

COGENERATION AND TRIGENERATION IN NEW SOUTH WALES

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LOCAL SUSTAINABLE UTILITIES

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Flow Systems Submission

Cogeneration & Trigeneration in NSW

NSW Parliamentary Inquiry

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Flow Systems

Flow Systems Pty Ltd is a private utility operating in the water and energy sectors. Flow designs, installs and operates decentralised sustainable water and energy infrastructure in new mixed use developments.

Flow is backed by a 51 per cent Brookfield Infrastructure shareholding.

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Terms of Reference

This submission has been prepared by Flow Systems in partnership with Brookfield Infrastructure, a shareholder of Flow. This submission is in response to the NSW Parliamentary Inquiry into the installation and use of cogeneration/trigeneration technology in NSW, conducted by the Public Accounts Committee.

Flow welcomes the opportunity to submit to the Committee of Inquiry on this critical issue of decentralised energy supply for NSW.

Executive Summary

Cogeneration and trigeneration offer NSW substantial economic and environmental benefits immediately and in the long term.

There is now a strong appetite for commercial deployment of renewable energy and low emission technologies in NSW. Cogeneration and particularly trigeneration are proven technologies uniquely placed to meet this demand.

Existing electricity infrastructure has required significant investment and will continue to do so in order to meet peak electricity demand, upgrades and maintenance of network infrastructure. This material investment is currently seen as the key driver to higher prices for residential and business users. The provision of energy as an essential and reliable service achieving above 99% availability - is used to justify these prices. In reality a combination of centralised and decentralised infrastructure will reduce the costs of energy provision through a reduction in peaking plants and network infrastructure expenditure. It will also improve sustainability, network flexibility and energy security.

Bills will continue to rise in NSW unless Government is able to better facilitate the introduction of a more affordable and efficient generation mix to households and businesses. Cogeneration and trigeneration decentralised energy networks are key drivers in shifting cities and communities away from reliance on high emission coal fired power stations. This is because they allow for the provision of thermal energy, heating and cooling and low emission energy generation on site, reducing costs and the need for infrastructure upgrades.

Decentralised energy solutions have a critical role to play in changing the energy mix in NSW/Australia and driving down carbon. They are essential to a sustainable energy future. More and more, developers and consumers are seeking decentralised energy solutions, particularly trigeneration, to create communities of the future.

However, to realise these benefits Government needs to remove key barriers and introduce a national, standardised connection processes for small to medium sized generators, automatic connection rights such as those offered for residential solar PV systems and practical district level licensing frameworks.

The current regulatory environment does not adequately support the sharing of energy from precinct trigeneration between buildings required to make these schemes economically viable.

Developers and communities want sustainable innovation, they are looking for new ways of servicing land that reduces costs, adds value and is more sustainable. Decentralised energy solutions such as cogeneration and trigeneration represent this change. They are also enablers presenting developers with new solutions unencumbered by the cost of centralised solutions. Decentralised energy and water solutions are already enabling the uptake of new technologies like solar, waste to energy, hydrogen fuel cell and more. Decentralised solutions are driving positive behaviour change and creating highly sustainable liveable communities of the future.

This Inquiry offers a unique opportunity for Government to implement some simple changes that can reduce or remove significant barriers to cogeneration and trigeneration projects in NSW. The benefits to the Government, community and business are large and currently underutilised

Recommendations

RECOMMENDATION 1

Remove unwarranted NOuS charges that are distorting true costs of connection and passing on higher costs to consumers of decentralised energy.

RECOMMENDATION 2

Introduce a standard connection processes for decentralised energy systems that will remove existing costs, delays and financial uncertainty associated with NEM access.

RECOMMENDATION 3

Create a connection exemption or licensing provision enabling decentralised energy schemes to retail to multiple customers.

RECOMMENDATION 4

Ensure NABERS ratings can be applied fairly to cogeneration and trigeneration precinct schemes.

RECOMMENDATION 5

Introduce feed-in tariff for cogeneration and trigeneration precincts to ensure the economic viability of decentralised energy schemes.

RECOMMENDATION 6

Prevent gas network distributors from categorising decentralised energy schemes as aggregators – this will substantially reduce costs to consumers.

RECOMMENDATION 7

Introduce a fair and reasonable approach to gas distribution charges.

1. Inadequate Regulatory Framework

The current regulatory framework cannot adequately support the utilisation of cogeneration or trigeneration urban in-fill precinct developments in NSW. Shared generation infrastructure is more efficient and potentially sustainable than building based cogeneration and trigeneration yet multiple barriers prevent their successful implementation in NSW. In particular, Federal and State regulation does not support the sharing of energy from precinct trigeneration between buildings which will often negatively impact on economic viability of a scheme.

The following unnecessary costs and bureaucracies must be removed.

