

20 February 2009

The Australian Energy Markets Commission  
PO Box A2449  
Sydney South NSW 1235

**Re Review of Energy Market Frameworks in Light of Climate Change – 1<sup>st</sup> Interim Report**

Pacific Hydro welcomes the opportunity to submit to the Review of Energy Market Frameworks in light of Climate Change Policies – 1<sup>st</sup> Interim Report.

In order to achieve the objectives of the Carbon Pollution Reduction Scheme (CPRS) and the expanded Renewable Energy Target (RET) Australia needs to move toward a new national approach to energy market regulation. It is imperative that the Review recognises the need to remove inconsistencies in state-based regulation, as these currently introduce unnecessary cost and complexity to renewable energy generators, preventing least-cost development of renewable energy projects in Australia.

Strong and clear policy is integral to achieving emissions reductions, regulation and market rules are critical in enabling policy outcomes to be delivered in the most timely and efficient manner.

Please find attached Pacific Hydro's submission to the Review of Energy Market Frameworks in light of Climate Change Policies – 1<sup>st</sup> Interim Report. This submission provides a summary of our experience in developing and connecting new renewable energy projects to the NEM and our vision for the future of energy markets.

Yours sincerely

This letter has been prepared for publication therefore bears no signature.

Lane Crockett  
General Manager Australia Pacific

# *AEMC Review of Energy Market Frameworks in light of Climate Change Policies – 1<sup>st</sup> Interim Report*

*Submission from Pacific Hydro Pty Ltd*

*20 February 2009*

Pacific Hydro Pty Ltd

Level 11, 474 Flinders Street, Melbourne Victoria 3000 Australia

Telephone +61 3 8621 6000 Facsimile +61 3 8621 6111

Email [enquiries@pacifichydro.com.au](mailto:enquiries@pacifichydro.com.au) [www.pacifichydro.com.au](http://www.pacifichydro.com.au)

ABN 31 057 279 508



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## Executive Summary

While Australia has comparatively high levels of greenhouse emissions, our abundant renewable energy resources and the immaturity of Australia's renewable energy industry offers significant opportunities for emissions reduction in the short, medium and long term. The development of this industry under the Renewable Energy Target (RET) and the Carbon Pollution Reduction Scheme (CPRS) will also stimulate large-scale investment in the economy. The RET alone is expected to stimulate investment of approximately \$25 billion to meet the renewable energy generation targets.

In the short-term, we believe that the existing energy market mechanisms in combination with the RET will provide adequate signals for investment to avoid possible shortfalls in capacity as a result of transitioning to a low carbon energy market. This will be cushioned to some extent by the Electricity Sector Adjustment Package of the CPRS which will guarantee that no incumbent thermal plant is retired from the market before 2015. However it will be essential to establish a transparent process for the retirement of thermal plant to ensure that timely investment decisions are made in planning low-emissions replacement capacity.

Pacific Hydro considers that the existing market frameworks will enable a timely response to the expected larger volume of intermittent wind generation, wind generation will displace energy otherwise produced from higher carbon cost fuels, leading to a damping of wholesale electricity prices.

Further work is encouraged to develop the network connection models proposed as connection arrangements will be a significant hurdle in the delivery of both wind and gas generation. Pacific Hydro has put forward the Texas ERCOT CREZ arrangements as a model considered appropriate for an Australian application.

Regulation and capacity constraints introduce additional uncertainties and costs for developers and investors, where possible these uncertainties should be eliminated. The transformation of the energy system to accommodate CPRS and RET will require leadership and vision.

## Summary of Recommendations

Pacific Hydro considers that key factors to be considered in the ongoing review must be:

- Include emissions reduction in the NEM Objectives to ensure alignment of the market operation with the policy objectives of the RET and CPRS.
- Identify optimal renewable energy zones and transmission infrastructure necessary to delivery this energy
- Develop a single national approach for investment in new transmission infrastructure including:
  - strategic national planning
  - augmentation of existing transmission infrastructure and the provision of a transmission backbone to the load centres
  - risk-sharing approach between Government and industry
- Provide regulatory certainty via nationally consistent regulation to investors and not cloud or inhibit market signals

## Introduction

Pacific Hydro welcomes the opportunity to continue to work with the AEMC to promote the efficient operation of the National Electricity Market (NEM) in light of the Renewable Energy Target (RET) and the Carbon Pollution Reduction Scheme (CPRS). The recent release of the CPRS White Paper and the RET exposure draft legislation highlights the critical timeliness of the First Draft Report of the AEMC Review (the Review) in shaping the energy market to underpin the delivery of these important policies and deliver real emissions abatement.

The most significant change since the scoping paper of this Review closed for submissions in November 2008 was the announcement of the Federal Government's intended interim emissions reduction targets. The CPRS White Paper has committed the Government to an unconditional 5% reduction in emissions from 2000 levels by 2020, with the option of increasing to up to 15% off 2000 levels in the event of a strong global agreement in Copenhagen in late 2009. This soft start to emissions trading is unlikely to drive emissions abatement in Australia in the short- to medium-term. The RET will therefore be of greater importance in the short-term, both in establishing a strong renewable energy industry to aid in the transition to a low carbon economy, and in delivering emissions abatement while the CPRS matures. Consequently, it is Pacific Hydro's opinion that the review should focus on removing all stress points and barriers to renewable energy development.

