TOTAL ENVIRONMENT CENTRE

ALTERNATIVE TECHNOLOGY ASSOCIATION

ETHNIC COMMUNITIES' COUNCIL OF NSW

SUBMISSION

Ministerial Council on Energy

Revised Demand Side Response and Distributed Generation Case Studies

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Revised Demand Side Response and Distributed Generation Case Studies

Introduction

Total Environment Centre (TEC), Alternative Technology Association (ATA) and the Ethnic Communities Council of NSW (ECC) welcome the opportunity to provide feedback on the NERA Economic Consulting paper entitled *Revised Demand Side Response and Distributed Generation Case Studies* (the paper) prepared for the Network Policy Working Group (NPWG) of the Ministerial Council on Energy (MCE).

We welcome the endeavours of the MCE, the Standing Committee of Officials and the respective working groups in their attempts to overcome the many and varied barriers and impediments faced by proponents of demand management and distributed generation. Distributed generation and demand management in all its forms offer significant potential to reduce energy consumption, shift loads, address network constraints, develop a dynamic electricity network and transition the NEM to a low emission future. Ongoing work by these workgroups has the potential to substantially increase the uptake of demand management and distributed generation in the NEM, and we encourage the NPWG and any other relevant work stream to thoroughly consider the responses provided below.

We have chosen to provide a response primarily to Case Study 1 on large scale PV roll out which contains a significant number of omissions and errors in analysis. These have been detailed and explored in length below. Additionally, we have provided some feedback on the second case study, AMI roll out, with specific attention to the rule recommendation provided in Box 3.1. The numbers and headings provided correspond to those as they appear in the paper.

Large scale PV roll out

We wish to express concern at many of the assumptions made regarding the large scale roll out of PV in the case studies paper. The paper continually refers to existing technology, at existing installation capacities, failing to take into account future scenarios which may produce dramatically different results.

Nowhere throughout the analysis is there any recognition of the potential for avoided greenhouse gas emissions resulting from renewable generation, and the consequent value of this in a scenario involving a carbon price – a situation which is just a matter of years away with the announcement of a national emissions trading scheme to commence in 2011. We believe it is a failure by the paper's authors to consider greenhouse issues when discussing the costs and benefits of a range of DG, renewable energy and DSR options, and urge these issues to be taken into account in any future analysis and consultation stemming from this process.

Further, the economies of scale which can be achieved by the wide scale roll out of these technologies will inevitably lead to a reduction in both production and installation costs of solar PV. This has been clearly demonstrated in the wind energy industry over the past decade, where the installed cost per MW of capacity has reduced significantly in response to increased take up of the technology. Such economies of scale and potential for resultant economic and greenhouse benefits that can be achieved by solar PV technology deserve more thorough consideration in the consultation process.

2.1 Historic PV roll out examples

The case study presented of the Kogarah Town Square project dismisses the potential of the installed PV capacity to reduce demand – with subsequent similar conclusions drawn throughout the paper – due to the output being only a fraction of the installed capacity. However, hidden away in the footnotes, the acknowledged reason for this poor performance was largely due to failure of the inverters at the site, and the 'lack of effective monitoring and maintenance arrangements at the site'. Surely, technological failure in this instance is hardly a reason to dismiss the potential of PV. There is very little acknowledgement of this fact, with the general gist of the example seemly dismissing the potential of PV outright.

Additionally, the analysis of the 'overstated' value of PV at 11c/kWh is similarly based on flawed assumptions. Firstly, solar PV as an embedded technology being supplied at the point of consumption, and particularly in this case where it is representing deferred demand, should be considered at its retail value, not the wholesale pool price. Given that wholesale generation costs usually represent between 35% and 40% of the retail electricity price, the value of this electricity should be closer to 17.5c – 20c/kWh.

Alternatively, a 7c/kWh wholesale price represents $70/MWh, which is significantly higher than the long term average wholesale price that the 11c/kWh is based on. Again, this represents an enhanced value of the electricity from the PV system, not a discounted value as represented in the paper.

Analysis of the Newington Village project hints at the potential of PV to match commercial loads and thus significantly benefit network infrastructure; a close match is shown between the peak PV output and the peak demand at the substation. However this potential is dismissed due to the lack of actual reduction observed resulting from the small amount of PV output – a direct function of the small numbers of PV systems installed at present. It seems somewhat self-serving to say that solar PV has not demonstrated ongoing and large-scale reduction in demand at the substation as a result of the small number of PV systems installed to date, and thus PV doesn't warrant further incentive to increase uptake. We encourage NERA to reconsider this position.

2.3 Costs and benefits

In assessing the costs and benefits from large scale solar PV roll out, NERA have made a number of omissions and errors, as well as failing to consider the potential and indeed the reality of technological advances in both the technology itself and the facilitating equipment.

The paper questions the capacity of solar PV to lead to real reductions in peak demand due to the perceived lack of firmness of solar PV capacity. However much of this analysis is based on flawed assumptions and analysis. The evidence given of peak output for the Newington Village project fails to take into account the seasonal variability in the data, instead relying on annual averages. With peak demands corresponding with the hottest and presumably sunniest days of summer, it is inadequate to use average annual variability data to assess the usefulness of PV to address peak demand. Analysis of summer output would no doubt give far more consistent output results and thus strengthen the case for PV.

Further, the paper ignores advances in PV technology. Whilst it is true that mono- and polycrystalline silicon cell solar PV technology – which suffers from considerable failure under shade – historically made up almost all of the solar installations in Australia, this is no longer the case. Recent developments in sliver cell technology, thin film / amorphous panels, etc, are far more resistant to failure from shading, and the infiltration rates of these technologies into the Australian market is expanding every year. Further technological advances could be expected to reduce these obstacles further. However, such technological considerations have been completely ignored in the analysis provided within this paper.

