Submission in Response to:

Review of the NABERS ruling 'Proportioning of Energy used by Cogeneration or Trigeneration Systems'

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Revision 0

Executive Summary

Inefficient buildings place undue pressure on our electrical networks, consume too much energy for normal operation and contribute to Australia having the worst per person emissions of Greenhouse Gas (GHG) Emissions in the world.

NABERS is a successful tool for promoting energy efficiency by connecting energy efficiency to commercial property financials. An increase NABERS star rating is accepted to see increased rental income and reduced vacancy rates for the property owner.

Where some sustainability initiatives struggle to get management and investor level support, NABERS provides a direct connection between energy efficiency, environmental performance and building revenue. For this reason, the NABERS rating system is a key driver in how the property industry approaches energy efficiency and GHG emission reduction.

Due to the high carbon intensity of Australia's electricity grids (due to the use of coal), property owners have realised that drastic GHG emission reductions can only be achieved by considering where the electricity comes from, not just how much is used by the building. The installation of a trigeneration system sees electricity, heating and cooling produced simultaneously in a cleaner, more efficient and greener way, and subsequent improved NABERS Star rating.

However, a building-by-building approach for installation of trigeneration is very limited because:

- Trigeneration systems have to be designed much smaller than the overall building demand, for fear of oversupplying in low demand times. For example, 20-degree days or when a building is not fully tenanted. If a system does oversupply electricity and feed back up into the grid, it can trip grid fault devices. This limits the economies of scale and GHG emission reduction potential for a building-by-building approach.
- Trigeneration systems are further limited to supplying base building electricity demand only, unless long term commitment from a tenant, for its electricity use, is agreed

Approaching trigeneration by a multi-building or precinct scale has the following advantages:

- Less limitation on sizing to not interfere with the grid
- Larger economies of scale for up-front and on-going costs
- Less reliance on decisions by 1 or 2 tenants or buildings
- Capital cost efficiency by servicing a variety of loads that have peak demands at different times (e.g. commercial office vs residential)
- Centralisation of technical capability required to run such plant efficiency

- Incentive for a central operator to maximise energy efficiency and revenue as energy generation is its core business
- Transfer of plant operation risks (e.g. legionella) from building owner to central operator
- Greater energy efficiency due to a larger system and better utilisation of plant (i.e. running hours)
- Greater electricity grid network support and reduction in future society wide electricity price increases due to network augmentation requirements
- Greater GHG emission reduction

The ability to sell low emission electricity to several buildings and tenants relies heavily on financial drivers, including NABERS. The position in the consultation paper will restrict the development of precinct scale energy efficiency around Australia, and limit trigeneration primarily to small in building installations.

It is recommended that NABERS adjust their draft position set out in the consultation paper to include GHG emission reduction from an offsite trigeneration system in the assessment of the star rating. The steps for this to be possible are set out in the recommendations section of the following paper.

Recommendations

We have the following recommendations for NABERS in response to the consultation paper:

- For offsite supply of low emission energy from a precinct or district system to be included in the Star Rating assessment
- For method of apportionment of the carbon emissions to electricity, heating and cooling or gas use from trigeneration to be flexible, but must be consistent for each building and system and justified by the precinct system operator. An agreed method could be set by NABERS over time
- Require precinct operators to provide connected buildings, on their monthly energy bills, apportionment of carbon emissions and gas use for the electricity and thermal energy consumed
- See precinct operators audited annually, organized by NABERS, paid for by precinct operators, to ensure gas use, energy generation, waste heat utilisation, energy efficiency and other parameters equate to the claimed apportionment of emissions for all energy sold.
- Require that buildings must be either in a 'deemed precinct', or connected to thermal services from the same system, to be able to include offsite supplied low emission electricity as part of their NABERS Star Rating improvement
- That NABERS build the necessary capacity over time to deal with precinct and district energy systems

The reasons behind these recommendations are set out in the following document.

