 Mt CO₂-e of cumulative abatement over the period from 2016 to 2020 to meet the 5% reduction target in 2020. This has the effect of reducing the cumulative abatement task from 2020 to 2030 by 374 Mt CO₂-e. The cumulative abatement target in the period for 2020 to 2030 is therefore reduced to 817 Mt CO₂-e.

Energetics forecast of emissions to 2020 only

considered the impact of the Emissions Reduction Fund. However, there are several other national policies and programs that will be in force during the period to 2030. In our report released in May 2016, [Modelling and analysis of Australia's abatement opportunities: Meeting Australia's 2030 emissions reduction target](#), our work showed that the current suite of national policies and programs have the potential to deliver the abatement needed to meet the 2030 target.

These include the programs under the [National Energy Productivity Plan](#), the phase-out of alternatives to ozone depleting gases that have high global warming potential, and the Safeguard Mechanism. The key now is to bring some of those policies forward; particularly the introduction of the National Energy Productivity Plan and the wider deployment of new energy saving measures in the built environment, so that the emissions in 2020 do not exceed the 5 per cent reduction target.

Back in 2006 the Stern report drew the attention of governments, investors and climate campaigners across the world with its calls for early action to reduce the significant future economic and societal costs that come with delays. Energetics' modelling further reinforces this argument for action now to reverse the current upward trend in national emissions.

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4

Climate risk disclosures

IN THIS SECTION

Five aspects of climate risk management that every company board member should know

A new climate for climate change

Insights into the recommendations of the FSB on climate-related financial risks

Five aspects of climate risk management that every company board member should know

19 January 2017

Written by Dr Mary Stewart

Recently shareholders have started to ask direct questions about climate change and how companies are addressing climate and associated risks at AGMs. The Australian Institute of Company Directors (AICD) has made a valuable contribution to helping Board members by publishing Climate change and good corporate governance which assists directors in their understanding of the complexity of climate change risks and establishes the building blocks for good governance. Importantly this work includes a summary of the science of climate change and demonstrates that climate risks are increasingly proven and thus requiring of due consideration by boards.

The AICD guide follows the increasingly broadly accepted climate risk categorisation of:

- **Physical risks:** risks to your company from the effects of climate change such as temperature changes, rising sea levels, changed rainfall patterns etc.
- **Transition risks:** risks to which your company is exposed as a result of different parties focused on mitigating or avoiding climate change; these include policy responses, technology shifts, market mechanisms and changes in public sentiment.

While the breadth of this topic is not trivial, there are five themes which you should consider when you define the magnitude of climate risks to which your company is exposed.

1

What is the impact of a carbon price on the value of your assets and investments?

Globally climate policy is changing, while there is limited indication that Australian companies will be exposed to a direct price on carbon in the near term, this is not necessarily the case for international assets, nor is this guaranteed in the long term. Do you understand what impact a price on carbon will have on your assets? What are the major emitting sites? Are they likely to be impacted directly, or only through supply chain costs? Will any of your products attract a carbon price under a trading scheme? Additional consideration needs to be paid to the information used to assess the magnitude of these impacts. It is easiest to use global datasets as a starting point. However, these datasets are readily available because they are highly aggregated, and can be quite old. If you have assets which may be at risk you should investigate quantifying this risk using best available information, and not just the cheapest information you can find.

2

What would be the impact of a carbon price on the cost of inputs?

A price on carbon has the potential to increase the cost of inputs, not only the obvious ones like electricity, but other emissions intensive materials like metals and building materials, even some chemicals. What impact would a carbon price have on operating costs, and ultimately EBIBT? How do current procurement processes address potential future carbon prices? What allowance is there for your suppliers to pass increasing costs on to you?

3

How exposed are you to energy price increases?

The energy markets are increasingly unstable at the moment. Securing long term energy prices is becoming less likely which leaves companies open to significant price increases in the short term. In recent years energy (electricity and gas) price increases have significantly outstripped CPI. If budgets are being built using CPI increases on energy costs then these could be significantly under-budgeted. This risk escalates with increasing exposure to energy costs. Do you know what percentage of your operating costs relates to energy consumption? Do you know how long this is locked in for? Have you considered using more sophisticated approaches to energy procurement which enable you to hedge future energy price risks? Note that this does not relate to carbon prices at all, only to the increased cost of energy.

4

Have you considered the physical risks that a changing climate represents to your assets?

The first impact that typically comes to mind when people think of climate change is sea level rises. But the impacts of climate change are more wide spread than this. Increased risk of flooding, fires, droughts and storms to name but a few is real. The cost of these to operations, as well as through increased insurance costs should not be overlooked. What does your climate change mitigation and adaptation strategy include? Have you considered the impacts of climate change on inputs and raw materials such as fresh products?

5

Have you costed potential losses from power supply disruption?

Recently power disruption from weather events has been increasing. Be this the South Australian black outs related to the super storm, loss of electricity to large parts of Brisbane during the Brisbane floods, or localised blackouts during extreme heat. Do you understand the impacts of power supply disruption on your business? Have you mitigated these risks adequately through installing backup supply or through your energy contracts? Increasingly board members need to understand the climate risks to which their companies are exposed. These can be surprising both in their source, and their potential impact. I hope that these five themes help you to better interpret the potential risks climate change and energy considerations pose your business.