Additionally, the paper cites a lack of correlation between peak production and residential peak demand as an additional factor limiting the ability to capture the full, promised network benefit from this technology. Whilst it may be true for panels in their traditional northerly orientation, this claim fails to take into account the potential for tracking devices which enable solar PV panels to track the sun across the sky and hence dramatically increase the length of their peak output times. Alternatively, fixed panels can be oriented in a north-westerly direction to create a better match between peak output and peak demand. These simple but important considerations have been overlooked in the paper's analysis.

Furthermore, the given load profile, whilst possibly accurate for Newington, is not consistent with load profiles in other parts of Australia. There is a real danger in making broad policy for the entire NEM based on a location-specific piece of evidence which may not be represented in other locations where a closer match between PV and residential loads may exist. We encourage NERA/ACG to undertake further analysis of load profiles in other locations to determine the true potential of PV to address peak demand for the entire NEM, rather than the flawed practice of basing analysis and recommendations on one specific example.

Finally, the claim that costs would be imposed on networks due to the need for policies to cover 'islanding' of PV systems in the event of them remaining live in the event of grid failure or maintenance work is preposterous. The connection of small-scale solar PV to the grid is already heavily regulated, with Australian Standard *AS 4777.3 Grid connection of energy systems via inverters - Protection requirements* providing adequate checks and safeguards against the potential for PV systems to be feeding electricity into the grid in the event of grid failure. The connection of DG to the distribution network is controlled to a significant degree requiring little further intervention and expense by the DNSPs. It is unfortunate that the authors don't show a similar concern for the costs imposed on PV and other DG proponents trying to establish connections with the distribution network.

Table 2.1 - Summary of benefits, costs and affected parties

The summary of the costs and benefits given in Table 2.1 of the paper also present a number of misconceptions and flawed assumption in evaluating large scale PV roll out. Firstly, it is claimed that growth in demand is likely to outstrip the growth in PV roll out in coming years. We strongly believe this fails to take into account both international experience and the range of incentives being considered by state and territory governments across Australia. Feed-in tariffs have seen the large scale and rapid roll out of solar PV across several countries internationally, and with feed-in tariffs being implemented or considered by at least four state and territory governments, climate change issues becoming increasingly at the front of peoples' minds, and the real installed costs of

PV coming down as economies of scales are achieved internationally, it is a shallow analysis to summarily dismiss the potential for PV uptake to outstrip demand in this country.

Second, the paper dismisses the potential for PV to contribute to reduced demand charges for customers, citing the fact that most residential customers are not on demand charges. This fails to acknowledge the enormous potential in the commercial sector, even more surprising given the fact that one of the case studies presented here actually outlines the commercial installation (albeit flawed in this instance) of solar PV. This is an astounding oversight.

Finally, the claim that one of the potential costs to be borne by PV proponents is the ongoing maintenance costs including the replacement of inverters with a life of 5 years is somewhat conservative. Inverters typically have between 3 and 5 year warranties and they would be expected to last considerably longer than that.

Throughout the cost benefit analysis presented in the paper there seems to be a blatant and recurring undervaluing of the potential for benefits to be achieved from the large-scale roll out of PV, and a readiness to dismiss the potential for solar PV to address not only network constraints and reduce peak wholesale electricity prices, but also to reduce transmission losses and greenhouse gas emissions.

AMI rollout

We generally agree with the costs and benefits analysis done by NERA on the AMI rollout. The full benefits of the rollout can only be realised through efficient time-of-use (TOU) tariffs set by DNSPs, a retailer's ability to pass through the price signal and, most importantly, a customer's capacity to respond. However, customers need to have the knowledge and means in order to respond to the price signal, therefore, to reduce peak electrical demand within the particular time period, and/or in the specific network constraint area.

Box 3.1 - Rule Recommendation

Reassignment should be accompanied by a requirement for customer education regarding ways in which they can manage their demand to affect their bill. Further work is required to identify whether this is a role best served by retailers or DNSPs.

We strongly support the idea of customer education regarding how they can manage their demand to affect their bill. However, neither DNSPs's nor retailer's core function is to educate customers to reduce electricity consumption, although both sectors should participate in education measures. Furthermore, industry restructuring, emerging technologies, competitive pressures and environmental concerns require utilities to consider new approaches to meeting their customers' increasing demand for reliable, renewable and affordable energy. Government policy initiatives also need to go into the mix of public education.

A good example of a non-government education measure is the establishment of the Community Energy Cooperative[1] (CEC) at Chicago, IL, in the USA. CEC is an innovative private sector initiative

[1] T Freyer etc 2002. "Combining Community-Based Efforts and Geographic Targeting to Optimize Delivery of Energy Efficiency Program", 2002 ACEEE Summer Study on Energy Efficiency in Buildings, CA US

to address energy reliability and capacity issues in targeted communities developed by the local utility, the Commonwealth Edison (ComEd), and the Centre for Neighborhood Technology (CNT). CEC works with Illinois residential, commercial and industrial energy customers to help improve reliability by changing behaviour and energy-use patterns in their communities. CEC has a diverse mix of energy experts, engineers, entrepreneurship experts, social capital experts, cooperative experts, ethnographic researchers and product designers to design and implement DSR/DG initiatives. Therefore, the role of DM education/implementation can be supplemented by work by a third party.

We suggest that an independent community-based organisation, whose goal is to reduce peak electricity demand by helping communities implement technologies, and/or change behaviour, can be an effective means of producing a significant demand curtailment resource to respond to price signals in a relatively short lead-time.