



Essential Services Commission
Level 37 / 2 Lonsdale Street
Melbourne VIC 3000

12 Feb 2016

Re: ESC Inquiry into the true value of distributed generation

Thank you for the opportunity to make the following submission on the ESC enquiry into the true value of distributed generation (DG).

The Northern Alliance for Greenhouse Action (NAGA) formed in 2002 to share information, coordinate emission reduction activities and cooperate on research and the development of innovative projects. NAGA is comprised of Banyule, Darebin, Hume, Manningham, Melbourne, Moreland, Whittlesea, Yarra, Moreland Energy Foundation Limited and the Shire of Nillumbik. NAGA's goal is to achieve significant emissions abatement and energy cost savings by delivering effective programs and leveraging local government, community and business action.

NAGA maintains the view that the current policy environment and pricing structures for distributed generators (DGs) is inadequate and unfairly undervalued. As previously stated in our 2015 submission to the ESC Feed in Tariff review, we are of the view that:

- There is a need for a mandatory minimum Feed-in Tariff (FiT) to ensure equity and fairness for small-scale energy generators, specifically solar photo-voltaics (PV)
- The current ESC methodology for calculating solar feed in tariffs is too narrow in scope and does not consider broader environmental and social benefits of small-scale renewable energy generation to the grid and other consumers
- The current feed-in tariff of 5c/kWh is not truly benefit-reflective
- The methodology to calculate the feed-in tariff should be updated and broadened to account for additional benefits
- There is a need to identify existing barriers to distributed generation beyond fair payment structures, and recommend to Victorian Government resolutions to these barriers

NAGA has advocated for many years for fairer prices and policy support for distributed renewable energy generation. On this basis we welcome this review, and hope that it leads to a fairer and more equitable outcome for distributed generators and the broader public.



Whilst we understand the complexity of the issues involved in calculating the energy and network benefits of DG, we note that this has been an ongoing piece of work for the commission over many years and that public consultation is likely to yield similar responses as previous feed in tariff submissions. As such we request that the extended timeline does not delay a decision that will lead to a fairer price for DGs from January 2017.

Q1. Do you agree with how the Commission is proposing to define true value? If not, why not? Are there other definitions the Commission could use?

NAGA supports the ESC proposed true value definition to be based on economic, environmental and social values. We note that the ESC “has so far been unable to identify specific environmental or other public benefits that a distributed generator provides to the distribution network, that are easily quantifiable.” We would respond that just because a value is difficult to be accurately quantified should not mean that that value is dismissed by the ESC.

Social Benefits

The ESC discussion paper states that “identifying the true value of distributed generation will support the development of efficient payment structures (for example, feed-in tariffs) that can be made to investors in distributed generation - payment structures that promote the *socially optimal* level of investment in distributed generation.”

We propose the most relevant social benefits could be captured by a social cost of carbon value to capture the value of damages avoided as a result of emissions reductions, as well as considerations of health benefits associated with reduced air pollution. This calculation is an estimate of the economic damages associated with a small increase in carbon dioxide (CO₂) emissions, in metric tons per given year and has been applied to rule making such as vehicle standards. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e., the benefit of a CO₂ reduction). Calculating a social cost of carbon will necessarily require many uncertainties and assumptions, but a conservative approach is better than no price at all. The current US social cost of carbon is about \$AUD53 per ton of CO₂.

Environmental Benefits

Environmental benefits captured within the price should clearly align with a Victorian Government objective to decarbonise Victoria’s energy supply through promoting renewable energy technologies and the promotion of and support for a diversified and localised energy supply. NAGA recognises that setting a price for DG that provides the environmental benefits associated with reduced carbon emissions from an increased uptake in renewable energy is fraught with difficulty. Previous price regimes have proved difficult to manage, creating booms in demand for solar which placed stress on state finances. NAGA would support a “set



and see” approach in which the price for solar is increased gradually and the response by the market is monitored with a view to setting a changed price at a defined point in the future.