A new climate for climate change

25 January 2017

Written by Dr Gordon Weiss

At the World Economic Forum (WEF) in Davos, Chinese president Xi Jinping said that the United States must remain committed to its international promises, including the Paris Climate Agreement. President Xi said that "the Paris agreement is a hard-won achievement... all signatories should stick to it rather than walk away". President Xi also stated that China is willing to "assume the mantle of leadership that so many are so eager to thrust upon it". So what can we expect in climate change politics and policies over the next four years, given the change in direction in the USA and the emergence of China as a new contender for global leadership?

AS THE US WITHDRAWS, CHINA EMERGES?

The early signs certainly point to the USA withdrawing from leadership on climate change action, which potentially increases the significance of President Xi's address at the WEF. Trump has promised to make withdrawing from the Paris agreement one of his first moves as President, and has called climate change a 'hoax' created by the Chinese to make the United States less competitive in global markets.

The WhiteHouse.gov web site was amended within an hour of President Trump taking the oath of office. References to climate change were removed from the Executive Branch's main site and a new page describing An America First Energy Plan appeared². This plan states that the new Administration will embrace the shale oil and gas revolution and revive America's coal industry; it made no references to renewable energy.

However, this may not have the impact that is expected on climate action in the US. After all, it was low cost gas (i.e. the 'shale oil and gas revolution') that undermined the US coal industry, not renewable energy. As Bloomberg stated³, "Environmental rules and government subsidies are no longer the key drivers for clean power...economics are".

A new wind farm can be built in West Texas for just \$22/MWh. Solar projects are costing less than \$40/MWh in the Arizona and Nevada deserts. Compare those figures with the average lifetime cost of \$52 for natural gas plants and about \$65 for a coal-fired generator. Further, half a million Americans work in the renewable energy industries making it politically difficult to do anything to impact those industries. China makes it clear they are ready to lead on climate if the USA won't, and as China is the world's largest emitter of greenhouse gases this is potentially more significant than the moves by the USA. For instance, China aims to spend at least \$360 billion on renewable energy by 2020⁴.

PLAYERS IN THE TRUMP ADMINISTRATION

Other pointers to the direction of climate change politics in the US response come from comments from key members of the Trump Administration. On the issue of climate change, Rick Perry the proposed US Secretary of Energy, admitted that he doesn't view climate change as a crisis nor does he believe that the US should take the lead in transforming its energy supply away from fossil fuels. Perry believes in technology, and it's his hope that the US can solve energy issues through research and development. He was also clear that research should be conducted on all forms of energy. Interestingly, he does not support a national renewable energy standard but will support the efforts of states in this area.

During his testimony before the Senate, Scott Pruitt, President Trump's choice to lead the Environmental Protection Agency, addressed climate change directly in his opening remarks, saying: "Science tells us that the climate is changing and human activity in some manner impacts that change. The human ability to measure with precision the extent of that impact is subject to continuing debate and dialogue, as well they should be"⁵. This view is not consistent with the consensus view of climate science. Mr Pruitt had a history as Oklahoma's attorney general of resisting 'overreach' by the EPA.



So it is likely that the EPA will not be as aggressive in promoting climate change objectives under the stewardship of Scott Pruitt. On the other hand, Mr Pruitt has said that he would not revisit a landmark 2009 EPA finding that carbon dioxide emissions endanger human life by warming the planet. This is particularly interesting as this ruling creates the legal requirement that the EPA regulates climate-warming emissions.

BACK TO AUSTRALIA, THE NEW ECONOMICS OF POWER GENERATION AND THE CLIMATE WARS

One of the early responses to the inauguration of President Trump was a number of conservative MPs, including members of Cabinet, stated that Australia should dump the Renewable Energy Target and its carbon emissions reduction commitments under the Paris climate agreement, if the United States reneges on its commitments⁶.

Tony Abbott has already called for the suspension of the RET, with other conservative MPs viewing the move in part as a way of wedging the Opposition. As mentioned earlier, they have also called for Australia to withdraw from the Paris Agreement if the US does. On that last point, Nationals' Leader Barnaby Joyce said that "Well, we have an agreement. We signed an agreement." adding that "Australia should not base its emissions reduction and renewable energy policies on the actions of Donald Trump"⁷.

At the same time Resources Minister Matt Canavan believes that the use of 'ultra-supercritical' power stations can fill a gap in local energy supplies. A study commissioned by the Turnbull Government estimated Australia's emissions could be reduced by up to 27% if the country's coal-based power generation ran on "ultra-super-critical technology"⁸. But who would build one? In Australia, we see wind farms costing less than new coal-fired generators, with the AGL Silverton NSW project costing \$65/MWh⁹ - significantly less than the estimated \$84/MWh for a new ultra-critical coal fired power station¹⁰. Furthermore, a new coal fired power station is incompatible with a target of zero emissions by the middle of the century.

Yet we've seen Environment and Energy Minister, Josh Frydenberg declare that clean coal and gas will retain key roles in the national energy mix, that the Opposition's 50% renewable energy target discourages the long-term investment needed to keep power prices down, and that 'artificial' schemes such as carbon pricing are ineffective and expensive. Meanwhile, the Prime Minister has said nothing. Whether these views are due to a lack of understanding of the renewable energy market, a failure to acknowledge the science of climate change or just reflect political positioning is immaterial. The result is the same for business in Australia. More uncertainty and more risk.