Pacific Hydro believes there are three central planks to enabling the transition of Australia's energy market to a low carbon future: policy, regulation and infrastructure. Without recognition and development of these three planks, investment in new low-emissions technology will not occur and the policy objectives of both the CPRS and the RET will not be achieved.

With the RET to be legislated in mid-2009, we believe that the key remaining barrier to renewable energy development in the short to medium term will be access to transmission infrastructure. We estimate that of our 800MW of projects in advanced planning stages, approximately 300MW will be stranded or at risk of being stranded due to infrastructure constraints. This has come about through chronic underinvestment in infrastructure by successive State and Federal Governments and has the potential to undermine the delivery of both the RET and the CPRS. The key role of investment in centrally-planned transmission infrastructure was highlighted both in the Garnaut Review<sup>1</sup>, and the Infrastructure Australia Report to COAG<sup>2</sup> on national infrastructure priorities in December 2008.

Regulations must now be revised to facilitate expansion and augmentation of infrastructure and support the delivery of the policies. As per our submission to the scoping paper, we believe that a fundamental part of this is to revise the NEM Objectives to include emissions reduction considerations. This single action would underpin the shaping of revised regulations and guide regulators and industry to move forward in a manner consistent with government policy on emissions reduction.

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<sup>1</sup> Garnaut Climate Change Review, Chapter 19, September 2008

<sup>2</sup> Infrastructure Australia, A Report to the Council of Australian Governments, December 2008

We have not attempted to respond to all the issues raised in the First Interim Report in this submission, as we believe that some of the issues are more appropriately responded to by other market participants.

## Generation capacity in the short term

A2.2 Do you agree that the ability for NEMMCO to manage actual or anticipated transitory shortfalls of capacity is a significant issue that should be progressed further under this Review?

Pacific Hydro disagrees and believes that the energy market mechanism will continue to provide adequate signals for investment. NEMMCO's role in this process should be to continue to report and monitor the generation and demand forecasts through the annual Statement of Opportunities and use such mechanisms as are currently allowable under the National Electricity Rules (NER) to report and manage any expected shortfalls in capacity.

The current market design provides adequate investment signals for the anticipated shortfall of capacity. Investors are encouraged to build capacity when investment signals and future projections are capable of providing certainty to enable a commitment to invest in generation capacity.

Since the start of the National Electricity Market (NEM) this market investment mechanism has brought about investment in capacity to meet the growing electricity demand.

NEMMCO's 2008 Statement of Opportunities predicts that Australia will require an additional 8,094 MW of generation capacity out to 2018 to satisfy NEM demand requirements<sup>3</sup>. This translates to an average installation of 809 MW per year, which is comparable to the 500 MW per annum of new renewable energy capacity required until 2020 required to meet the expanded RET<sup>4</sup>.

With the right scheme design, the energy market will see a boom in construction of new renewable energy generation capacity under the RET in the coming decade. Therefore in the short-term, the RET will drive enough renewable energy investment to meet the majority of the NEM's projected additional demand, thereby avoiding investment in new emissions-intensive fossil fuel generation in line with the objectives of both the CPRS and RET. Furthermore, the RET will assist in establishing a strong and sustainable renewable energy industry which will help to meet Australia's growing energy demand in the longer term.

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<sup>3</sup> NEMMCO, Statement of Opportunities 2008

<sup>4</sup> 8000MW of new renewable plant by 2020 has been forecasted by the different models - AEMC – Survey of Evidence on the Implications of Climate Change Policies for Energy Markets – Supporting paper to 1<sup>st</sup> Interim Report 23/12/08 Page 68

### A2.3 Are additional mechanisms required to complement the Reliability and Emergency Reserve Trader (RERT) and NEMMCO's directions powers, and what characteristics should such mechanisms have?

Pacific Hydro considers the current NEMMCO energy market mechanism will continue to provide adequate signals for investment.

The RERT and NEMMCO's directional powers are adequate for the short term, however beyond 2020 it is expected major thermal plant will start retiring<sup>5</sup>. Investment for new generation capacity to replace this will require transparency as to the timing of plant retirement if adequate planning for replacement is to take place.

The Electricity Sector Adjustment Scheme (ESAS) under the CPRS<sup>6</sup>, together with the higher energy prices associated with the CPRS, will encourage coal plant to operate beyond the time horizon considered by the AEMC in this Review. Transitional funding of existing coal plant under the ESAS will result in a delay in the market mechanism from signalling the true cost of carbon in the wholesale electricity market. This may delay the development of gas generators that are expected to replace coal plant on retirement. This may have ramifications for investment in new renewable energy capacity as we believe gas generation will be important in strategic partnership with wind generation in the short to medium term.

We believe that transparency in both the funding of coal plant and an agreed plan for the retirement of coal plant is essential to ensure that there is no rapid shortfall in generation capacity in the NEM. As discussed in Issue A3.2, the NEM maximum market price may also require review in light of the operation of the ESAS to ensure market signals are adequate to encourage this investment.