Current National Electricity Market (NEM) barriers mean decentralised electricity customers are paying too much for decentralised electricity. This is because decentralised energy systems have high and increasing NUoS tariffs imposed for the transporting decentralised electricity through publicly owned wire. These NUoS charges must be eliminated. This can be achieved through exemptions for precinct scale network providers. In addition connection costs are too high and connections require protracted negotiations.

RECOMMENDATION 1

Remove unwarranted NOuS charges that are distorting true costs of connection and passing on higher costs to consumers of decentralised energy.

Current Ausgrid connection requirements present a barrier because the connection framework is too complicated and time consuming. Proponents are required to undertake multiple studies with no guarantee of approval. This process can take up to three years. In addition, critical data required for viability studies such as grid congestion, substation capacity and future capital investment (upgrades) are unavailable publicly to the market – making it more difficult to undertake accurate analysis.

RECOMMENDATION 2

Introduce a standard connection processes for decentralised energy systems that will remove existing costs, delays and financial uncertainty associated with NEM access.

Barrier to retailing. There is currently not clear framework for decentralised cogeneration and trigeneration schemes to effectively and economically retail decentralised electricity directly to multiple customers in an embedded network. By creating a connection exemption or licensing provision that enables decentralised energy schemes to retail to multiple customers – decentralised cogeneration and trigeneration schemes and substantial reduce risk and cost and sure up new markets

RECOMMENDATION 3

Create a connection exemption or licensing provision enabling decentralised energy schemes to retail to multiple customers.

Barriers to recognising decentralised schemes. Commercial building developments need to support decentralised schemes. This can be achieved by ensuring NABERS ratings are applied fairly to cogeneration and trigeneration precinct schemes – recognising the clear carbon abatement and sustainability benefits.

RECOMMENDATION 4

Ensure NABERS ratings can be applied fairly to cogeneration and trigeneration precinct schemes.

Distribution barriers mean high grid electrical network protection costs are born by proponents many of which could potentially be achieved more effectively and affordably. For example, existing gas access arrangements are leading to higher costs of gas delivery for trigeneration projects supplying thermal energy for domestic hot water heating.

2. A proven and essential technology

Cogeneration and trigeneration technologies are working proficiently in many other jurisdictions with large efficiencies and cost savings.

Average global efficiency of fossil-fuelled power generation remains stagnant at around 35 to 37 per cent. While technologies capable of bringing power generation closer to 45 per cent efficiency exist today, efficiencies are expected to plateau below the overall efficiency level achieved by the best cogeneration plant. Cogeneration enables 75 to 80 per cent of fuel inputs to be converted into useful energy, this can increase to 90 per cent in the most efficient plants.¹

“Two-thirds of input energy lost globally in traditional power generation represent significant missed opportunities for savings on both energy costs and CO2 emissions. Implementing co-generation does not, in itself, increase the power supply for a given plant; rather it increases overall energy efficiency by supplying useful heat alongside useful electricity. By making more efficient use of fuel inputs, co-generation allows the same level of end-use energy demand to be met with fewer energy inputs. When these energy inputs are fossil-based, this leads not only to less reliance on these CO2 - generating fuels, but also preserves such exhaustible materials for applications where they can less easily be substituted. Cogeneration is, thus, a low-carbon energy solution.”²

Cogeneration and trigeneration have a critical role to play in the clean energy future of NSW and Australia delivering the following energy, environmental and economic benefits include:

- dramatically increased energy efficiency
- major reductions in CO2 emissions and other pollutants
- increased energy security through reduced dependence on fossil fuels
- cost savings for the energy consumers
- reduced pressure on transmission and distribution networks
- reduced requirement for peaking plant generation infrastructure
- beneficial use of local energy resources such as waste, biomass and geothermal resources used in district heating and cooling systems; and
- a critical transition to a lowcarbon future.

The Property Council/ ClimateWorks report identifies 13.5 million tonnes of cost effective abatement potential through cogeneration by 2020³. Currently Australia has only 3,338 megawatts of cogeneration installed and 592 megawatts of that is fuelled by renewable sources.

¹http://www.iea.org/publications/freepublications/publication/CoGeneration_RenewablesSolutionsforaLowCarbonE

²http://www.iea.org/publications/freepublications/publication/CoGeneration_RenewablesSolutionsforaLowCarbonEnergyFuture.pdf section 6.

³ <http://www.propertyoz.com.au/vic/library/Unlocking%20Barriers%20to%20Cogeneration%20Report.pdf>

3. Economically Viable

Cogeneration projects were developed in NSW over the last couple of decades as a direct result of the Cogeneration Tariff introduced in the early 1990s. Then electricity companies were obliged to purchase any exported electricity to the grid at the rate of \$110/MWh.