It would seem Australia does not need Donald Trump in the White House to reignite our climate change wars. Energetics will follow developments over the course of the year – locally, in the US, and especially in China and through the Asia Pacific. We may well find that China's actions as both the world's largest emitter and Australia's largest trading partner may in fact bear more influence on Australia's climate response than many currently expect.

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Insights into the recommendations of the FSB on climate-related financial risks

9 February 2017

Written by Dr Peter Holt

Climate change is a risk that the G20 Finance Ministers and Central Bank Governors have recognised is insufficiently incorporated into the global financial system. As a result the Financial Stability Board (FSB) was tasked with investigating climate-related issues and investigating the need for better information to support financial decisions. In response, the FSB established the Task Force on Climate-related Financial Disclosures (TCFD) to address this issue, and specifically to:

- “Promote more informed investment, credit, and insurance underwriting decisions
- Enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system’s exposures to climate-related risks”¹.

The TCFD lead by Mark Carney and Michael Bloomberg released its draft recommendations

GOVERNANCE	STRATEGY	RISK	METRICS & TARGETS
Disclose the organization’s governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning.	Disclose how the organization identifies, assesses, and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.

The TCFD supports these recommendations with detailed explanations and guidance targeted to highlight sector-specific considerations. These are for:

- Financial: Banks, insurance companies, asset owners, asset managers
- Non-financial: Energy, transportation, materials and buildings, agriculture, food and forest products.

DEALING WITH COMPLEXITY – A FOCUS ON SCENARIO ANALYSIS

The TCFD provides clear guidance for both financial and non-financial businesses. The task force recognises that a simplistic approach to the assessment of climate risks does not exist. There is not a single metric available – no ‘silver bullet’ – that adequately encapsulates climate-related risks.

Importantly, as the external market is changing, historical performance is inadequate to assess future performance. Resilience and robustness are

late last year. The initial public consultation is set to close next week. Investors and businesses are now assessing the TCFD’s recommendations to understand the implication for their business. This article outlines Energetics’ view of the key issues for business.

DEVELOPING RISK DISCLOSURE GUIDANCE WITH BROAD RELEVANCE AND VALUE

The TCFD recognises that climate-related risks are complex, impacting businesses, sectors and geographies differently. The inter-relationships between these impacts are difficult to understand and evaluate. Likewise the responses from countries and jurisdictions to climate change are wide and varied.

The TCFD recommendations are applicable to all organisations globally. They focus on relevant information, scalable to any business’ level of sophistication and should be addressed in financial filings. The core recommendations focus on:

increasingly important in a global environment where uncertainty and volatility abounds.

As such forward looking analysis is recommended to help investors and the financial sector understand and assess climate related risks and opportunities. Scenario analysis is proposed by the task force as a useful tool to understand these issues. It requires a business to develop a number of divergent but plausible global scenarios over the medium to long term. Businesses and investors can then assess and explain how resilient they are to future climate and economic scenarios and change their strategy where relevant. Clear definitions and assumptions provide investors with an understanding of how robust businesses are to future challenges.

THERE ARE REWARDS FOR MOVING EARLY

We anticipate that the financial sector will continue to seek information to price climate-related risks for investment decision making and to disclose carbon exposure within their portfolios.

The TCFD disclosure requirements are voluntary. However there are clear benefits for companies who outline to the market their resilience under different low and high emissions futures. These benefits include:

- Demonstrating the ability to incorporate climate related financial risks into corporate strategy and potentially capitalise on competitive advantage
- Reduced risk of mispricing of their equity
- Potential opportunities to attract debt financing and/or insurance at lower cost.

Early adopters of the TCFD recommendations will also have more time to improve internal buy in, refine their corporate strategy, and accelerate initiatives while expectations of the extent and complexity of financial disclosures are lower.

Companies actively improving and disclosing their response to climate change can also mitigate legal risks. A recent legal opinion from Minter Ellison concluded that Australian company directors “who fail to consider ‘climate change risks’ now could be found liable for breaching their duty of care and diligence in the future”.

For those businesses seeking to improve their understanding and management of climate change risks, Energetics can assist you to:

- Understand the gaps between the TCFD recommendations and your current climate related disclosures
- Identify and assess transition and physical climate change risks to your business, suppliers and markets
- Develop qualitative and quantitative scenarios, including identifying trigger points which may indicate that certain scenarios are more likely to occur, and understanding potential financial impacts and implications for business strategy
- Develop greenhouse gas abatement targets and identify opportunities to reduce emissions.

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READ THE FULL REPORT

Increasing transparency makes markets more efficient and economies more stable and resilient — Michael R. Bloomberg

IN THIS SECTION

Not just another reporting task, GRESB offers a climate risk management framework

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Reporting



Not just another reporting task, GRESB offers a climate risk management framework

25 January 2017
Written by Harriet Kater

The expectation for organisations to disclose climate and broader sustainability strategies and performance to their investors has stepped up in significance following the December 2016 release of the [Financial Stability Board's \(FSB\) recommendations](#) on climate risk disclosure.

The FSB release reinforces the value of existing disclosure efforts. For Energetics' commercial property clients, our experience is that GRESB – the Global Real Estate Sustainability Benchmark - is a key priority. GRESB is driven by an active group of institutional investors who are seeking evidence of continuous improvement across their portfolios and are 'demanding tangible improvements in operational performance metrics, such as energy intensity and water consumption'¹. Even for those Australian property companies who are leading the global GRESB index, investors are seeking improvements in GRESB performance year on year.