### A2.4 Do you have any views on the detailed design and implementation of additional mechanisms?

Pacific Hydro does not support any other mechanisms that might cloud market signals for investment.

As discussed in A2.3, the transparency of existing arrangement mechanisms will require appropriate legislative consideration to ensure investment timing.

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<sup>5</sup> MMA Treasury modelling suggested that brown coal power stations were not likely to close before 2020 - AEMC – Survey of Evidence on the Implications of Climate Change Policies for Energy Markets – Supporting paper to 1<sup>st</sup> Interim Report 23/12/08 Page 23

<sup>6</sup> Carbon Pollution Reduction Scheme: Australia's low pollution future White Paper 15/12/08 Policy Position 13.8

## Investing to meet reliability standards with increased use of renewables

A3.1 Do you agree that the existing framework based on an energy-only market design with supporting financial contracting is capable of delivering efficient and timely new investment, including fast response capacity to manage fluctuations in outputs resulting from larger volumes of intermittent wind generation? If not, what are your reasons for reconsidering this position?

Pacific Hydro believes the NEM's energy-only market and available contracting arrangements will support both the development of wind generation and the fast start peaking plant, a partnership between which we believe will be essential in managing the transition to a low carbon future.

It is expected that larger volumes of intermittent wind generation will be developed on the basis of a combination of the NEM's energy-only design and the market for renewables created under the RET. The current expense of funding due to the global economic situation will drive industry-wide minimisation of risk and maximisation of security, leading wind generators to long term, fixed price contracting arrangements. Because wind generation is intermittent, the perceived value of the energy to buyers will be less than base load generators and peaking plant and may result in lower prices for wind generation.

In the medium term, the CPRS will lead to the wholesale energy price rising as higher carbon costs drive the base and peaking plants' short run marginal costs. On the other hand, wind generators have the effect of dampening the wholesale energy price due to its zero fuel cost displacing energy otherwise generated by peaking and base load plant. The RET and the CPRS is expected to increase the volatility of the wholesale energy prices<sup>7</sup>, attracting fast start peaking plant. Peaking plant will seek to finance a portion of this investment by selling caps, anticipated to have a much higher value, into the market under these policies.

Australia is fortunate to be developing its wind industry at a time when the technology of modern wind turbines has evolved to a level of performance consistent with modern electrical systems. This starting base, together with challenging NEM technical and performance requirements will deliver leading-edge wind technology into Australia's energy markets. These technologies will assist in the management of larger volumes of wind energy and the fast response necessary to manage thermal transmission limits.

### Western Australia's SWIS Energy and Capacity Market

Although WA is not considered an energy-only market the AEMC should be aware that SWIS market mechanisms could remove current incentives for wind generation in Western Australia.

Pacific Hydro also believes the current energy and capacity market in Western Australia can continue to deliver the required investment in Western Australia within their energy and capacity market structure. However, the Office of Energy is undergoing a review to consider the coincidence of peak demand and wind generation which may lead to a

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<sup>7</sup> ROAM supports this conclusion - AEMC – Survey of Evidence on the Implications of Climate Change Policies for Energy Markets – Supporting paper to 1<sup>st</sup> Interim Report 23/12/08 Page 10

reduction in capacity credits available for wind generators. Pacific Hydro is concerned that this change in investment value may impact the ability of the Western Australian market to deliver their contribution to the RET and CPRS. Any decisions by State jurisdictions to modify the investment signals for renewables should be reviewed by the AEMC to ensure consistent policy can be delivered in Australia.

### A3.2 Do you agree that the processes supporting the ongoing maintenance of this framework in respect of review and periodic amendment to the market settings, including the maximum market price, are robust? If not, what are your reasons for reconsidering this position?

Due to the transitional arrangements in place for the CPRS, Pacific Hydro believes an increase in the maximum market price will be required to stimulate the certainty required for investment in the volume of fast start gas plant that will be required in the transition to a low emission energy future.

The current frameworks provide the market signals necessary for the additional capacity required to meet forecast demand. However the ESAS introduces an externality to this process leading to a step change in generation costs expected post-2015. This sudden impact on the incumbent coal fuelled generators will require a rapid response from alternative low emission generation, including wind and gas generation. To ensure the market signals are sufficient to drive this investment, it is essential that all withdrawals of the capacity are transparent and that mechanisms exist to keep market participants informed of expected withdrawals. Failure to do this could lead to supply shortfalls as the investment decisions will be delayed until energy supply certainty is achieved.

## Operating the system with increased intermittent generation

### A4.1 Do you agree that operation of the power system with increased intermittent generation is not a significant issue and therefore should not be progressed further under this Review? If not, what are your reasons for reconsidering this position?

Pacific Hydro agrees that increased intermittent generation is not a significant issue for the NEM as mechanisms are already in place to ensure this form of generation is managed appropriately.