NAGA would strongly recommend that the price set is not influenced by a broader longstanding debate about market cross subsidies for solar. Within this context, the position of the Energy Networks Association that a consumer without solar PV panels now pays about \$60 a year more to subsidise homes with solar PV panels, due to “under-recovery of network costs” during summer evening peak periods, is undermined by the fact (noted in the same ENA report) that households without air conditioning subsidise households with air conditioning to the tune of \$350 a year. Within this debate it is also important to consider the implicit subsidies associated with non-renewable energy. A 2015 report by the International Monetary Fund (IMF) identified that Australia is subsidising fossil fuels at a rate of \$1,712 per person per year¹.

Q2. Do you agree with the Commission’s view that this Inquiry is focused on identifying the public benefit of distributed generation? If not, why not?

We support this view, given that private monetary benefits will naturally flow through once a more comprehensive methodology is developed to reflect the broader public benefits of distributed generation.

Q3. Do you agree with how the Commission is proposing to define public benefit as it relates to distributed generation?

Yes. However, we encourage the ESC to investigate more comprehensively the environmental and social benefits associated with DG, as stated above. While we recognise the limitations of a Feed in Tariff (FiT) to reflect all values of distributed generation, the purpose of this review is to look at payment structures more broadly. Distributed renewable energy generation has a number of additional benefits such as health benefits, jobs creation, energy security, greenhouse gas emissions reductions, energy efficiency from local generation/point of use generation and reduced water usage. It may not be possible to capture all of these values in a FiT, but we consider that additional government programs to support and incentivise payments to DGs are still necessary.

Q4. Is the Commission’s understanding of how the costs, to network businesses and consumers, of connecting distributed generation are calculated and recovered correct? If not, why not?

Yes, however as noted below under connection issues, there remains an equity issue relating to the costs associated with connections that may need to be considered in a payment structure.

¹ <http://www.imf.org/external/pubs/ft/survey/so/2015/new070215a.htm>



Q5. Do you agree with the Commission’s proposed approach to the inquiry? If not, why not, and what alternative approach would you propose?

Yes, however, the ESC proposes to use the following guiding principles:

- Materiality
- Simplicity
- Behavioural response

We note that the previous VCEC inquiry in 2012 had also considered the principle of equity. We recommend the equity principle be reinstated by the ESC as this will be one of the key issues amongst stakeholders in determining a “fair” price.

DEFINITION OF DISTRIBUTED GENERATION

Q6. Do you agree with how the Commission is proposing to define distributed generation? If not, why not?

Yes, the definition reflects that used elsewhere, including recently in the AEMC Local Generation Network Credit (LGNC) rule change request. However, we agree with the ESC that unlike the LGNC definition, this inquiry should consider DG capped at 5 MW to ensure the inquiry focusses on small scale generators.

NAGA suggests the ESC consider that distributed generation be separated into renewable and non-renewable fuel types (e.g. diesel generation), in order to simplify the calculations of social and environmental benefits, but also to be able to consider additional policy incentives. Also, there may be value in greater delineation between micro embedded generators (up to 30kW such as household solar PV) and mid-scale embedded generators (30kW-5MW such as a community energy project).

One issue that relates to this definition is the different way different DGs are treated across network operators. For example, Jemena requires secondary protection for all solar systems above 30kW, whilst other network operators do not. This raises additional costs, delays and uncertainty and is an effective barrier to installing >30kW systems on community use and business properties in the Jemena network area.

WHAT VALUES CAN BE ATTRIBUTED TO DISTRIBUTED GENERATION

Q8. Are there other public benefits that the electricity generated by a distributed generator provides? How can these identified benefits be quantified?