GRESB benchmarks the sustainability performance of Real Estate and Infrastructure assets, as well as Real Estate debt, which captures the 'current state of ESG (Environmental, Social and Governance) in lending practices as informed by leading primary lenders and private equity investment management firms'².

In this article we consider the value of GRESB beyond its function as a reporting framework.

GRESB AS A DRIVER OF STRATEGY

It goes without saying that companies develop sustainability and climate change strategies in response to their own material risks and commercial requirements. Institutional investors with high expectations around sustainability performance create an additional imperative to craft a strategy that, whilst genuinely mitigating risks, also complements the GRESB survey questions and corresponding score weightings.

The GRESB score weightings for sustainability aspects within the 2016 Real Estate survey are presented below. As demonstrated, the Performance Indicator and Stakeholder Engagement sections comprise 50% of the total score.

Strategies that reporters could undertake to maximise scoring under these sustainability aspects, in turn meeting the demands of priority stakeholders, are discussed further below.

Sustainability Aspect	Weight
Management	9%
Policy & Disclosure	9%
Risks & Opportunities	12%
Monitoring & EMS	9%
Performance Indicators	25%
Building Certification	11%
Stakeholder Engagement	25%

PERFORMANCE INDICATORS

Much of Energetics' work with our Real Estate clients relates to collecting robust, granular datasets to inform the performance indicator question sets. Disclosure of energy, water and waste data for own use as well as tenants, is a key point of difference between GRESB and other reporting initiatives. Equally, it can be a point of pain due to difficulties with sourcing data.

Examples of initiatives that could improve scoring include:

- Continuous improvement processes for [ensuring the completeness of data](#) collected for both own use, that of tenants and indirectly managed assets
- Establishing long term targets for the management of energy, emissions, water and waste diversion. The implementation of a Science Based Targets, as announced by Investa in late 2016, is highly compatible with this section of the survey
- [Onsite solar or offsite renewable energy procurement](#), which also complements RET exposure for large electricity consumers.

STAKEHOLDER ENGAGEMENT

The GRESB survey also focuses on employee, tenant, supply chain and community engagement strategies deployed.

In Australia, effective tenant engagement strategies represent a significant opportunity for the property sector, especially given the problem of split incentives whereby property owners see little direct

benefit in pursuing costly efficiency upgrades which primarily serve only to lower costs for tenants. The split incentive is a sector-wide challenge from top tier REITs, mid-tier institutional investors to private investors³. Furthermore, given that commercial buildings and infrastructure developments have been identified as a major source of abatement in the achievement of Australia's emissions reduction targets through to 2030 and beyond, efforts to engage stakeholders to overcome barriers to efficiency improvements will become increasingly important.

CONCLUSION

GRESB has just circulated its pre-release of the 2017 Real Assessment Survey. For those who report to GRESB, consider the broader value it can bring to your energy and carbon management strategy, especially if you are currently engaged in business planning. There would also be value in evaluating GRESB in light of the FSB recommendations. Energetics has not only advised reporters to GRESB, throughout our broader consulting work we also provide technical support on emissions reductions strategies and projects to governments and large, complex businesses in the ASX200. We can assist with your strategy, assess risks and opportunities and advise on the establishment of systems and processes that support the efficient delivery of accurate reports that enhance your brand and reputation.

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Energetics' GRESB Partnership

Energetics is pleased to announce that we are now a GRESB Partner. Our decision to partner with GRESB is a result of our team providing increasing support to our property clients with the preparation of GRESB submissions and strategies to enhance scoring. We look forward to working with GRESB throughout 2017 and beyond.



Sustainability reporting is on the rise: Is your business ready?

8 February 2017

Written by Jody Asquith

In the past few years, Energetics has observed that the organisations we work with now have well-established systems and processes for mandatory reporting like NGER and NPI. However, this has coincided with the rise of investor pressure for greater transparency in sustainability reporting and such systems and processes may need to expand or adapt. The array of sustainability disclosure frameworks can be confusing and companies that

are just embarking on this journey can often have difficulty in knowing where to begin.

REPORTING FRAMEWORKS

There are a number of sustainability disclosure frameworks available and even though some aspects are overlapping, selecting the right one for your organisation is important in order to achieve the best outcome and value.



Figure 1: Sustainability disclosure frameworks

Some frameworks are generic and can be adapted or applied to any organisation, such as the Global Reporting Initiative (GRI) Standards and Dow Jones Sustainability Index (DJSI). Some are sector specific, like the Global Real Estate Sustainability Benchmark (GRESB) which applies to the property sector. Infrastructure now has the Infrastructure Sustainability Council of Australia (ISCA) rating scheme. The Green Star rating scheme covers buildings and communities. Other frameworks target particular sustainability aspects. The CDP (formerly Carbon Disclosure Project) covers climate, water and forests, while the newly released guidance (still open for consultation) from the Taskforce for Climate-related Financial Disclosure focuses on disclosing financial risks and opportunities related to climate change.

THE VALUE OF SUSTAINABILITY REPORTING

Sustainability reporting requires you to gather

information and data. Disclosing this information creates greater transparency for both internal and external stakeholders about your sustainability performance and can help you identify key issues to focus on and, accordingly, improve productivity and reduce costs.

Reporting annually is a valuable way to identify gaps and opportunities and to continuously improve your sustainability performance. It can provide your company with a benchmark of your current and past performance in various aspects of your business, and encourages you to set improvement targets.