International experience shows that the effect of intermittency is minimised when wind energy generators are installed over a wide geographic area. Given the increased competitiveness of renewable energy projects under the CPRS and RET, wider installation of wind projects across eastern Australia is highly likely, improving the diversity and contributing to stable generation from wind power. Small generators placed deep in distribution networks also relieve local network congestion and avoid excessive transmission losses due to energy flows over vast distances.

The combination of the NEM semi-scheduling and wind forecasting initiatives will assist NEMMCO in managing the increased volumes of intermittent generation. Every 5 minutes semi-scheduled wind generation will be re-forecast by the Australian Wind Energy Forecast System (AWEFS) and where thermal issues exist on the transmission network, wind farms will be controlled to operate within defined limits. NEMMCO has recently published the January 2009 results from the AWEFS showing a Normalised Mean Absolute Percentage Error of 0.66% for the NEM. Pacific Hydro considers this testament that wind forecast can reliably assist in power supply management.

Modern wind farms include technology with reactive or power factor control capabilities. These attributes, together with active power control introduced into the NEM from 2009 for all intermittent plant greater than 30MW, will provide system operators with the ability to manage wind power generation's contribution to network congestion. It has been estimated that in some managed systems where loads coincide with wind patterns, wind penetration can be in the range of 30-40% without compromising the reliability of the system<sup>8</sup>. If regions of the NEM are adequately interconnected through expanded and augmented infrastructure, large proportions of renewable energy in any one region should not be unmanageable. In Victoria, VENCORP estimates that the transmission network can support up to 4,000MW of wind generation, which represents approximately 40% of installed capacity, due to Victoria's strong transmission network<sup>9</sup>.

## Connecting new generators to energy networks

**A5.1 Do you agree that the connection of new generators to energy networks is a significant issue that should be further progressed under this Review? If not, what are your reasons for reconsidering this position**

We believe the current connection arrangements are inadequate to support the RET and CPRS and should be reviewed to ensure transparent process and risk sharing arrangements are embodied in future arrangements.

### Transparent Process

The ability of the market to accommodate the number of anticipated connection applications, and their associated complexities, stimulated by the RET and CPRS will be a significant issue for the NEM and SWIS. The challenge to accommodate the expected increase in the number of connections will strain the existing resources and increase the complexities for both TNSP's and generators.

Although the connection of renewable generators is national and based on the NER, state jurisdictions can impose interpretation and regulatory hurdles that result in delays and uncertainties. Pacific Hydro agrees with Infrastructure Australia's recognition of the need for "One nation, one set of rules" identifying that "inconsistent rules, legislation and regulations governing markets impede productivity and create unnecessary costs".<sup>10</sup>

### Risk Sharing

Existing market rules require that generators seeking to connect to the network must pay for any new infrastructure up to the point of connection or any immediate augmentation of the network required to safely deliver the extra capacity into the NEM. In connection negotiations, Transmission Network Service Providers (TNSPs) have a desire to maximise their revenue and our experience is that TNSP's consider the connection arrangements as having high profitability with little risk. In most instances this transfers all risks relating to the connection arrangements and ongoing network access to the generator. The delineation of boundaries between what is needed and what is preferred is left to the negotiation

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<sup>8</sup> Regulatory Policy Institute, International Approaches to Transmission Access for Renewable Energy, March 2008

<sup>9</sup> VENCORP, Capacity of the Victorian Electricity Transmission Network to Integrate Wind Power. December 2007

<sup>10</sup> Infrastructure Australia – A Report to the Council to the Australian Governments – Dec 2008 - Page 7

between the parties. This disparity in negotiating strength typically results in generators covering the full costs and all associated risks.

As a result of this, there is no regulatory mechanism available to develop or extend the extra high voltage transmission backbone in areas with little or no load yet rich with renewable resources. The costs are prohibitive for the private sector under the conventional monopoly rate of return regulations that persist in Australia that result in a first mover disadvantage. The Government has been reluctant to build infrastructure where it believes it may crowd out more efficient private investment. This stand-off has resulted in continual under-investment in grid augmentation and expansion.

Pacific Hydro encourages the AEMC to take a visionary approach in identifying the mechanisms to develop the infrastructure to enable this under-investment to be rectified and provide the certainty for an aggressive rollout of the network into Australia's world class renewable resource areas.

## A5.2 Would any of the models identified in this chapter ensure the more efficient delivery of network connection services? In particular, with relation to these models:

Pacific Hydro applauds the AEMC in their recognition of the shortcomings in the existing connection framework and the identification of the four broad mitigation options.

Pacific Hydro suggests that the discussion of the following issues may assist in the development of a robust framework. We consider that the options provided in the Report do assist the debate in raising the potential mitigation issues to deliver a more efficient network connection service, however these options are not mutually exclusive and elements of each option should be further debated and considered by the AEMC. This stage of the Review should focus on this as a major theme of the Second Interim Report to be released in September this year.

### Option 1

#### Open Season

Pacific Hydro accepts that an "open season" may well assist in the management of connection applications and focus resources in particular areas. However it may inadvertently introduce complexities which could ultimately undermine project development.