Introduction

1. Buildings use 40% of the nations energy and produce 23% of the nations Greenhouse Gas (GHG) emissions.
2. Inefficient buildings place undue pressure on our electrical networks, consume too much energy for normal operation and contribute to Australia having the worst per person emissions of Greenhouse Gas (GHG) Emissions.
3. Trigeneration can see GHG emissions from energy use by buildings reduced by 50% or more.
4. Prendergast Projects provides advice on several new development and existing built form Precinct Trigeneration and District Energy projects. These projects see low emission generation and distribution of electricity, heating and cooling, on a multi-building basis, rather than each building considering it's heating and cooling (and sometimes embedded low emission generation) requirements.
5. In such projects, the provision of centralised services makes economic and commercial sense, but face timing challenges:
    a. New developments start with zero energy demand at first, then energy demand growing over time. Infrastructure is required to be built up front, prior to revenue through energy sales commencing.

b. Existing built form projects can provide energy services more cost efficiently, but until existing buildings are required to replace their existing plant, there is little commercial driver for them to change to a centralised system

6. In centralised services projects, the provision of trigeneration, to further improve GHG emission reductions, relies purely on the demand for local buildings to purchase low emission electricity. It is not possible for a council or developer to force the existing or new buildings to purchase electricity from a nearby trigeneration system.

NABERS – The value equation

7. Often, projects related to GHG emission reduction, the environment or sustainability rely on the goodwill of an organisation or it's objective to promote itself as a 'green' company. It can be a struggle to convince the powers that be that there is value in such initiatives.
8. NABERS has become a mechanism that provides a direct connection between GHG emission reduction initiatives and commercial drivers for property owners. Sustainability, into dollars and cents.
9. It is now widely accepted that buildings with high NABERS ratings get higher rents, and have lower risk of vacancy. This is due to tenants, especially government and large corporate tenants, being attracted to energy efficient buildings.
10. NABERS sees energy efficient buildings valued higher. If low emission electricity from a nearby centralised generator is bought in from offsite, should a building see an increase in value? We believe that buildings in such precincts should reap the benefit of a precinct approach to energy efficiency.

Limitations of building-by-building trigeneration approach

11. Building-by-building trigeneration has its limitations. Trigeneration engines either run or they don't. They are not suited to loads any less than 70% of its capacity. For this reason trigeneration systems have to be designed much smaller than the overall building demand, for fear of oversupplying in low demand times. For example, 20-degree days or when a building is not fully tenanted. If a system does oversupply electricity and feed back up into the grid, it can trip grid fault devices. This limits the economies of scale and GHG emission reduction potential for a building-by-building approach.
12. There are several trigeneration systems installed in Melbourne and Sydney buildings that have not been able to run as the building electricity demand is lower than expected, and not high enough to enable the trigeneration system to operate.
13. Additionally, thinking long term, it is not a logical energy solution to have thousands of small generators scattered through our cities and towns, each requiring their own management and upkeep.

The benefits of a precinct or district approach

14. The potential benefits a precinct approach to energy compared to a building-by-building approach include:

- Less limitation on sizing to not interfere with the grid
- Larger economies of scale for up-front and on-going costs
- Less reliance on decisions by 1 or 2 tenants or buildings
- Capital cost efficiency by servicing a variety of loads that have peak demands at different times (e.g. commercial office vs residential)
- Centralisation of technical capability required to run such plant efficiency
- Incentive for a central operator to maximise energy efficiency and revenue as energy generation is its core business
- Transfer of plant operation risks (e.g. legionella) from building owner to central operator
- Greater energy efficiency due to a larger system and better utilisation of plant (i.e. running hours)
- Greater electricity grid network support
- Greater reduction in future society wide electricity price increases due to network augmentation requirements
- Greater GHG emission reduction