Sustainability disclosure can also serve as a differentiator in competitive industries and foster stakeholders' confidence, trust and loyalty. The value is described in Figure 2.



Figure 2: Ways that sustainability reporting provides value to an organisation¹

ENERGETICS' EXPERIENCE

Energetics has helped clients to identify which sustainability disclosure frameworks are appropriate for their organisation. We have also assisted clients travel further along the path of sustainability disclosure. For example, through actions like the development and implementation of an Environmental Management System (EMS) and aligning their annual ESG report to GRI requirements, we helped one of our clients to improve their GRESB score by 13 points in 2015. Further improvements and refinement of the survey responses in 2016 resulted in a jump from 8th to 5th place in their peer group and an additional increase of 8 points to the score.

Energetics can provide valuable insight into the requirements and opportunities for sustainability reporting. We can help you in two ways:

1. Understanding your level of maturity and integration of sustainability management

Where are you currently positioned in regard to your sustainability performance and disclosure? Understanding your current situation helps your organisation to identify gaps and define your sustainability vision, mission and business goals, and outlines the management practices to achieve these

goals.

2. Measuring performance through reporting (sustainability reporting)

What are your options for sustainability reporting? Reporting ESG metrics using sustainability frameworks such as GRI or GRESB is one way of measuring and benchmarking your performance with your peers. Sustainability reporting enables you to measure, manage, and disclose your ESG performance. Developing and executing systems and processes to gather information for sustainability reporting can also result in the early identification of ESG risks.

Sustainability reporting is generally voluntary and not all schemes are the same. It is therefore important to determine what is appropriate for you at your stage in the sustainability disclosure journey.

Now is the best time to plan your sustainability reporting for 2017. Contact any one of our experts for more information.

REFERENCES

[1] Boston College Center for Corporate Citizenship and EY 2013 survey

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Energy accounting

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The rise of the energy accountant

8 December
2016
Written by
Michael Bosnich

The complexities of managing a significant energy portfolio have increased markedly in recent years. The financial, operational and reputational impacts on your business of poor energy management practices can be considerable, and can result from small oversights in seemingly straightforward factors.

Conversely significant rewards can be realised by effectively understanding and managing energy policy, supply, contracting and accounting issues. This additional complexity has created a need for Australian business to re-think the way energy is managed.

In response we are now seeing the rise of the 'energy accountant'. This article discusses the value they deliver.

Nearly fifteen years ago I commenced my role as the energy manager for a significant Australian energy consumer with a substantial number of sites. This role required the transforming of the existing energy data base, literally a box of cards, into a platform to ensure that energy bills were accurate, authorised and paid on time.

At the time this 'check and authorise' approach was viewed as progressive and, based on the errors consistently identified in billing from retailers and other energy suppliers, provided significant savings for the organisation.

In truth, at the time, energy was a pretty straightforward management task. Electricity and gas prices were cheap and relatively stable, there were no issues with supply, and we didn't concern ourselves to manage it efficiently. Typically business engaged in straightforward fixed price contracting with renewal options.

UPHEAVAL IN AUSTRALIA'S ENERGY MARKETS

The task of managing energy costs in large complex businesses has become far more complicated than the traditional 'check the bill and authorise payment' model of the past. Australia's markets for electricity, gas and increasingly renewable energy have become volatile, costly and for business requiring secure, large volume supplies a strategic management approach is critical.

And over the past few years many other things has changed. We currently see:

- Electricity market volatility as evidenced following the Hazelwood closure and the intermittent supply issues (especially in South Australia, but increasingly in New South Wales and Victoria)
- Electricity and gas markets requiring new approaches to procurement including:
 - Flexible contracting
 - Direct purchasing on the wholesale market
 - 'Blend and extend' contracting arrangements
 - Management of environmental charges (especially LGCs which are forecast to stay at \$85 or higher for the foreseeable future)
- Organisations with significant and public emissions reduction targets and carbon neutrality commitments, leading to issues such as:
 - Procurement of green, in preference to black, electricity
 - Evaluation of on-site generation options (especially solar PV)
 - consideration of options for energy independence, and into the future more use of storage solutions and decentralised grids
 - Opportunities for LGC creation and sale
 - The need to establish a detailed understanding of energy consumption profiles to rigorously support capital project evaluation and financing
 - Mandatory and voluntary reporting schemes
 - New rigour given growing fiduciary duties in regards to risk management and disclosure to investors
- The ratification of the Paris Agreement by the Australian Government requiring Australian companies to:
 - Clearly understand the potential impact of a 2°C world
 - Establish "science-based" targets that fairly and transparently reflect the scale of their carbon reduction obligations to keep global temperature increase below 2°C.

RESPONDING TO HIGH COSTS AND MARKET VOLATILITY

Due to the complexity of Australia's taxation system many people engage an accountant to manage their financial affairs. Australian businesses employ large financial and accounting teams to manage their day-to-day issues and maximise their commercial position.

It is Energetics' view that the Australian energy market has become so complex, volatile and expensive that sound energy accounting principles should be applied within all significant energy consuming organisations. The newly emerging field of "energy accounting" is driven by rapid changes across Australia's energy markets and provides the potential for Australia's large energy users to extract significant commercial benefit through the application of best practice energy accounting principles.