The declaration of an "open season" for a specified period and the refusal to accept connections after this period is problematic. Investors require certainty about factors other than connection feasibility if they are to commit to a generation location. Issues such as wind regimes, certainty regarding planning and environment approvals, contribution to transmission infrastructure and risk of energy constraints are all important considerations prior to a commitment. Without these aspects the "open season" arrangements will simply establish a queuing mechanism, potentially risking delayed development by successful applicants sitting on capacity and potential applicants unable to force connections.

### Bilateral Negotiation

As discussed at 5.1 risk sharing in bilateral negotiation is problematic.

The current regime of bilateral negotiations for network connection does not take into account the unbalanced weight of negotiating strengths inherent with monopoly providers. It results in unreasonable outcomes for developers which stifles and delays investment.

### Planning Review

Planning for both the transmission and generation development is required to identify the most appropriate sites.

The delivery of a National Transmission Network Development Plan (NTNDP) by the Australian Energy Market Operator (AEMO) will require amendment in light of the direction taken by the AEMC on the proposed models. A proponent for the development of these areas must be identified - a role which could be undertaken by Infrastructure Australia - and the various sites assessed on resource and development potential utilising such information as provided in the Renewable Energy Atlas<sup>11</sup>. Recommendations could then be made to the AEMO for these sites to be developed within the NTNDP.

### Option 2

The separation of network extension into a "cluster" and "hub" has merit and Pacific Hydro encourages the AEMC to pursue further analysis of this Option for Australia.

This mechanism can be used to delineate the connection assets from the network assets and ensure generators are not forced into deep infrastructure contributions that bolster the transmission network beyond the impact of the generator connection.

### New Economic Test for Hub

A review of the NER objectives is needed to facilitate the economic test.

The "Hub" planning and approval mechanism should be structured to consider the environmental benefits associated with the development. This may require a review of the current NER economic test to include the environmental benefits of the investment or a "deemed" approach as contemplated in Option 3. Including emissions reduction in the NEM Objectives would provide the basis for implementing this test, ensuring that projects planned meet the required

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<sup>11</sup> Australian Government Department of Environment Water Heritage and the Arts

environmental standards. With this in mind, Pacific Hydro again calls for the AEMC to consider amending the National Electricity Objectives as part of this Review.

The “Hub” should be funded across a broad base, beyond the jurisdictional TNSP revenue base, such as from the Infrastructure Australia Fund.

#### Cluster or Network Extensions for Remote Generation (NERG)

Clusters will require rules and risk allocation.

Without coordination of the Hub and Cluster this process cannot deliver the most efficient site selection or transmission capacity augmentation. Achieving the level of commitment from generators will also be challenging and may result in blockages in potential investment or delays in funding. Clear criteria will be required to ensure generators are committed to meeting the development timeframe and TNSP's will also be required to accept the risk of ensuring augmentations and network delivery matches these timeframes. Obtaining at least a 50% commitment from generators for the expected capacity will provide some certainty that the development will not become a stranded asset, however the generators will need to have a similar level of certainty that the transmission will be delivered on time at a reasonable cost.

The current bilateral approach to achieving an optimum outcome fails. Pacific Hydro believes any model going forward should clearly articulate the separation of risks and level of contribution to the network. Equitable negotiation is only possible when there are alternatives available, but by developing this model proponents will have no option but to accept the risk and pricing arrangements set by the TNSP or wait for the next development.

#### Funding of the Hub

The proposed option considers generators will meet the full cost associated with the Hub development. This may prove insurmountable for the necessary commitment from generators. The risks associated with deep transmission augmentation are unavoidable for the existing network due to many years of under investment. It is unreasonable to expect a generator to pay the full costs of this augmentation. Option 4 presents a possible solution to this issue (see below).

#### Option 3

Deeming the economic test is met is necessary to accommodate the failure to amend the NEM Objectives.

We believe that a “deemed” approach to the Economic Test in the NEM is sub-optimal and results from a failure to review the National Economic Objectives of the NEM to include emissions reduction as part of this Review. Pacific Hydro believes this will result in a mechanism that is both subjective and non-transparent in allowing the National Transmission Planner to deem whether or not the economic test has been met.

#### Option 4

A benefit to all Australians should be funded by all of Australia.

The recovery of the Network Extensions for Remote Generation (NERG) should not be restricted to the area serviced by the development but based on a broader criteria of environmental benefits associated with both the reduction in greenhouse emissions and the implementation of sustainable future energy production. The suggested Infrastructure Australia Fund is considered an appropriate mechanism for this broad-based recovery.

#### • How should the risks of connection be most appropriately spread across new connection parties, network businesses and end use consumers?

As previously stated, renewable energy developers face significant barriers to negotiating connection access due to the unbalanced negotiating power of developers and TNSPs. Clear risk delineation and process must be available in order to control the cost of connections.

Generators accept and manage where possible the market and construction risks of new connections. However the risk of the transmission capacity being available (energy unconstrained) or constructed in a timely manner relies on the relevant TNSP to ensure infrastructure is designed and maintained to performance standards necessary to ensure generation can be delivered to end users. As transmission systems serve end use customers, customers will ultimately pay for this reliability and efficiency of the network infrastructure. To ensure monopoly TNSPs do not over-charge for this infrastructure the return on investments is controlled by regulations.

