

**Submission
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COGENERATION AND TRIGENERATION IN NEW SOUTH WALES

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Submission to NSW Public Accounts Committee

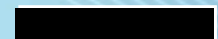
Cogeneration and trigeneration in New South Wales Inquiry

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Total Environment Centre's National Electricity Market Advocacy

Established in 1972 by pioneers of the Australian environmental movement, Total Environment Centre (TEC) is a veteran of more than 100 successful campaigns. For nearly 40 years, we have been working to protect this country's natural and urban environment, flagging the issues, driving debate, supporting community activism and pushing for better environmental policy and practice.

TEC has been involved in National Electricity Market (NEM) advocacy for eight years, arguing above all for greater utilisation of demand side participation — energy conservation and efficiency, demand management and decentralised generation — to meet Australia's electricity needs. By reforming the NEM we are working to contribute to climate change mitigation and improve other environmental outcomes of Australia's energy sector, while also constraining retail prices and improving the economic efficiency of the NEM — all in the long term interest of consumers, pursuant to the National Electricity Objective (NEO).

Inquiry into cogeneration and trigeneration in New South Wales

TEC appreciates the opportunity to make a submission to the Public Accounts Committee regarding the inquiry into cogeneration and trigeneration in New South Wales. TEC is strongly in favour of increasing the utilisation of co- and tri-generation in the state, with important environmental caveats, and is pleased to see the NSW government taking positive action. We hope that this inquiry will improve the conditions for investment in this technology.

Though the catalyst for this inquiry is not immediately apparent, we hope that it will lead to clear strategic action to improve the climate for investment in co/trigen projects in NSW, and provide some 'bigger picture' thinking on the future of energy generation in the state. TEC would like to refer the Committee to the City of Sydney's Renewable Energy Master Plan as a prime example of the kind of forward thinking that could drive investment in renewables in the state and begin to reconfigure our energy systems.¹

We have structured our submission around the terms of reference and set out our comments below.

Opportunities for NSW

Increasing the utilisation of combined heat and power technologies (CHP) such as cogeneration (combined heat and power) and trigeneration (combined cooling, heat and power) offers NSW a vast opportunity. These technologies provide significant environmental and economic benefits, both in the short and long term, and lend themselves to deployment in NSW's abundant urban buildings and precincts to supply electricity, heat and/or cooling.

Australian property developers and owners are already seeking to incorporate such systems into their existing buildings and new developments, but face considerable hurdles. This inquiry should focus on providing an open and stable policy context for developers and investors to take projects forward.

¹ See http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0019/146116/Renewable-Energy-Master-Plan.pdf.

A recent project undertaken by the Property Council of Australia (PCA) called *Unlocking Barriers to Cogeneration* researched and documented barriers at the national level in considerable detail, and we highly recommend that the inquiry consider its recommendations and the ongoing process with the Australian Energy Market Commission to implement them.

One of the advantages of co/trigeneration projects is their ability to match supply with times of peak energy demand, thereby overcoming the intermittency issue faced by wind and solar power and helping to reduce the need for network infrastructure spending to cater for any increase in peak demand (noting that peak demand as well as total electricity consumption has decreased in NSW in recent years).

Potential for community ownership

With the real and present threats posed by climate change, coupled with rising electricity prices, communities, individuals, companies and governments worldwide are seeking to take practical action to mitigate the problem, as well as adapt to its consequences. Transitioning to renewable energy through Community Renewable Energy (CRE) projects is one of the many such actions that can be taken.

CRE projects enable communities to take responsibility for their own electricity generation and can bring communities together, as well as providing all the benefits of decentralised, low-emission electricity generation. CRE projects are therefore something the NSW Government should seek to support.

There are thousands of CRE cooperative organisations and projects around the world, and around 70 in the early stages of development in Australia, but only two have been commissioned to date (Hepburn in Victoria and Denmark in WA). The development of this sector has been slow for a variety of reasons, but some of them, especially the issue of selling power, affect the financial viability of co/trigen projects as well.

While, to the best of our knowledge, no community-owned co/trigen projects have yet been proposed in Australia, there is potential for such projects. For example, owners and residents of residential buildings could invest in a CRE project in their building or locality.

Regulatory framework

As noted, the PCA project on cogeneration identified a number of barriers at the federal level in terms of National Electricity Market regulation. Specifically they call for:

- a standardised connection process to replace the case-by-case approach
- extension of automatic access to the grid to cogeneration facilities of up to 5 megawatts
- streamlining of the connection process for non-standard projects.