The ESC has not yet identified comprehensive social and environmental benefits that would reflect best practice energy policy. We propose consideration of the following additional



values:

Health benefits from avoided pollution

Distinct from greenhouse gas emissions, distributed renewable energy provides important health benefits arising from reduced air pollution from avoided fossil fuel based electricity. Last year the Climate Council and the Climate Health Alliance released a Joint Statement on the Health Effects of Coal in Australia, detailing how Australia's heavy reliance on coal for electricity generation and coal industry expansion present significant risks to the health of communities, families and individuals². The third recommendation of the report was that "coal's human health risks must be properly considered and accounted for in all energy and resources policy and investment decisions." This reflects that to date in most energy policy, including feed in tariffs, air pollution from coal remains an externality. We recognise that the health effects are localised, however these impacts are accrued by the state as a whole.

A recent report by the US National Renewable Energy Laboratory (2016) measured public health benefits from state renewable energy portfolio standards in the United States. This work offers some positive examples of how to measure and quantify social health benefits from renewable DG³. The report found that deployment of renewable energy reduced national emissions of sulfur dioxides, nitrogen oxides, and particulate matter by 77,400, 43,900, and 4,800 metric tons in 2013, respectively, leading to health benefits equal to \$5.2 billion. Importantly they translate these benefits to an energy unit value of AUD 8 cents/kWh.

Q9. Are there any environmental or other public benefits that a distributed generator provides to the distribution network? How can these identified benefits be quantified?

We would like to reiterate the views previously expressed in our 2015 FiT submission, that there are three other significant values that DG is delivering to the broader market that should be reflected in a fair price, that of:

- avoided transmission capital expenditure (as solar generation and peak transmission load profiles broadly overlap); and
- merit order value (i.e. the downwards pressure that PV is placing on wholesale prices at peak times which according to Melbourne Energy Institute (MEI) (2013), is worth hundreds of millions of dollars savings to all consumers per year⁴).
- Network benefits of reduced demand

NAGA welcomes that these values were mentioned in the recent 2015 Feed in Tariff review by the ESC and hope that this inquiry properly investigates all available evidence for these values. NAGA strongly supports the inquiry to consider and develop a network benefit framework based on the 2015 Clean Energy Council report on value of small scale generation

² <http://www.climatecouncil.org.au/uploads/800f051ad0cb47d1554179635d9f4070.pdf>

³ <https://emp.lbl.gov/sites/all/files/lbnl-1003961.pdf>

⁴ <http://www.energy.unimelb.edu.au/documents/paper-merit-order-effect>



to the network⁵. As acknowledged by the ESC, the report recommends a preferred framework for quantifying the value of DGs to distribution networks using an evidence-based approach.

NAGA supports the current rule range request to the Australian Energy Market Commission for a Local Generation Network Credit, as one regulatory change to support small scale distributed generators. We welcome the reference to this proposed methodology in the ESC inquiry. We hope that the ESC will also recognise that any national rule change may take many number of years to be enacted, so encourage the ESC to consider how to incorporate these values into a more immediate payment structure. The proposed methodology would require DNSPs to calculate:

- the long-term benefits that embedded generators provide in terms of deferring or down-sizing network investment or reducing operating costs; and
- pay all types of embedded generators a local generation network credit (LGNC) that reflects those estimated long-term benefits (netting off any additional costs).

The two main benefits being proposed in this rule change could be fast tracked by the ESC in a payment structure and include:

- capacity support for network (deferred network augmentation); and
- reduction in the variable transportation costs, alleviating the need to transmit energy through certain parts of a distribution or transmission network (different from the current FiT which calculates the avoided cost of electricity generation in the wholesale market).

REGULATORY FRAMEWORK

Q10. Are there other aspects of the current regulatory framework outlined in this paper that the Commission should consider when evaluating the adequacy of the current Victorian policy and regulatory frameworks governing the remuneration of distributed generation?