Energy accountants: specialist skills that support your energy management objectives

25 January 2017

Written by Michael Bosnich

We are increasingly seeing the emergence of 'energy accounting' for large energy using businesses in response to a range of cost risks and disclosure requirements. In this article we discuss the different aspects of energy and carbon management that can fall under the responsibilities of an energy accountant. Some of these could be considered core services, while others are more advanced and inform broader areas such as your business' emissions reduction strategy, sophisticated contracting arrangements for energy supply, and the development of business cases for on-site renewable energy projects.

DE-RISKING ENERGY COST MANAGEMENT

There are a number of core energy accounting functions that offer large energy-using businesses confidence at a time of high energy costs and close scrutiny of environmental performance – particularly in relation to energy usage and emissions reductions. These core energy accounting services can be categorised as follows.

1 Bill validation and energy retailer management

Energy accounts can be proactively managed and strong relationships developed with energy retailers. The role of the energy accountant is to contain costs, address billing anomalies and identify energy savings opportunities across your operations. The strength of the relationships formed with retailers can in turn help the business with rapid resolution of problems when they arise, but also inform contracting decisions and the negotiation of terms and conditions when they fall due.

2 Bill payment files and financial accruals

Like any regular accounting service, energy accountants produce bill payment files for good-to-pay invoices. Typically, bill payment files are produced in formats that can be easily uploaded into accounts payable systems. At the end of the month, a financial accrual file is raised for energy charges incurred to date. There are various methodologies for producing financial accruals with inputs including historical cost and consumptions, allocated budget for an account or, most accurately, accruals based on actual interval data and assigned tariffs.

3 Data stewardship

Thorough and accurate energy data, which is gathered efficiently (and therefore cost effectively), is needed for a range of mandatory and voluntary reports.

4 Budgeting and forecasting

An energy accountant should draw upon their specialised knowledge to transform your historical energy data into accurate energy budgets and forecasts.

ENERGY ACCOUNTING KNOWLEDGE THAT UNLOCKS NEW BUSINESS OPPORTUNITIES

Advanced energy accounting disciplines are increasingly supporting the delivery of solutions in a range of energy and management areas.

Emissions reduction target setting

Energy market analysis and procurement

On-site renewable energy generation

Operational energy monitoring and optimisation

Measurement, verification and benchmarking

Reporting and disclosure

- **Emissions reduction target setting:** Thorough and accurate energy and carbon data is needed as more businesses are developing science-based targets in step with the global climate action framework and national climate goals. With established data sets and clear systems for gathering critical information, businesses can disclose their progress with greater confidence.
- **Energy market analysis and procurement:** Contracting for electricity and gas supply is increasingly complicated in the face of market volatility and east coast gas supply shortfalls. We're also seeing a great deal of interest in procuring green power and/or on site renewable generation projects which can also lead to the creation of high value large-scale generation certificates (LGCs). The range of options for managing energy risk has led to sophisticated risk-managed contracting options as fixed price, flexible pricing and blended solutions across a large energy portfolio, which require close management of payments, as well as terms and conditions.
- **On-site renewable energy generation:** Furthermore, as the costs of on-site power swing in favour of renewable energy options, energy accountants can provide critical inputs. With a deep understanding of energy costs, a specialist energy accountant can help size, scope and develop robust business cases and thereby ensure that any investment is backed by sound analysis and delivers broad productivity benefits.
- **Operational energy monitoring and optimisation:** Energy accountants can help your business understand how energy is being used so that you can take corrective actions, identify energy savings opportunities and report with confidence.
- **Measurement, verification and benchmarking:** Energy accountants can work with energy engineers to verify and report savings achieved through energy projects. With this information they can provide insights to evolve strategic energy management programs to ensure that targets are met, risks are managed and costs driven down.
- **Reporting and disclosure:** The disclosure of carbon liabilities and reduction strategies has never been more important with scrutiny growing from the ASX, government, investors and activist groups. An energy accountant ensures that your data set is complete and accurate to give you confidence in the integrity of your reports and to mitigate the risks of misinformation.

Effective energy management in recent years has evolved from 'payment of accurate bills on time' to a focused energy accounting approach. This approach, while still ensuring the timely payment of accurate energy bills, must now be expanded to consider strategic, market, operational and compliance imperatives as the management of energy and carbon emissions comes increasingly into view of senior business executives. The financial, operational and reputational impacts on your business of poor energy management practices can be considerable.

An energy accountant's skills can also assist your business in developing its response to energy policy, supply, contracting and accounting issues. Furthermore, most businesses in Australia are yet to unlock the full value that can be found in managing energy proactively. Beyond cost savings, an energy accountant can help identify and quantify the broader productivity gains that can be created for the business.



7 DATA MANAGEMENT AND INNOVATION

IN THIS SECTION

- Financing innovative climate technologies to achieve a 1.5 degree world
- Why Netflix and Salesforce will change the way you deal with energy data
- How do you work out your carbon footprint after moving your IT to the Cloud?

FINANCING INNOVATIVE CLIMATE TECHNOLOGIES TO ACHIEVE A 1.5 DEGREE WORLD

13 January 2017

Written by Dr Mary Stewart

Of the 120 nations which have ratified the Paris Agreement, more than 70 are developing countries which have referred to innovation and R&D in their nationally determined contributions (NDCs). As nations now work towards achieving their NDCs, the Technology Executive Committee (TEC) of the UNFCCC is investigating the best ways they can provide support.