The PCA is currently in the middle of a proposed change to the National Electricity Rules to facilitate improved connection processes for embedded generation, but it appears that some of the problems will remain, with the AEMC not sympathetic to some aspects of the PCA proposal.

A related issue is that of co/trigen proponents obtaining a fair and viable price for their exported energy. TEC is currently leading a process that is likely to a change to the National Electricity Rules to facilitate virtual net metering (VNM) in the National Electricity Market. This will assist tenants and community energy groups as well as precinct scale co/trigen projects to split the exported energy among numerous customers, and will be aided if we can negotiate lower network charges for local generation and consumption (because customers should not pay the full network charges for energy only transported a short distance on the grid.)

There are also state-level barriers and reforms that the NSW Government should consider.

- Reform the Building Sustainability Index (BASIX) to incorporate CHP projects in urban areas. BASIX is already configured to operate with different reduction targets across NSW depending on location and building type. CHP (and renewable energy) systems in are an effective way of providing low emission energy to new buildings and facilitate cost-effective BASIX compliance. Greenhouse gas compliance targets for new construction could be raised within certain LGAs; the revised target would be achieved CHP and renewable energy in conjunction with energy efficiency and other measures.
- Recognise the benefits of precinct co/trigen energy generation in NABERS ratings.
- Introduce environmental upgrade agreements for new developments. The Local Government (Environmental Upgrade Agreement) Act 2010 already enables financing for energy efficiency retrofits in non-residential and strata multi residential buildings and can include building integrated or precinct scale renewable energy, making it easier for building owners and occupiers to provide or connect to renewable energy systems. Such agreements should be extended to new developments.
- Fund feasibility studies and demonstration projects. Feasibility studies need to be an ongoing part of supporting CHP systems. Obstacles exist at many different levels and feasibility analysis can help overcome such barriers. Such studies could further investigate technologies and practicalities or conduct site identification. Demonstration projects are important in setting standards and showing that potential projects can be implemented in practice.

Other jurisdictions/applicability to NSW

The European Union (EU) has been proactive in pursuing co- and tri-generation. The Combined Heat and Power Directive² explicitly recognises the benefits of CHP systems in achieving efficiency and aims to support its proliferation. This has resulted in CHP systems receiving support from government and being included in existing renewables incentive schemes, such as feed-in tariffs, premium payments for energy generated, certificate schemes, tax support and capital grants.

The Directive also requires Member States to improve the regulatory settings for CHP by:

² Directive on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/62/EEC, 2004/8/EC. http://europa.eu/eur-lex/pri/en/oj/dat/2004/l_052/l_05220040221en00500060.pdf.

- producing an analysis of the national potential for the application of high-efficiency cogeneration, including high-efficiency micro-cogeneration;
- ensuring that the origin of electricity produced from high-efficiency co/trigen can be guaranteed, enabling producers to demonstrate the provenance of their electricity;
- reducing the regulatory and non-regulatory barriers to cogeneration;
- streamlining and expediting procedures at the appropriate administrative level; and
- ensuring that rules regarding projects are objective, transparent and nondiscriminatory, taking the particularities of different technologies into account.

Penetration of CHP varies among the EU member states from between around 2-60%, and some of Australia's closest partners are pursuing the most ambitious goals. For example, the UK is actively supporting CHP through exemptions climate change levies, capital allowances (which enables a business to claim 100% first-year capital allowances of their spending on qualifying plants) and exemption from business rates. The UK also provides financial incentives, grant support, a strong regulatory framework, and government leadership and partnership. The UK government's Department of Energy and Climate Change has created CHP Focus, an online hub for information and support, and a free helpline.³

The US was an early leader in CHP. In 1978 the US Congress noted the stagnation of efficiency of centralised generation and sought to encourage improved efficiency with the Public Utility Regulatory Policies Act by encouraging power utilities to buy energy from other producers. Cogeneration plants proliferated and by 2006 were producing 9% of all energy in the US.⁴ The United States Department of Energy has established Eight Clean Energy Application Centers with the aim of developing the required technology application knowledge and educational infrastructure necessary to lead on CHP and reduce any perceived risks associated with their implementation.⁵

As previously mentioned, the urban areas of NSW provide fertile ground for the installation of CHP systems, provided the right frameworks are in place.

