24th August 2012

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NABERS Consultation Review Panel

NABERS Energy
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Dear Sir/Madam

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

EXECUTIVE SUMMARY

We believe the issue addressed by this NABERS Consultation Paper to be extremely important and critical to the ability of the Australian property industry to deliver significant emissions reductions. While the paper provides some clear guidance there are other critical areas where the position taken fails to deliver the level of clarity necessary for the industry to continue to invest in a low carbon future. Moreover there appears to be an underlying tendency towards defining design outcomes rather than enabling the market to decide the most technically appropriate and effective means of reducing overall greenhouse gas emissions.

We unfortunately conclude that the revised methodology as presented in this paper will require further revision before it can become an effective tool for the development of NABERS and a sustainable property industry. The following response seeks to set out our key areas of concern and to recommend preferable courses of action.

Key Recommendation Response

In response to the public consultation we comment as follows on the recommendations:

A. *"When a co/trigeneration system is located on-site and all the usable energy generated by this system is consumed by either the base building or its tenants; then 100% of the externally supplied energy (usually natural gas) can be proportionately allocated to the end users of the generated electricity."*

   Umow Lai agrees with the recommendation as outlined above. However, in some instances this statement is contradicted by 'D' below. A clearer instruction is required, which would necessitate change to 'D' rather than 'A'.

   The definition of a 'site' is unclear. On a large site it is common for a third party network provider to be used and sometimes the grid supplier network to be used or augmented. Likewise on existing buildings where retrofitting of Co/Trigeneration is carried out, restrictions caused by existing electricity supply network infrastructure may necessitate solutions that utilise small local parts of the grid (third party) network to reticulate electricity to all parts of a building. This use of the network acts as a short 'bridge' between separate sections of electrical infrastructure within a single site. This approach overcomes the need to fully upgrade and change existing electrical infrastructure that would otherwise render the use of trigeneration uneconomic or severely curtail its impact on emissions.

Although allowed in this recommendation part, these approaches could be disallowed in item D below. NABERS should not discriminate against certain infrastructure solutions providing consumption measurement accuracy can be proved. We believe this is an area where the ruling seeks to isolate some 'off-site' practices but also inadvertently blocks a range of sensible 'on-site' approaches.

B. *When a co/trigeneration system is located on-site and it is exporting thermal energy or electricity offsite; then the proportion of externally supplied energy (usually natural gas) used by the co/trigeneration plant to generate these exports can be excluded from the host buildings NABERS Energy Base Building Rating.*

Umow Lai agrees with the recommendation as outlined above. However, in some instances this recommendation could result in 'lost' emissions if recommendation 'D' below is also followed. If it is possible to accurately apportion and exclude the portion of exported energy emissions from the host building using this recommendation, it should also be possible to include the calculated emissions on the target building. However, recommendation part 'D' below contradicts this recommendation. The simple accounting that is essential to correctly account for thermal energy in 'B', should therefore be equally applicable to 'D'.

C. *When co/trigeneration thermal energy or electricity is externally supplied to a building then this energy is to be accounted for within a NABERS Energy rating.*

Umow Lai agrees with the recommendation.

D. *NABERS supports the creation of an industry/government accreditation standard to allocate an emissions value to co/trigeneration thermal energy and electricity products externally supplied to buildings (similar to Green Power). Once an accreditation process is established, then these externally supplied energy products can be included in a NABERS Energy rating. Until such a standard is developed co/trigeneration electricity supplied via the grid/network will be allocated standard grid emission values. Imported thermal energy will be considered by the NABERS National Administrator on a case-by -case basis.*

Umow Lai strongly disagrees with the position put in this recommendation, that an industry/government accreditation standard is required before the use of externally supplied low carbon electricity and thermal energy can be included in a NABERS Energy rating. Umow Lai similarly opposes the recommendation that imported energy from Co/Trigeneration should be allocated standard grid emissions values. This approach taken by the position paper ignores the ability for NABERS to sufficiently account for this energy in a wide variety of existing instances using current industry regulatory practices. This effective 'lack of ruling' also fails to provide the certainty required by property owners and developers to undertake investment in co/trigeneration technology. Consideration of thermal energy on a case by case basis also does not provide the market a required level of certainty. In the current property market a defined outcome and benefit in terms of a building's NABERS rating is essential for investment in technology and upgrades to proceed.