NAGA considers it important for the Victorian Government to recognise that fair payments and policy incentives for distributed generation align with the current goals and ambitions of the Victorian Government to be a leader in renewable energy and climate change policy. The recent Victorian Climate Change Act Review has recommended the Victorian Government introduce long term and interim targets that are in line with a 1.5 degrees Celsius threshold. Removing barriers to distributed generation is critical to ensure Victoria can decarbonize its electricity supply and meet its own policy goals and targets.

NAGA notes that there are a number of systemic issues within the national electricity market (NEM), which prevent small-scale distributed generators from being properly valued and accessing the market.

NAGA considers these issues relevant to the ESC, as the Commission has a regulatory role to

⁵ <http://fpdi.cleanenergycouncil.org.au/reports/value-of-small-scale-generation.html>



play in setting fair terms and conditions for renewable energy small scale generators. We also note this inquiry is requesting views from stakeholders on their experiences with the regulatory environment as it applies to distributed generation.

This inquiry is limited by the lack of overall policy vision for Victoria and Australia's future electricity supply mix. Without this longer term common vision, it is difficult for the ESC to make judgements on *socially and environmentally optimal* levels of investment in distributed generation.

The following issues are of particular concern:

- The National Electricity Objective (NEO) is no longer appropriate to the current and future Australian energy market. The NEO does not recognise the interest of the community at large and confines consumer interests to economic interest alone.
- The interpretation of 'efficient investment' has resulted in unbalanced rule making and a market bias that supports centralised infrastructure rather than demand management or other distributed generation solutions to network issues.
- The NEO is to be achieved with respect to "firstly, price, quality, safety, reliability, and security of supply of electricity and secondly the reliability, safety and security of the national electricity system." In the absence of a NEO that recognises the need to reduce greenhouse gas emissions, incumbent fossil fuel generators, generator-retailers and network businesses have consistently used these current objectives to protect and advance their own interests and disproportionately influence regulatory reform. Advocates for renewable energy, demand management and innovation have had to argue within this framing of the NEO, leading to limited success against incumbents arguing about threats to reliability and security of supply. This can be seen in the recent methodologies used to calculate feed in tariffs, where the terms are narrow and the environmental and social benefits are largely ignored and externalised.

Q11. What is the impact of the current regulatory framework on the valuation of distributed generation in Victoria? In particular, what has been the scale and scope of support provided to distributed generators by: avoided TUOS payments, avoided DUOS payments, Network Support Payments, the Distribution Network Pricing and Assessment Framework, and the RIT-D??

Support for small scale distributed generators has been minimal to date.

Avoided TUOS and DUOS payments and Network Support payments are only provided for distributed generators greater than 5MW, hence are not relevant for this inquiry, or at least have not been demonstrated to support DGs using the ESC definition.

Similarly, cost reflective network pricing is only a price signal regarding electricity consumption and does not explicitly address small-scale distributed generators exporting electricity to the grid.

The RIT-D as it currently stands, has negligible impact on incentivising distributed generation



as it only applies when the estimated cost of the most expensive credible option exceeds \$5 million. This was noted in the Clean Energy Council's Review of Policies and Incentives report.

Whilst a new Demand Management Incentive Scheme (DMIS) and Innovation Allowance is being developed by the AER this is unlikely to come into force until 2020.

As the Greenhouse Alliances have previously advocated in our [submission](#) to the AER, there are significant issues with the current demand management incentive schemes including:

- the lack of support for demand management initiatives in the current regulatory period;
- the small allowances provided to network businesses to pilot and trial projects to fully assess the costs and benefits of network innovations via the Demand Management Incentive Scheme (on average, allowances under the scheme equate to just 0.11% of the total revenue allowances for each DNSP); and
- stalling the implementation of the DMIS rule change until 2020, rather than establishing transitional arrangements - another example of a failure in meeting the needs of a dynamic market, resulting in productivity loss.

Grid connections and equity

NAGA acknowledges that grid connection issues are likely to change in Victoria since the December 2015 legislation to adopt chapter 5a amendments of the NER. As such, many of these existing issues may be improved over time.