Investment in "Hub" infrastructure will require deep augmentation in the TNSP's network to accommodate the increased capacity; this will require negotiation with the regulator to ensure only relevant augmentation is included. Overseas markets provide firm capacity on transmission networks; a form of firm capacity may be a characteristic necessary in the justification of the deep infrastructure costs associated with implementation of a NERG project.

#### • How do the connection charges change for connecting new generation plant and what benefits may arise?

We believe the identification of renewable energy resource zones (RERZ) and the development of a National Strategic Infrastructure Plan (NSIP) will encourage investment in generation projects as greater certainty can be provided regarding:

- the timing of the connection;
- the generator's contribution towards deep augmentation;
- energy at risk; and
- other factors regarding connection feasibility.

This should lead to the development of viable RERZs within remote areas, including a preliminary assessment of key planning and environmental issues which are likely to prevent investment. With this level of certainty wind developers would be able to make informed investment decisions in line with transmission commitments.

### A5.3 Are there any other potential models that we should consider to address this issue?

Pacific Hydro would like to promote an alternative model for expanding Australia's transmission network, based on how investment is handled in other parts of the world. In particular we would like to promote the system used in Texas, where an excellent renewable resource is located in remote areas with no connection to existing grid infrastructure.

#### Texas Wind Capacity

The United States of America, is second only to Germany in having the world's most installed wind capacity (16,596 MW compared to 22,247 MW), with Texas (at 4,296 MW) being the largest US market. Texas' installed wind capacity has risen by 4116 MW in eight years, including the largest single wind farm in the world, FPL Energy's 735 MW Horse Hollow wind farm. This phenomenal growth has been a result of visionary policy setting and legislation driving both wind farm developments and transmission infrastructure.

#### Texas Transmission

The major wind developers in Texas locate their wind turbines in areas which are ideal for maximum wind power generation but which also are the least populated and remote areas far from load and demand centres

Senate Bill 20 includes a transmission plan for areas of high wind resource but poor grid connectivity. This was recognised as an issue when the 775 MW of wind capacity in West Texas could only export a maximum of 330 MW of the installed capacity.

#### ERCOTS McCamey plan

The Electricity Reliability Council of Texas (ERCOT) are the transmission operator and traditionally offered developer-friendly transmission costs to generator by running a "postage stamp" pricing scheme where all transmission costs were spread evenly amongst all customers regardless of the distances required. However the five to six years required to build transmission lines was still not considered adequate enough for wind generation.

The McCamey plan in 2003 was adopted by ERCOT to construct 345kV transmission lines to the remote McCamey area (south of Odessa and Midland) at a cost of \$155 million to connect with 1100MW worth of wind capacity.

The McCamey plan initially required that the transmission lines are 100% subscribed with wind interconnection agreements prior to installation of the five year process. This proved insurmountable.

#### CREZ

To overcome the shortcomings of the McCamey plan, Senate Bill 20 was modified to provide a process whereby ERCOT are able to nominate Competitive Renewable Energy Zones (CREZ).

These Zones are ways to identify the best wind resources anywhere in the state of Texas and details the transmission available in those areas. In 2007 the Texas Legislature directed the State Energy Conservation Office (SECO) to update the 1995 assessment of Texas renewable energy resources. This report expected to be released early this year will provide up-to-date wind resources for wind proponents.<sup>12</sup>

As a result of the CREZ project, in October 2006 Governor Rick Perry announced that \$10 billion of investment in 7,000 MW of new capacity has been committed, contingent on the construction of transmission lines<sup>13</sup>.

In July 2007, after evaluating approximately 25 areas in the state, the Public Utility Commission of Texas (PUC) designated six CREZ zones covering between 10,000 MW to 25,000 MW of proposed wind capacity. In April 2008 ERCOT released the CREZ Transmission Optimization Study, which provided four scenarios for wind generation. The estimated cost of building new transmission lines to windy parts of the state ranges from \$3 billion for 12,053 MW of wind generation capacity to \$6.4 billion for 24,859 MW. Each scenario includes 6,903 MW of wind generation that was either in-service or had signed interconnection agreements as of the northern autumn of 2007.<sup>14</sup> PUC will issue final designation of transmission solutions for CREZ areas and decide which transmission companies will be selected to build transmission lines. Once a CREZ passes the nomination process the grid will be paid for evenly by all Texas ratepayers through their electricity bills.

On the transmission side, several companies have partnered to form ventures to build merchant transmission for the CREZ's for the construction of around 2,000 km of transmission line and also a 1,500 km high voltage high capacity backbone transmission system.

#### Federal Rule for Transmission Access

In February 2007, The Federal Energy Regulatory Commission (FERC) made a ruling to allow greater access to transmission lines for power generators of all types, including renewable energy projects.

Under this rule, wind developers are exempt from excessive charges when the amount of energy delivered differs from what they are scheduled to deliver.

This new rule on open access transmission tariffs eliminates the broad discretion that transmission providers have in calculating unused available capacity on their lines.