Energetics' Dr Mary Stewart is a member of the TEC taskforce charged with the responsibility of assessing RD&D financing needs, including options for improving public and private sector investment and deploying climate technologies. On the taskforce Mary represents Sustainable Business Australia (SBA) in the role of 'BINGO' observer (Business, Industry and NGOs). In this article Mary provides insights into the work of the taskforce which is required to deliver a major paper by May 2017.

ADVISING AND SUPPORTING DEVELOPING NATIONS

Last year I was honoured to be nominated by Sustainable Business Australia (SBA) to represent Australia on this critical taskforce as a BINGO observer and contributor. Over the two years of the appointment, I will be able to closely observe international progress on climate change.

The current focus of the TEC taskforce is the development of advice, primarily to policy makers, on how innovation can support the implementation of the technology elements of NDCs and the Paris Agreement's mid-century strategies. This work is due for delivery in May as a paper and for presentation at a TEC event that will form part of its scheduled 13th meeting.

In my observations to date, the definition of the problem is likely to be the most challenging aspect:

- Understanding how to measure success (cost reduction, greater deployment of technologies, reduced emissions, increased employment, successful implementation of national plans, etc.)
- The scope of the analysis (what should the analysis be limited to: mitigation and adaptation, stage of technology development, categories of finance to be considered).

Once the problem is defined, the paper will consider current trends in financing, and how to enhance financing models and structures to deliver success.

The paper has been scoped by the committee and is currently being worked on by external consultants. The expectation is that a first draft will be available to the committee to review in the short term.

PRESENTING THE PAPER AS PART OF A TEC SPECIAL EVENT IN MAY

Building on the momentum created by recent innovation initiatives and given the focus of countries to implement their NDCs, the TEC decided that it will hold a special event as part of its 13th meeting in May. As the TEC says in a briefing note, "The 1.5°C goal, particularly, will need a revolution in technological (and other) terms. Accordingly, the Paris Agreement notes that "[a]ccelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development." In the last year a number of high-level actors launched initiatives which focus on the key role that innovation must play in supporting accelerated and scaled-up climate efforts. These include Mission Innovation, the Bill Gate's led Breakthrough Energy Coalition and Bertrand Piccard's World Alliance for Clean Technologies."

Furthermore the TEC states, "(We have) never before held an event which focuses squarely on how the TEC can support countries to implement actions with the aim of achieving the Paris Agreement".

The objectives are:

- Highlight the key role that innovation policy and international cooperation on innovation can play in accelerating the implementation of NDCs and mid-century strategies
- Showcase experiences, good practices and lessons learned from previous relevant efforts
- Identify possible innovation policies and international cooperation on innovation that can be established, strengthened and/or implemented to support countries to accelerate the implementation of their NDCs and mid-century strategies.

From the 13th meeting, the TEC will prepare recommendations for COP 23 based on the technical paper on RD&D financing and the outcomes of the May event.



WHY NETFLIX AND SALESFORCE WILL CHANGE THE WAY YOU DEAL WITH ENERGY DATA

20 January 2017

Written by Chris McLean

The way we manage energy data hasn't changed much over the past decade. New products offer more detailed visualisation and reporting of meter data, and building optimisation products are providing information on HVAC (heating, ventilation and air conditioning) and building management systems, with some real time monitoring and alerts. In the industrial world, SCADA systems still generally rely on on-site historian systems that collect historical data from site systems.

However energy management in Australia is becoming increasingly complex, as large users address substantial costs and risks. Factors driving complexity include persistent volatility in our energy markets, the penetration of renewable energy sources, emissions reduction commitments, and developments such as the electrification of transport and emerging models of decentralised energy generation, storage and distribution. As a result, the need is growing for sophisticated data management systems that offer valuable insights into energy usage and efficiency opportunities.

THE LIMITATIONS OF ENERGY DATA SYSTEMS TODAY

The trouble with almost all products on the market is that they are limited in the amount of data they can collect, analyse and report on. Most building systems collect limited data sets from sources such as the main power meters and HVAC systems. Most energy data management systems and SCADA historians are still running on traditional databases. Up to now this has not presented significant issues.

The problem these systems are now encountering is that the world of data from both buildings and industrial processes is rapidly changing. Rather than simply obtaining hourly meter data from a site, it is possible to install cheap sub-meters across all parts of the business and obtain minute by minute updates (even more frequently if desired). Most industrial equipment now has the ability to produce information for hundreds, if not thousands of metrics that would enable real time monitoring and reporting. Building managers can now install cheap wireless temperature/humidity meters into every room of a building and obtain minute by minute data on the impact of any changes to HVAC settings.

BIG DATA SOLUTIONS AND WHERE TO FIND THEM

Just this month the Rocky Mountain Institute stated in an article, "Declining costs for metering systems, new automation capabilities, and the advent of cloud computing are creating enormous opportunities that we haven't fully captured. The potential for big data

is palpable."

The answer to questions about how to take full advantage of large amounts of energy and process data may lie in the world of Netflix, Salesforce and other companies who have to deal with data on very large scales. Netflix currently runs "tens of thousands of servers on the Amazon cloud". Salesforce also has thousands of servers supporting both their online software and platforms for others to run their own applications. Both companies need to know exactly what is happening with these servers and collect many hundreds of pieces of data from each machine, every minute. For Netflix, as their business has grown, the number of data points has increased from hundreds of thousands in 2011, to billions of points today.

To process and extract full value from this data, Salesforce and Netflix have built their own systems.

Salesforce produced *Argus*, a system that can handle 25 million data points a minute using a standard set of 16 machines and up to 250 million points per minute with 25 machines.