In Victoria, the process for connecting to the grid has acted as a significant barrier to small scale DGs. The costs for connection to the grid, including network access studies, are borne by the generator, and may make many projects cost prohibitive, particularly larger community energy projects under 5MW. This policy environment prioritises network aspects such as distance to a suitable grid connection point, rather than the question of the best possible renewable resource.

The costs of connection being incurred by a generator is considered under the National Electricity Rules as 'fair and reasonable'. However, if the goal is to develop a more sustainable decarbonized grid then this is arguable and ignores a larger question: who should pay to upgrade an old grid designed for centralised fossil fuels to have the capacity for significant renewable energy penetration? It should also be remembered that older generators historically did not have to pay for such connections, benefiting from a publicly owned grid, raising further equity issues.

As much of Victoria's electricity infrastructure is approaching the end of its lifecycle in the next 10 years, now is an important time for the policy settings to help drive this transition in a least cost, equitable way. NAGA strongly agrees with a point made by Kallies (2011) that Victoria has "an enormous opportunity to strategically upgrade its grids. Giving renewable power generators a public interest status and recognizing the fact that established generators profit from having established their grid connection pre-privatisation could go a long way



towards successfully integrating more renewable energy into the Australian energy mix.”

Although Australia has its own unique grid issues, it is worth considering how the connection and access issue is treated overseas. In the EU Directive on the promotion of renewable energy, Article 16 includes a provision of “either priority access or guaranteed access to the grid system of electricity produced from renewable energy sources,” and a requirement to ensure cost transparency for all rules relating to grid access, reinforcement and transmission. In Denmark, grid reinforcement costs are borne by the network operator for connecting renewable energy sources.

In the current setting, where a small scale generator incurs the majority of the costs associated with connection and grid access, then it only makes the case stronger for incorporating broader environmental and social values into remuneration payments. This issue will become more and more tested as higher levels of renewable energy penetration are reached.

As mentioned above, DNSPs have different requirements and approval processes for DG with Jemena currently requiring an approval process and secondary protection installed for solar systems greater than 30kW. This creates cost, time and uncertainty barriers for DG installations above this capacity within the Jemena network.

Consultation of stakeholders during a recent CEC report on Energy Policies and Incentives Review, found similar frustrations with the connection process in terms of:

- the limits for installed capacity below which automatic approval is granted;
- the processing timeframes for connection applications;
- the ability to submit applications online;
- lack of clarity around the process and required information; and
- the level of information provided regarding the reasons why an application may not have been approved.

This often means that the efficiency of a connection process is highly dependent upon the experience of the installer and the relationships they may have developed within a network business, which ultimately means an inconsistent and inefficient result in many cases.

KEY ISSUES FOR THE INQUIRY

Q12. Do you agree with the Commission’s proposal to develop a methodology for calculating the time-of-use benefit of the electricity produced by a distributed generator? If not, why not?

Yes, NAGA has previously advocated for a time and location varying benefit for distributed generators.

We also support the views of the Clean Energy Council and the Australian Solar Council that



a benefit-reflective feed-in tariff should be time varying and include a critical peak payment⁶. A feed-in tariff that includes this component would provide an important incentive for small-scale generators seeking to maximise feeding electricity in times of peak demand. We wish to encourage the ESC to continue to research a time-of-use component to DG and to conduct analysis examining the impact of different methodologies on different types of distributed generators.

Q13. Which of the two time-of-use options presented do you favour?

NAGA's initial preference is for option 2, where time periods are identified when the value of the electricity generated, to the wholesale electricity market, is highest, as per the Frontier Economics modelling for IPART, outlined in Section 2.2.1. However, further modelling needs to be done to better understand the impacts on different types of solar households (e.g. existing with north facing panels, households with PV and storage, EV's etc.).