Texas however is not subject to FERC regulation because most of its transmission lines do not cross state boundaries.

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<sup>12</sup> Energy Report – May 2008 - Texas Comptroller of Public Accounts. Pg 169 <http://www.window.state.tx.us/specialrpt/energy/>

<sup>13</sup> Sara Parker, "Wind energy in Texas Gets \$10 Billion Boost", Renewable Energy Access.com (4 Oct 2006), <http://www.renewableenergyaccess.com/rea/news/story?id=46145>

<sup>14</sup> The Energy Report – May 2008 - Texas Comptroller of Public Accounts. Pg 176 <http://www.window.state.tx.us/specialrpt/energy/>

## Augmenting networks and managing congestion

A6.1 Do you agree that the issue of network congestion and related costs requires further examination in this Review to determine its materiality? This includes considering whether the existing frameworks provide signals that are clear enough and strong enough in the new environment where congestion may be more material. If not, what are your reasons for reconsidering this position?

Pacific Hydro strongly agrees that network congestion and the associated costs for renewable energy generators is material and requires further examination under this review.

Based on our experience in connecting wind farms to the NEM, we believe that network congestion is already a key risk requiring consideration in the selection of acceptable wind generation sites, and that this risk will become more significant as a greater number of distributed generators seek to connect to the network under the RET and CPRS.

Current grid studies only provide a snapshot of the current network and expected generation development in the area. Network service providers are unable (due to confidentiality constraints) to provide full disclosure on proposed generation in the area and modelling data is currently not made available to proponents. This lack of transparency in the level of potential congestion is a major risk for generators that will lead to the energy they produce being unable to get to the market.

There is a lack of transmission capacity in the NEM infrastructure, in some areas creating significant risk to new connections.

Progressively any spare capacity in the network is soaked up by generators, leading to the need for major network augmentation, bringing an associated increase in connection costs, required to accommodate the next generator. This creates barriers to generator connection and increases the levels of congestion associated with the fully utilised network.

Coordination of connection and augmentation of transmission capacity under the current open access arrangements can lead to a barrier for the first mover into a resource rich area that has limited transmission capacity, and a piecemeal approach to network development. In South Australia the expansion of the network to Mount Millar, and the subsequent interaction with generation connected into the area, resulted in a physical constraint on the network leading to generation being withheld from the market. Transmission constraints can also drive the project capacity; Chalicum Hills wind farm was planned as a 75MW development, however was reduced to 52MW to accommodate the local existing limits in the distribution network.

Intermittent technology will require transmission capacity to accommodate the utilisation of the variable wind resources. It is accepted that it is inefficient to abolish all congestion on the network, however transparency in communicating the level and location of congestion requires improvement. This will assist proponents to make informed investment decisions and provide clear signals to policy makers.

There is currently no mechanism available to address deeper augmentation issues or to enable strategic development of new transmission in remote areas. Investment in the near-term should focus in particular on upgrading the interconnectors between Victoria and South Australia and improving the South Australian transmission backbone,

allowing development and export of South Australia's world-class wind and geothermal energy resources.<sup>15</sup> By way of illustration of the seriousness of this constraint, NEMMCO recently revealed the number of hours the South Australia to Victoria interconnector was constrained has increased from a three year average of 10 hours between 2003 and 2006, to 564 hours in 2007/08<sup>16</sup>.

Currently Pacific Hydro is constructing the Clements Gap Wind Farm in South Australia as the NEM's first semi-scheduled wind farm. During periods of network congestion this wind farm will be controlled by NEMMCO's five minute dispatch process to ensure its generation levels are maintained within the physical transmission limits required for the network to perform. Apart from the ability to limit wind generation the frequency and duration of the semi-schedule periods will provide a clear signal to the market and regulators on the inefficiencies within the existing network. Reporting and quantification of wind generation constraints should be a market and regulatory requirement.

Without a strategic national approach to transmission planning and investment, access to networks has the potential to prohibit renewable energy project development. There is a strong role for government in establishing a strategic national approach to infrastructure development through bodies such as the Australian Energy Market Operator (AEMO) and Infrastructure Australia. This should aim to streamline or fast-track routes for transmission augmentation based on areas of strategic national resource potential. Overseas, governments have realised the strategic significance of their renewable energy resources for attracting investment and lowering emissions. The Garnaut Review<sup>17</sup> outlines examples in Britain and California where public contributions are being made to new energy infrastructure projects.

## Financing new energy investments

**A8.1 Do you agree that the current energy market frameworks do not impede the efficient financing of the significant increase in investment implied by CPRS and expanded national RET? If not, what are your reasons for this position?**

Pacific Hydro, as a renewable energy developer, considers that regulatory certainty and capacity constraints are key barriers in the current market frameworks that should be addressed to encourage investment under the RET and CPRS.