Economic viability

While we do not have sufficient expertise to comment in detail on the economic viability of CHP systems, it is our understanding that a well designed and sited system can provide significant savings. Return on a CHP is essentially the result of a simple relationship between annual operating cost savings and capital outlay. I.e. once the net annual savings resulting from running a CHP plant outweigh the capital outlay, the project is economically viable. Ensuring that this is the case is a matter of planning. Referring again to the UK, the Government has produced considerable guidance for developers on financing co/trigen projects.⁶

³ See <http://chp.decc.gov.uk/cms/>

⁴ https://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/itp_chp.pdf

⁵ Ibid.

⁶ See <http://chp.decc.gov.uk/cms/appraisal-2> and <http://chp.decc.gov.uk/cms/financing-options-2>.

Fluctuations in gas prices could significantly affect this equation. Such fluctuations would necessarily form part of the feasibility assessment process. It is worth noting that CHP projects can work synergistically with renewables, and that precinct generation projects can be based on renewable technologies, rather than fossil-fuelled CHP, and would benefit from similar reforms and incentives.

Recent co/trigen projects around Australia, for example the Bindaree Beef project in NSW, have been part-funded by the Clean Energy Finance Corporation (CEFC) to ensure that they have a short payback period. This guarantees that the investment is attractive and enables the technology to be proven in the Australian context. NSW, and other states, should be ready to co-invest in such projects, particularly in the event that the CEFC is disbanded.

Security of supply/reliability

CHP projects may have a positive effect of security and reliability through:

- reducing the cost of energy;
- making energy go further through more efficient use of fuel (regardless of the fuel type: renewable or fossil);
- increased flexibility and reliability of energy supply at a local, state and national level as CHP can complement other forms of generation;
- flexible and responsive heat supplies: the heat or cooling produced can be stored and delivered later delivered to meet demand; and
- reduced demand from centralised power stations (generally coal- or gas-fired), thereby reducing stress on the grid.

Environmental issues

TEC only supports the expansion of co/trigeneration in NSW where the fuel or feedstock is biogas rather than natural or coal seam gas. As private proponents will no doubt explain to the Committee, there are significant untapped biogas resources in NSW, especially from green waste and meat and poultry processing. By contrast, NSW has limited supplies of natural gas, which cannot be relied upon for domestic supply as there is no regulatory mechanism to prevent it from being sold into the international market where that is where gas companies can maximise their profit.

At least as importantly, NSW communities have shown overwhelmingly that they do not want to risk the future health of their aquifers, streams, productive farming land and biodiversity by allowing CSG to be extracted in this State. There is also considerable doubt as to the viability of fossil gas as a so-called transitional fuel, and in view of the urgent need to shift to a low carbon economy in order to limit the chances of catastrophic climate change we consider it is much more important to shift as rapidly as possible to an economy based on renewable energy resources such as biogas.

A related environmental issue is that of burning crop or timber industry waste for energy, which could be regarded as co/trigeneration where (as in sugar and timber mills) woody waste is burnt for electricity as

well as to provide heating for the plant's operation. There is considerable community concern about planned changes to the *Protection of the Environment Operations (General) Amendment (Native Forest Bio-material) Regulation 2013*, which would allow some native forest products to be burnt for electricity generation, since it is likely to lead to a new market for native forest logging. Even apart from this issue, combustion inevitably leads to greenhouse gas emissions and sometimes to the emission of other pollutants including dioxins. There are often better uses for woody waste than burning, including mulching for soil improvement and the manufacture of high-value plant-based products including containers and clothing.

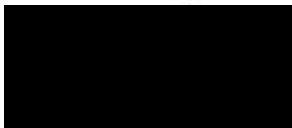
TEC has a cautious approach to

- (a) co/trigeneration projects involving pyrolysis, which produces few greenhouse gas emissions but consumes energy to produce electricity as well as biochar, which CSIRO and other studies have not found to reliably sequester large amounts of carbon in soils over a long period; and
- (b) the generation of energy from municipal waste, which should occur only where there are no reasonable higher order uses, and where there is no likelihood of pollutants such as dioxins being produced.

In summary, TEC supports the co/trigen industry in NSW except where the fuel is natural gas or CSG, while our support for co/trigen projects where the process involved is combustion or pyrolysis rather than anaerobic digestion and the generation of energy from municipal waste is on a case by case basis.

We would be happy to provide further information if requested, and to discuss the points made in this submission at a public hearing.

Yours sincerely,



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