15. Precinct systems in Australia are not just currently limited to the City of Sydney project that was noted in the NABERS consultation position paper. Such projects at various stages, from planning to operation, are happening throughout Australia, including, that I know of, four in Victoria, three in NSW and two in Western Australia, ACT, South Australia and Queensland.
16. Additionally, we now have Prime Ministerial support for Distributed Generation as a way to help control spiraling electricity costs, and the Green Building Council have now released their Precinct Green Star tool.
17. Developers of precincts, such as Frasers Central Park, Docklands, Revitalising Central Dandenong and Green Square, are now investigating methods of energy efficiency and maximization GHG emission reduction at a precinct scale. The development of low emission centralised heating, cooling and/or trigeneration systems is often more efficient at a precinct level due to economies of scale and non-simultaneous demands of a variety of different buildings types (known as Diversity factor).
18. Additionally, many local governments are investigating ways of reducing the Greenhouse Gas (GHG) emissions of their LGA, which includes existing buildings stock. Again, while some councils are considering energy efficiency of buildings only, other councils are investigating precinct scale low emission supply of electricity, heating and cooling. Such projects include the City of Sydney trigeneration project, and Townsville District Cooling project.
19. In all precinct scale projects, they:

a. would not occur without a central coordinating organisation, and the willing participation of local developers, building owners and tenants.

b. See the engagement of an energy services provider to, at a minimum, retail the electricity, and also commonly fund, install, own and operated generation plant.

Long term application of distributed generation

20. While trigeneration and gas fired electricity generation sees immediate GHG emission reduction compared to grid delivered electricity in Australia, it also has a part to play in the long term move to 100% renewable energy
21. Wind, solar and other renewable technologies face the challenge of intermittency and ability to dispatch at times of peak demand.
22. Gas is a storage of energy, which can be dispatched on demand. This can complement renewable energy by operating in times of low renewable electricity availability, or at times of high demand.
23. It is common in Denmark for CHP (Combined Heat and Power) plants to run using a portion of locally produced biogas. Such biogas is produced generally from waste agricultural products. This is a form of renewable gas.
24. In September 2011 in Fredericia, Denmark, a major milestone was achieved when a biogas plant was connected to the gas network. Now it is possible to buy renewable gas from normal gas grids, much like it is possible to buy renewable electricity in the Australian grid.
25. Further information is available here - http://www.e-pages.dk/energinet/258/1 - on how Denmark see renewable gas as a key part of moving towards 100% renewable energy and 0% fossil fuel energy.

NABERS position in consultation paper

26. The position in the consultation paper, in effect, limits NABERS star ratings uplift to in building trigeneration systems, rather than being flexible and working with the best solution in each case.
27. A note on a NABERS certificate will not see the financial benefits for building owners that occur with an increased star rating
28. In our opinion, NABERS are well placed to increase capability in precinct and district systems, and oversee the apportionment of GHG emissions or gas use in precinct and district systems.
29. NABERS should be willing to adapt and improve over time, to see energy efficiency and GHG emission reduction improvements across the property sector

Risks of NABERS position in consultation paper

30. The following risks exist if NABERS proceed with their position in the consultation paper:

- Development of precinct wide or district energy projects will be hindered in the short and long term in Australia.
- New developments consisting of several commercial buildings are more likely to include 1 trigeneration system per building, or no trigeneration, rather than a centralised system
- Installation of trigeneration systems will be limited to high-grade buildings where the building owner has the capability and access to capital to install trigeneration.
- The widespread development of small trigeneration systems throughout our city, requiring their own management and upkeep, which is not a sensible energy solution for our cities
- Although NABERS is now somewhat entrenched due to the CBD program, it could become less relevant, especially as precinct and district systems become more and more commercially attractive for property owners, and the savings are greater than the increased revenue due to a high NABERS rating

Conclusions

31. The NABERS framework should support whatever is the best energy efficiency and GHG emission reduction solution in each case, and not be limited to a single approach.
32. We need a coordinated and collaborative approach to improving the energy efficiency of our cities, rather than a very limited building-by-building approach.
33. Please contact Jonathan Prendergast on the contact details below if any further information is required

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