It would appear that the position paper is seeking to prohibit certain applications of trigeneration energy distribution while in practice throwing a blanket across a wider variety of very legitimate solutions. The lack or deferment of an effective ruling in 'D' effectively precludes the use of precinct based trigeneration solutions. Unfortunately this approach There are many different varieties of precinct base co/trigeneration systems including 'hard wired' island precincts linking 2 or more buildings, embedded power network precincts (such as some university or business park campuses) and precincts that use the electricity grid in either an individual building or wider virtual network configuration.

It would appear to us that the primary concerns in the current NABERS position rest with the apportionment of low carbon energy distributed to a wider consumer market through the electricity grid in a similar way to Green Power. While further regulation or industry accreditation standards may be required in this area, it is not required to rate the preceding three types of precincts noted above. Unfortunately the ruling captures all precinct types and we believe this should be rectified by enabling hard wired precincts, embedded power network precincts and individual building virtual network configuration to be rateable under NABERS now. In later sections of this response we have provided

specific examples to show how these types of precincts should be included.

E. The amount of low emissions electricity will be identified in the NABERS Energy Rating Certificate and accompanying Rating Report.

Umow Lai does not believe in the case of co/trigeneration it is necessary to identify low emission electricity by default. It most cases it is not similar to the purchase arrangements of Green Power. Where the sources of Co/Trigeneration Plant can be clearly identified the carbon emission efficiency improvement can be calculated using existing NABERS Energy methodologies. Co/Trigeneration plant electricity generation (Scope 2 emission) represents a more efficient use of raw (Scope 1 emission) fuel use than the sourcing of electricity from the grid, where electrical generation efficiency is usually lower and thermal portion is wasted. Co/Trigeneration alongside building thermal envelope, lighting and other efficiency improvements work in tandem to improve building raw emission (Scope 1) fuel use efficiency and should be equitably credited in the reduction of building $CO_{2\text{-}e}$ emission intensity reduction.

Electricity should continue to be reported in the same manner as it is currently reported on NABERS certificates. Low emission electricity should only require identification when sourced from an undefined pool of generation that not directly identified as part of a distinct closed energy network at a building or precinct

REVIEW OF KEY ISSUES

ISSUE 1: Potential double counting of emissions and corresponding double benefit under NABERS when the co/trigenerated electricity is delivered via the grid.

We agree with NABERS findings that existing legislation and reporting systems are in place to prevent double accounting of co/trigeneration emissions and therefore it should be possible for emissions accounting to take place without double accounting.

ISSUE 2: How should on-site energy generation be treated within NABERS rating?

Item 1: Currently NABERS does allow the carbon emissions from small scale solar PV electricity connected on-site behind a utility meter to be credited as an emissions reduction measure to the building. This is possible even if RECS through SRET/MRET has been claimed. This is an example of double accounting carbon emissions savings to a building where energy has upfront SRET applied or is in progress of being funded and paid for (MRET) by an external third party. This is effectively double accounting the benefit of solar electricity but is allowed under current methodology. As these are design features provided by the building and the schemes used are an incentive to employ these systems into a building, the current acceptance of emissions reduction to the building should be maintained.

The following explanations assume solar electricity is not being remotely sold through a third party scheme, regardless of whether the plant is connected behind a utility meter or exports locally to a development by supplying through local third party infrastructure. Co/trigeneration falls outside of the RECs discussion.