The down side to time of use options is that this adds another layer of complexity to both solar installs and energy literacy for most people. If the feed-in tariff is the same as the peak tariff rate for energy consumed then it makes it easier for residents to understand and would help promote optimising for social and environmental benefits. It is also unclear how the introduction of such a tariff would be treated and reflected by retailers, in the same way as there are concerns with how retailers will reflect the new tariff structures proposed by network operators.

Q15. Are there other methodologies for calculating the locational benefit of distributed generation?

Locational benefits are complex but do potentially offer important incentives for efficient investment of DG. The issue is discussed in detail in the Local Generation Network Credit rule change and the ACIL Tasman report, and it is noted that the benefits of additional distributed generation in a location will vary substantially over time depending on the network capacity.

Such a change to feed in tariffs could confuse the issue, and require a lot of change to how all DNSP charges are incurred - currently all DNSP customers share the cost of substation upgrades regardless of where they live, so there would be challenges to any alternative process.

The potential cost savings (measured by long-run marginal cost) from deferring network investment can be significant, but once an investment has been made in a particular area of the network, this potential drops away (e.g. Figure 3).

⁶ <http://fpdi.cleanenergycouncil.org.au/reports/value-of-small-scale-generation.html>

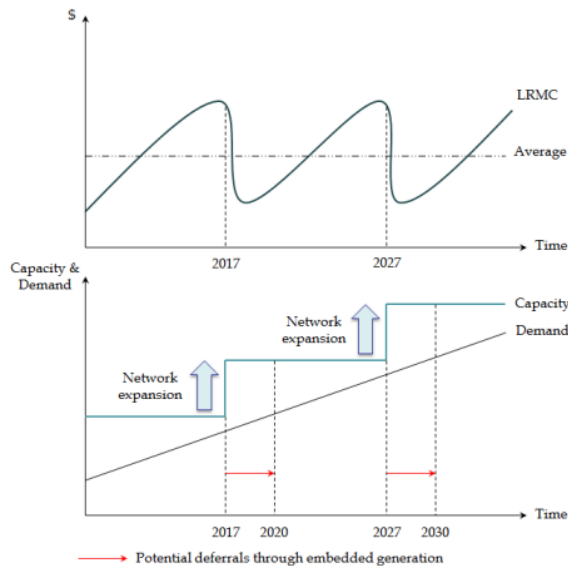


Figure 3: Fluctuations in network savings from distributed generation investment (AEMC 2015)⁷.

Another challenge with developing locational specific tariffs is that the need for simplicity and consistency may drive an averaging across networks, losing the resolution of the substation and feeder level constraints. This has been demonstrated in the development of tariff structure statements, where DNSPs have been requested to harmonise with each other. This has led some DNSPs like Jemena to adapt a peak period that is more reflective of United Energy rather than their own average profile⁸. As a result, the cost reflective tariffs are not as location specific for Jemena compared with other DNSPs, and in some areas of the network are completely mismatched.

As previously stated, NAGA recommends the ESC accelerate a Victorian version of the proposed methodology in the local generation network credit rule change. Also, a mapping platform soon to be released by UTS could support identifying transparent and consistent network constraints and locational benefits of distributed generation. Greater relationship building needs to occur between government agencies and network operators to find non network solutions in appropriate locations.

Q16. Do you agree with the Commission’s view that the environmental benefit of distributed generation may be sufficiently reflected in the payments available under the RET? If not, can you provide evidence to detail what environmental benefits of distributed generation are not already captured by the RET scheme and how they can

⁷ <http://www.aemc.gov.au/getattachment/ab1269b8-cde9-4610-b819-747a47267558/Consultation-paper.aspx>

⁸ <https://www.aer.gov.au/system/files/Jemena%20Tariff%20Structure%20Statement%20proposal%20-%2025%20September%202015.pdf>



be valued?