In the past years cogeneration and trigeneration projects have been installed with the help of Federal and State government grants. While helpful to one-off projects, these funding grants have offered no long term security or support to the industry.

As a matter of priority, Government needs to introduce a feed-in tariff for cogeneration and trigeneration precincts that will ensure the economic viability of decentralised energy schemes. This will provide critical long term security for the industry which is already grappling with a range of inhibitors.

RECOMMENDATION 5

Introduce feed-in tariff for cogeneration and trigeneration precincts to ensure the economic viability of decentralised energy schemes.

The following issues also continue to introduce a level of risk to economic viability of decentralised schemes:

- Potential changes in gas and electricity pricing
- Material barriers imposed by electricity and gas distribution monopolies
- Changing government policy and regulatory frameworks

Despite these known potential risks, investment in cogeneration and trigeneration projects continues as companies seek the clear benefits from expected operational cost savings, as a hedging strategy and material reduction in carbon emissions. The Property Council/ ClimateWorks report recognises the following capital, operational and environmental cost savings:⁴

- *Buildings connected to the system have lower capital costs because they don't need conventional chillers and boilers*
- *The total installed capacity of the central plant can be reduced compared to the capacity that would need to be installed on a building-by-building basis. This is achieved by taking advantage of the diversity in energy loads – particularly in mixed use developments where operating times vary. This diversity arises from the fact that not all energy users need energy at the same time*
- *Building owners will have reduced operating and maintenance costs*
- *Gains in operating efficiency can be achieved through highly efficient plant that is centrally operated and managed by specialist expertise*
- *A central plant is likely to have a more constant base load resulting in a better operational performance than individual building systems*
- *District systems can use a variety of fuel sources and can more readily incorporate renewable or low emission technologies*
- *Transmission losses (that is, electricity lost while it travels along the transmission network from source to use) are reduced as electricity is generated at the point of use.*
- *The waste heat produced through electricity generation can be utilised locally to provide heating and cooling; and*
- *Building owners will save building space that can be used for other purposes*
- *The reliability of a central plant would also typically be higher than in individual buildings as greater redundancy can be built in, meaning greater buffer against outages.*

⁴ <http://www.propertyoz.com.au/vic/library/Unlocking%20Barriers%20to%20Cogeneration%20Report.pdf>

4. 100% reliable & Safe

Cogeneration and trigeneration do not present any supply security and reliability issues for residential or commercial customers of these systems. The expected availability and reliability curves are well known. With appropriate maintenance and operating discipline they can provide reliable and efficient energy and improve security of supply.

These technologies have operated safely and reliably in Australia and all developed countries for many decades.

5. Role of monopoly gas companies

Anticompetitive behaviour from gas monopolies is a huge issue impacting on the viability of the decentralised energy market.

Existing gas access arrangements are leading to higher costs of gas delivery for trigeneration projects that supply thermal energy for domestic hot water heating. Distribution Network Service Providers like Jemena, SP Ausnet, Citipower-Powercor and United Energy Distribution are facing criticisms of not working with cogeneration project owners. In many cases they treat cogeneration or trigeneration building or district plants as an aggregator – applying high charges. In addition, uncertainty around timelines, no publicly available standard DNSP technical requirements and poor information exchange complicate and add to the anticompetitive environment.

RECOMMENDATION 6

Prevent gas network distributors from categorising decentralised energy schemes as aggregators – this will substantially reduce costs to consumers.

Current gas distribution access arrangements have the approval of the Australian Energy Regulator (AER) which tests gas distributor interpretations through its rulings. Current wording of the access arrangements needs to change to provide certainty to the industry.

RECOMMENDATION 7

Introduce a fair and reasonable approach to gas distribution charges.

Conclusion

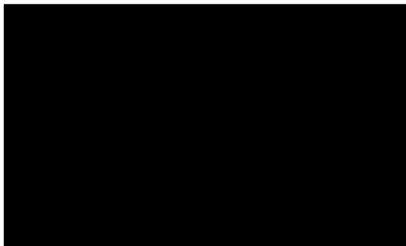
The above recommendations will create a level playing field, deliver a competitive decentralised energy marketplace and establish transparent energy servicing and procurement processes capable of delivering the best possible value for money in decentralised energy services in NSW.

The deployment of regulatory changes suggested above will have minimal impact on the regulated monopolies, yet, they will remove material barriers to the development of cogeneration and trigeneration projects in NSW.

The development of cogeneration and trigeneration projects has the potential to reduce carbon emissions without requiring ongoing subsidies from government. Furthermore, they can assist business and residential users alike to have access to a more competitive energy source.

On the other hand the electricity grid will see a lower rate of growth in demand and will require less and less investment overtime.

Overtime, consumers will see lower energy costs, the government can reduce its intermittent subsidies and grants and the carbon emission intensity factor in NSW will continue to reduce.



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