Item 2: In the case of buildings or precincts it may be necessary to export solar electricity or co/trigeneration electricity locally through third party electrical infrastructure. Providing the net energy export is used (after parasitic energy used by the facility is deducted from the gross export) it should be possible to connect either way. It is wrong to exclude emissions benefit if a local third party infrastructure is used to supply the same building or local development if a precinct boundary can be clearly defined.

The requirement to connect user side of the meter, unnecessarily excludes many legitimate configurations from a NABERS Energy rating which can be readily and easily attributed to an end user.

Item 3: A clear definition of a building bounds is required. If a building is receiving metered electrical energy from a co/trigeneration plant located in a shared energy building (in a precinct) we assume that this recommendation will exclude the lower emissions from this source. This is problematic.

It is already possible to accurately account for electrical energy transmitted if a third party licensed retailer or generator is used. "Power Brokers" and suppliers such as Diamond Energy and Cogent (supported by Origin Energy) can provide accurate accounting of this transmission for inclusion in a NABERS Energy rating.

As long as metering accuracy requirements are followed (such as through utility accuracy metering through a licensed retailer or generator provider covered by law for accuracy in reporting) it should be possible to accurately apportion energy use and provide an exception to items 2 and 3 in issue 2. The NABERS assessor should be able to trust the outcome from a registered retailer/generator without question, as they would from a grid utility supplier. These accounts are already used as the basis of every NABERS Energy rating.

ISSUE 3: How should usable energy generated by co/Trigeneration systems and exported off-site be treated in a NABERS Energy rating?

The recommendation takes a somewhat blinkered approach to the understanding of how an exporting system may be designed. A building exporting to a local second building may be doing so to overcome plant spatial issues in the other building or to share output between two buildings. The assertion that a second building (or precinct) may be freeloading and gaining by transaction, deserving no accreditation through NABERS Energy is somewhat absurd. This suggests that consideration of only part of the transaction (the on sell) has been considered in the recommendation and not the intention to purposely design the facility in this manner to procure a better environmental outcome.

A building should be rewarded for providing lower emission output than can be sourced from the grid. Over time grid electricity will be cleaned up, NABERS Energy improvements from Cogeneration systems will fall and will eventually make certain technologies obsolete. This will take place with existing NABERS Energy assessment methodology.

The prime goal of NABERS Energy is for buildings to be efficient energy consumers and possibly low emission in net exporters, that might be emission intensity negative. The low emission energy export aspect of a building's design, is therefore important in the NABERS calculation and should not be ignored.

The exclusion of energy export from the NABERS rating on a single building is acceptable, however, if it is possible to calculate the export energy exclusion using this method it should also be possible to include this exclusion on an adjacent building if it is reliant on that exported energy.

If the exported energy is not able to be included in designated target buildings then the calculated export component should rightly be credit as a positive benefit by that building to its local environment. There is no reason why this shouldn't be credited as a net emissions saving bonus. Without this level of consideration the energy output is otherwise lost by NABERS Energy methodology and not credited anywhere. This is an incorrect outcome.

ISSUE 4: How should low/zero emission energy externally supplied to a building be treated in a NABERS Energy rating?

Carbon intensity accounting is closely linked to the consumption of fuel emission source. Carbon emissions can be traced and applied in a similar manner as taxation calculations already apply tax to the cost of energy consumption source. Utilising the existing accreditation of registered licensed energy retailers or generators can provide a secure, reliable and transparent mechanism to accurately account for energy transmission without double counting, which contravenes existing laws. As the majority of Cogeneration systems utilise natural gas as a major fuel source, the emissions values associated with the generation of electricity and thermal energy can be accurately metered and retailed to third parties by licensed energy retailers. Electricity retailers and generators already have the ability to apportion energy reticulated from multiple sources and would be covered by existing laws when attaching a retail value to energy sold from these sources.