This question depends on the purpose of the payment structure. If a FiT or similar is to act as an incentive to enable a rapid transition to low carbon renewable energy, then the RET alone is highly unlikely to provide this. In 2015, the RET is likely to have contributed to solar and energy efficiency activities that have led to an equivalent 1% reduction in consumption⁹. Also, 2015 saw a 2% *increase* in greenhouse gas emissions, half from increased consumption and half from higher use of coal fired generation due to higher gas prices in Victoria. This demonstrates the need for ongoing policy support for low emissions technology beyond existing payment structures.

In the current market, a 2 kW system in Melbourne can generate approximately 35 small scale renewable energy certificates (STCs) over a period of 15 years. 1 STC is equivalent to 1 MWh, and the price for an STC currently sits between \$30-40 tonne of carbon, and is capped at \$40¹⁰. So if an STC is worth \$35, then this system would generate an upfront rebate of \$1225 off a system cost.

The National Greenhouse Accounts use a full fuel cycle emissions factor of 1.34 for electricity generation purchase from the grid in Victoria (scope 2 and 3 EF in 2014)¹¹. This means that 1 kilowatt hour of energy used is equivalent to 1.34 kilograms of CO₂ equivalent. This is higher than the emissions factor for NSW, due to the higher quantities of brown coal generation in Victoria.

Therefore if a 2kW solar PV system is expected to generate approximately 35 MWh over 15 years, this is equivalent to a greenhouse gas saving of 46.9 tonnes of CO₂e. If an STC is worth \$35, then this is an equivalent carbon price of \$26 tCO₂ paid from the rebate. This is not a sufficient price to reflect the carbon benefits of renewable generation. If this is translated to a price of roughly \$35/MWh then this still sits well below the current GreenPower price at about \$80/MWh¹².

Of course the most efficient way to price carbon is with a direct carbon price. However, in the absence of any carbon price in Australia and for the foreseeable future, it may be necessary to build in a carbon price to a feed in tariff or similar to drive greater investment in distributed renewable energy generation. The ACIL Tasman (2012) report referred to by the ESC in this current inquiry acknowledged that feed in tariffs can play an important role in the absence of a carbon price: “Regulated FiTs have traditionally been targeted at small scale distributed generators and to particular generation technologies, often technologies with low or zero greenhouse gas emissions. They have been seen as a way of supporting those technologies in the absence of, or transition to, a carbon price.” (page vi, ACIL Tasman 2012).

A recent report by CDP examined what an effective carbon price trajectory would look like in

⁹ <http://reneweconomy.com.au/2016/solar-makes-its-mark-but-demand-and-emissions-increase-in-2015-19980>

¹⁰ <http://www.green-bank.com.au/calculator/solar-pv-calculator/>

¹¹ <http://www.environment.gov.au/system/files/resources/b24f8db4-e55a-4deb-a0b3-32cf763a5dab/files/national-greenhouse-accounts-factors-2014.pdf>

¹² <http://www.climatefriendly.com/blog/greenpower-price-gone-wild-what-are-your-options>



order to meet a target of 2 degrees Celsius¹³. It states that in order to drive any meaningful emissions reductions a carbon price needs to be in the range of \$30-70 AUD to enable the types of structural changes needed for a wholesale switch to low emissions electricity generation. Of course, in order to meet a 1.5 degrees Celsius target, which is the agreed goal of nations following the Paris Climate Change Conference, this would mean a carbon price higher again.

Distributed renewable energy generation (mostly PV) also has the added environmental benefits of avoided water use. The existing five coal power stations in the Latrobe Valley use 125 billion litres of water, equivalent to a third of Melbourne's water use annually. This is particularly important consideration, especially with climate change expected to reduce the average annual volume of water available through Melbourne's water system by 8 percent in 2020, and 20 percent by 2050. This value is not currently reflected in any payment structure.

Q17. Are there other methodologies that the Commission could consider for calculating the carbon benefit of distributed generation technologies that are not covered by the RET?