Netflix produced an alternative system called *Atlas*. Once again it is optimised for time series data and can deal with "1.2 billion time series (corresponding to publishing billions of data points per minute)".

Both systems can deal with hundreds of millions (or billions) of data points per minute and more importantly give Salesforce and Netflix the ability to be alerted to any anomalies and easily act upon them.

The good news for the energy data world is that both Netflix and Salesforce have open sourced their systems, which means that they are free to use and build upon. You can find Salesforce's *Argus* [here](#).

ARE WE ON THE VERGE OF A TRANSFORMATION IN THE WAY ENERGY IS MANAGED IN AUSTRALIA?

Energetics closely follows trends in big data management set by leading firms – whether local or global; in the energy sector or in any sector. Throughout 2017 we will continue to comment on the innovation we are seeing in data management and the opportunities that may arise for business to address the challenges of managing energy and carbon.

If you are interested in understanding how innovative big data solutions can inform your energy management strategy, please contact any of the experts below.



salesforce



NETFLIX

HOW DO YOU WORK OUT YOUR CARBON FOOTPRINT AFTER MOVING YOUR IT TO THE CLOUD?

9 February 2017

Written by Chris McLean

We recently reviewed the carbon related risks in Energetics' own systems and supply chain. In calculating the greenhouse gas emissions produced by our IT systems, we came across an interesting issue. A few years ago the calculation of emissions from our IT system would have been straightforward. All our systems were housed in our office, we knew the office energy use, and we could easily calculate our emissions using standard measures of CO₂-e per megawatt hour of electricity used.

But this time calculating our emissions was much harder, as we'd moved a chunk of our IT infrastructure to the Cloud. As a small company we could simply assume that emissions from Cloud-based systems were pretty similar to those we previously hosted in-house and leave it at that. But it did get us thinking. How do large companies who move to the Cloud deal with sustainability reporting?

First of all, it makes some compulsory reporting tasks more simple, as it moves the emissions from Scope 2 (indirect emissions associated with electricity consumption) to Scope 3 (indirect emissions or those produced by your supply chain). Mandatory schemes like the National Greenhouse and Energy Reporting Scheme only require reporting of Scope 1 (direct emissions) and Scope 2. Scope 3 reporting is not required or is optional in other forms of sustainability reporting. For many companies, the size of these emissions from IT systems wouldn't be material, however for companies where IT is a large part of their infrastructure, these emissions matter.

Let's imagine a large company, a bank for instance, has just turned off its whole data centre with thousands of servers, tonnes of air conditioning and lots of lighting, moving it all to the Cloud. Its Scope 2 emissions will be dramatically reduced, so its reported greenhouse gas emissions by most standard measures will also be dramatically reduced. But most widely used reporting and disclosure standards such as the [Global Reporting Initiative \(GRI\)](#) and [CDP](#) strongly encourage the reporting of Scope 3 / supply chain emissions to provide stakeholders with a complete representation of the business' carbon related impacts. The Greenhouse Gas Protocol Group have published guidance on how to calculate these Scope 3 emissions (see [Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard](#)). The standard doesn't explicitly cover how to work out Cloud based IT emissions (it probably should in the future) but does say that "the company [ie Energetics] should determine whether the tier 1 supplier [ie Amazon, Microsoft etc] can provide scope 1 and 2 emissions data of sufficient quality relating to the purchased good or service".

ARE EMISSIONS LOST IN THE CLOUD?

So this is where it gets really hard. It turns out that Cloud providers are notoriously secretive when it comes to their energy use and greenhouse gas emissions. Greenpeace regularly reviews the emissions of Cloud providers and their latest report can be found here, [Clicking clean: who is winning the race to build a green internet?](#) The really interesting thing is how much a difference there is between different providers and even different data centres from the same provider. Some companies such as Google and Apple are actively moving to using renewable energy sources and working on the efficiency of their systems, while others are still heavily reliant on traditional power. A server running in a Google data centre is likely to have much lower emissions than the same machine in an Amazon data centre.

So after failing to find any information on the providers' websites on their energy use per server we searched for any studies or papers on the topic. The only real advice we could find was a 2012 paper by the US NRDC stating that Cloud systems should be more efficient than in-house systems and suggested using data volumes as a proxy for emissions (see [The carbon emissions of server computing for small-to-medium-sized organizations: A Performance Study of On-Premise vs. The Cloud](#)). The problem with this approach is that data volume is a terrible proxy for energy use, as you may have 50 servers using 50Gb of data or 1 server using 1000Gb of data. The 50 servers will use far more energy, making data size a really bad way of calculating energy use.

CLOUD PROVIDERS CAN DEVELOP EMISSIONS DATA. MORE PEOPLE JUST NEED TO ASK FOR IT

Cloud providers like Google, Amazon AWS and Microsoft can provide us with very detailed information on our service usage, whether it be server time in minutes, data usage or database transactions. We are billed according to this granular information. It should be quite easy for the Cloud providers to simply include an emissions total next to each billing amount. To achieve this the cloud providers would need to measure the emissions per minute for each type of server and for each data centre.

The big benefit to their customers would be that it would provide a really accurate method of reporting their emissions. It would also enable potential customers to compare the likely emissions from different services. So if anyone from Amazon, Microsoft, Google or any of the other Cloud providers are out there, please provide some visibility of the greenhouse gas emissions of your services! And if you need any help calculating your emissions, you can always call us.