It should be noted that buying Green Power is buying from a non defined pool of zero emission energy that is quite different from the majority of precincts or buildings where a source is clearly identifiable. Be it zero emission solar PV or a low emission gas fired Cogeneration facility, in these instances if a source can be identified its energy emissions should be able to be apportioned accordingly. In such cases where a designated energy source is identified for low emission electricity, for chilled water (absorption chiller or central electric chiller) or for hot water (Cogeneration or straight gas fired boiler) accreditation to a NABERS Energy rating should be allowed. In order for the credit to take place it should be physically possible for the energy to be transferred locally.

This would exclude remote sites where a building on one side of a city supplies energy through a third party grid to a remote building on the other side. This would also exclude the purchase of low emission energy from a pool of non specific providers, as may occur in the Sydney district Trigeneration scheme. Buying Green power from a non defined pool of providers is already excluded.

Failing to recognise identifiable remote sources for energy supply in a precinct may preclude many precinct buildings from receiving realistic NABERS Energy ratings. Even worse, it may discourage precinct scale energy system development that has many discernible community benefits.

The use of existing government licensed energy retailers and generators, accredited to apportion energy within already defined accuracy requirements, could be mandatory for a NABERS Energy rating in these instances until an alternative methodology is developed. This would simplify evidence for assessors, whilst ensuring the integrity of the NABERS Energy rating scheme.

The recommendation appears to prohibit correct carbon emissions allocation for buildings that are solely reliant on energy plant located remotely from the building itself, therefore the inclusion of an assessment recommendation that appreciates these cases is highly important. In future, when multiple energy sources become available to a building, the building owner will face a choice over which energy source to choose. NABERS Energy should assist by rewarding the use of lowest energy emission sources for a building, thus enhancing precinct energy generation systems. To bunker down and decline to face up to distributed energy system choices for buildings, will be to the detriment of the building development and may limit choices afforded to the tenants within. The reluctance to set sensible interim rules and resort to grid energy emissions is in our view an undesirable outcome.

As noted in the executive summary, Umow Lai believe that this ruling is flawed and essentially defers any action to some undetermined point in the future. While there may be uncertainty around some types of precinct style external energy distribution, this does not apply to all precinct types that are possibly inadvertently captured by this ruling. The main different varieties of precinct base co/trigeneration systems that we identify include ‘hard wired’ island precincts linking 2 or more buildings, embedded power network precincts (such as some university or business park campuses) and precincts that use the electricity grid in either an individual building or wider virtual network configuration. The following examples are provided to demonstrate how these types of precincts should be included within the current NABERS rating methodology:

Hard Wired Precinct

One example of a ‘hard wired’ precinct system is Legion House, which currently features on the main NABERS home page and has a signed Commitment Agreement for a 6 Star NABERS Energy rating. Legion House is supplied with renewable electricity and heat from a biomass gasification cogeneration plant that meets all its energy requirements completely isolated from the electricity grid. The issue with this project is that the cogeneration plant is located on the adjacent 167 Castlereagh St building who’s office s are also supplied off-grid by the plant along with Legion House. The cogeneration plant is also able to connect to individual switchboards in the adjacent office tower (off-grid connection) to enable the export of renewable energy to offset embodied energy in the construction. Legion House is a world leading sustainable project that demonstrates the extent of what can be achieved in delivering a zero carbon building.

However, under the current proposal outlined in issue 4, Legion House’s electricity would be counted the same as dirty grid electricity. This is despite both of these buildings being disconnected from the electricity grid and supplied with on-site renewable energy! The previous NABERS cogeneration ruling allowed this scenario to be rated under NABERS and we see no reason to change from this. No energy from the cogeneration plant goes outside of the hard wired connection between buildings and there is never any potential to send this energy to the grid. All energy flows are fully metered to NABERS requirements so that all energy can be fully accounted between buildings in a NABERS rating.

Embedded Network

Large campus or business park developments often own their own high voltage network between building substations with the utility ownership ceasing at a high voltage metering point at the boundary. This is the case for Edith Cowan University and many other similar campus style developments. Here it makes no sense to locate cogeneration in individual buildings as there is no economy of scale and the costs involved make it uneconomic. By contrast a precinct based cogeneration plant feeds into the private network supplying all connected buildings with metering throughout the system able to account for cogeneration vs grid electricity. The proposed system is

then able to meet a far greater proportion of an individual's building electrical demand resulting in increases in carbon emissions reduction in the order of 100%.No electricity is exported to the utility grid through the embedded network as the plant capacity is sized and modulated to be always less than the combined electrical demand of the campus.