Pricing carbon benefits

NAGA recommends the ESC consider including an avoided social cost of carbon in order to reflect the broader carbon benefits of renewable energy generation. This calculation is an estimate of the economic damages associated with a small increase in carbon dioxide (CO₂) emissions, in metric tons per given year and has been applied to rule making such as vehicle standards. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e., the benefit of a CO₂ reduction).

Calculating a social cost of carbon will necessarily require many uncertainties and assumptions, but a conservative approach is better than no price at all. The current US social cost of carbon is about \$AUD53 per ton of CO₂. A study last year in Nature Climate Change, estimated that a truer social cost of carbon is likely to be much more, around \$AUD320 per ton¹⁴. The NREL report quantified a social cost of carbon for renewable energy in the US at a value of 3 AUD cents/kWh. There are a number of Integrated Assessment Models (IAMs) available to calculate the social cost of carbon that could be adapted by the ESC for a payment structure to renewable distributed generators¹⁵. Oliva and MacGill (2011) propose a method for estimated the social value of avoided CO₂ emissions by multiplying the average emission intensity factor of the power plant whose generation is being displaced by a social carbon cost (SCC).

Alternatively, another way to better price the carbon benefits of distributed renewable energy generation would be to take a 'like for like' approach, whereby the wholesale value of one

¹³ <https://www.cdp.net/CDPResults/carbon-pricing-pathways-2015.pdf>

¹⁴ <http://www.nature.com/nclimate/journal/v5/n2/full/nclimate2481.html>

¹⁵ http://belfercenter.ksg.harvard.edu/files/dp68_metcalf-stock.pdf



zero emission technology is compared against another low emission technology such as a carbon capture and storage plant. Without a carbon price this would recognise that high emitting coal plants are not properly priced in the wholesale market and that they receive an implicit subsidy for unpriced greenhouse gas emissions.

Q18. Do you agree with the Commission’s proposal to undertake further analysis into the economic benefit of distributed generation to distribution networks? If not, why not?

Yes, NAGA does not consider current payment structures reflect the broad economic benefits of distributed generation to the networks. Whilst NAGA commends EY on their analysis into the value of small-scale generation to networks, we recommend the ESC consider simplifying the methodology in the first instance in order to reduce administrative complexity for DNSPs and to reduce delays. Our concern is that if the methodology is too complex, albeit truer and comprehensive, then setting up the administrative processes within each DNSP to measure and calculate this value may become a significant barrier to uptake. Over time, the methodology could be refined and strengthened.

Q19. Do you agree with the proposal to focus this analysis on the three pieces of analysis highlighted? If not, why not?

Yes, all three pieces of analysis are comprehensive and are a good basis for this inquiry. However, the 2012 VCEC report’s inquiry and methodology occurred whilst there was a national carbon price. Since the carbon price has now been removed, some of the recommendations are no longer relevant. As stated above, we consider that there remains a market failure of carbon pricing that should be addressed in this inquiry.

Q20. Is there other analysis that might be helpful to the Commission in considering the economic benefit of distributed generation to distribution networks?

We also recommend the ESC consider the NREL report *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards (2016)*¹⁶ as an example of how to calculate and quantify different social benefits from distributed generation. As previously mentioned, this report has quantified health benefits in the range of 5 US cents/kWh for avoided pollution, and a Social Cost of Carbon value of 2 US cents/kWh.

Thank you for the opportunity to make a submission to this inquiry. We are happy to talk further regarding any points in our submission and look forward to working with the ESC and the Victorian Government to deliver fair, equitable outcomes for distributed generators and all Victorian consumers.

¹⁶ <https://emp.lbl.gov/sites/all/files/lbnl-1003961.pdf>



Regards,

A handwritten signature in black ink, which appears to read "Paul B. Murfitt".

Paul Murfitt, NAGA Chair

The views represented in this submission do not necessarily represent the views of all NAGA members individually.