### Regulatory Certainty/Consistency

The ability of renewable energy developers to finance new investment toward achieving RET is contingent on transparent and consistent national regulation. Current overlaps and inconsistencies in regulation through the regions of the NEM create administrative and cost burdens for renewable energy developers. In the current economic climate

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<sup>15</sup> ROAM Consulting also considered SA suffered from transmission congestion issues - AEMC – Survey of Evidence on the Implications of Climate Change Policies for Energy Markets – Supporting paper to 1<sup>st</sup> Interim Report 23/12/08 Page 7, 38

<sup>16</sup> NEMMCO, Statement of Opportunities 2008

<sup>17</sup> See Garnaut Review Final Report, chapter 19

where both debt and equity are harder to secure, this introduces significant risk that new investment will not occur as developers face increased competition for finance. In addition, it is contrary to the NEM Objective of efficient market operation.

Pacific Hydro has made a submission in relation to the draft Renewable Energy Target (RET) scheme outlining a number of issues in respect to consistency of the RET with the current Victorian Renewable Energy Target (VRET) scheme and electricity industry practice in the measurement of energy. These inconsistencies need to be removed in order to ensure efficient market operation and provide clear investment signals to project developers.

Further inconsistencies arise as a result of Western Australia adopting a completely different market structure and a complex local regulatory regime that has been overlaid throughout the state, capturing all the small remote electrical islands.

These issues create a situation where regulatory uncertainty or complexity lowers the likelihood of achieving the objectives of the CPRS and RET. As stated in the introduction to this submission, regulation should support, not hinder, the delivery of policy.

### Capacity Constraints

Limited capacity in the transmission network and lack of transmission networks in areas of high renewable energy resource is a key limitation to new renewable energy investment. However arrangements for financing new investment in transmission infrastructure are such that all risk is borne by the project developer, significantly increasing the cost of a project.

This also creates a situation which introduces risk to the network. To return to the example of Mount Millar, poor planning of the network expansion to accommodate this project, and a competing project in the area, along with poor voltage control has led to generation being withheld from the market.

Current transmission planning generates a piecemeal approach to infrastructure investment and expansion, creating a system where congestion and constraint is endemic, thereby increasing the likelihood of further limiting investment in new generation. There is a key role for government however in providing investment solutions for expanded transmission infrastructure to allow new renewable energy projects to proceed. As outlined above and in A5.3, strategic intervention by government in this critical matter will facilitate least-cost network development, reducing the cost to the economy.

We believe that a new national approach to infrastructure planning, investment and regulation will be required to enable the delivery of the CPRS and RET objectives.

## Conclusion

While Australia has comparatively high levels of greenhouse emissions, our abundant renewable energy resources and the immaturity of Australia's renewable energy industry offers significant opportunities for emissions reduction in the short, medium and long term. The development of this industry under the RET and the CPRS will also stimulate large-scale investment in the economy. The RET alone is expected to require investment of approximately \$25 billion to meet the renewable energy generation targets.

Renewable energy will play a key role in the transition of Australia's energy market in a low carbon future, and with the right RET design, can make a significant contribution in meeting expected generation shortfalls as Australia's energy consumption rises and incumbent thermal plant begins coming offline. Wind energy will make up a significant proportion of this contribution but will have minimal impact on reliability standards due to the expected geographic spread of generation sites, existing technical standards which allow for greater control of wind generators, and the increase in gas generation capacity expected under the CPRS.

To enable the efficient transition of the energy market to accommodate greater levels of renewable energy, the AEMC should focus the remaining stages of the Review on ensuring all regulatory and infrastructure barriers to renewable energy development are addressed, allowing safe and efficient delivery of the RET.

Pacific Hydro believes that moving to a single national approach would deliver a clear and transparent approach to regulation of the energy market, facilitating greater certainty in investment decisions by project developers and therefore more rapid reductions in greenhouse emissions. A nationally consistent approach would also address jurisdictional barriers to renewable energy development which impose unnecessary cost and time delays on renewable energy developers.

We believe that the key barrier facing renewable energy development in the short to medium term is a lack of transmission capacity, and that this should be addressed as a priority of the next stage of the Review. The Second Interim Report should focus on detailing a single recommended approach to investment in new transmission infrastructure, which appropriately shares the risk of large-scale investment between Government and industry. There are aspects of each Option for investment outlined in the First Interim Report which it would be appropriate to include in the final recommended approach, but Pacific Hydro recommends that the AEMC also look at the CREZ approach used in Texas as a potential model for the Australian approach.

Furthermore, we strongly advocate further work through the Review on addressing endemic capacity constraints of the existing system which currently limit renewable energy development. It is accepted that it is inefficient to abolish all congestion in the network, however transparency in communicating the level and location of congestion requires improvement. This will assist proponents to make informed investment decisions and provide clear signals to policy makers.

Pacific Hydro looks forward to continuing to work with the AEMC in this important Review.

## Summary of Recommendations

- Include emissions reduction in the NEM Objectives to ensure alignment of the market operation with the policy objectives of the RET and CPRS.
- Identify optimal renewable energy zones and transmission infrastructure necessary to delivery this energy
- Develop a single national approach for investment in new transmission infrastructure including:
  - strategic national planning
  - augmentation of existing transmission infrastructure and the provision of a transmission backbone to the load centres
  - risk-sharing approach between Government and industry
- Provide regulatory certainty via nationally consistent regulation, to investors and not cloud or inhibit market signals