Single Building Private Network
On existing buildings such as 385 Bourke St in Melbourne it is common for electricity to be transferred through third party owned infrastructure. Due to the large sioze of the building there are separate points of supply from the utility infrastructure. In this case it is not practical for a cogeneration plant to service all of the building load without crossing over the boundary between the third party owned and utility networks. It is not normally possible to supply from behind a single supply point. To do this without using the utility network as a bridge between separate segments of the building would require massive, costly and prohibitive electrical infrastructure upgrades that do nothing to improve the efficiency of the building in themselves. The solution to this is to utilise a Virtual Private Network arrangement to account for the energy transferred between sections of the building using the very short segments of utility network.

This recommendation would by default, result in an incorrect emissions intensity being applied to all co/trigeneration electricity supplies used in similar precinct configurations. Mechanisms already exist to calculate and correctly apportion grid and cogeneration emissions mix of electricity, providing a registered electricity retailer/generator license holder is used to undertake accounting of energy transferred. If a licensed energy retailer/generator is used to provide the energy supply source mix it should be possible for a NABERS assessor to trust the accuracy of the energy data provided, as the reporting accuracy is covered by existing legislation.

ISSUE 5: How should NABERS communicate the use of low/zero emissions electricity in a rating to assist industry in understanding both the environmental performance and energy efficiency of a building?

The two fuel sources used by Cogeneration are already picked up as grid electricity and normally gas. In the case where Co/Trigeneration source is identifiable there should be no requirement to identify low emissions electricity. The fuel emission source is already picked up in within the grid supplied gas and electricity consumption. This should be the case regardless of whether the cogeneration set is located behind a utility electrical meter or connected via a third party closed embedded or virtual network, as the outcome is the same.

It should only be necessary to report on low emission electricity when co/trigeneration electricity is purchased from an undefined pool of different cogeneration plant. This is the only scenario that could be considered similar to the purchase of Green power from an undefined pool of zero emission sources. The act of purchasing energy in this fashion suggests that a specific Co/Trigeneration plant has not been considered and specifically designed to form part of a building design.

The consideration of thermal energy should also be treated equitably with electricity and should only be considered under this recommendation as an efficiency improvement, if the co/trigeneration source can be clearly identified as serving the building. If the thermal energy is also purchased from an undefined pool of thermal energy, it makes no sense to include thermal energy as an environmental benefit and exclude electrical energy.

CONCLUSION

NABERS Energy methodology should not favour certain design approaches over others. It is a performance tool and should therefore continue to credit outcome on its performance merits, providing that all items of the design can be clearly identified and accurately attributed to a rated buildings functionality.

A more sensible approach might be for NABERS to consider the likely thresholds for star ratings and the introduction of additional stars beyond six, that credit buildings on their overall emissions intensity. It is difficult to reach zero emissions by technology alone and buildings require good thermal envelope and design parameters to accompany technology to facilitate extreme low carbon goals.

We have highlighted several examples of precinct solutions that Issue 4 appears to prohibit but that should be included within the NABERS framework as all safeguards to account for energy use can be met.

Economic drivers will force buildings to use lower volumes of energy and reduce emissions by design. NABERS Energy does not need to cross the boundary of favouring building design approaches through assessment technicalities in order to acquire a rating. Such instruction stifles innovation and reduces market efficiency and it tantamount to regulation of design outcomes, albeit in a covert way.

NABERS is a carbon emissions intensity rating tool, as such it should reward low emission intensity, providing that accuracy of metered result can be proved for an individual building. This is already possible using existing mechanisms.

Yours faithfully,
UMOW LAI

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