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Electricity Reform Implementation Unit – ERIU
Office of Energy
ATTN: Mr Gavin White
Principal Policy Officer
Level 8, Governor Stirling Tower
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Perth WA 6000

18th. January 2006

SUBMISSION TO ERIU ON THE DRAFT ECONNECT REPORT: “Maximising the Penetration of Intermittent Generation in the SWIS”

Dear Mr White,

Solar Sales is a WA-owned company and systems integrator with a 25-year successful track record in solar electricity (photovoltaic, PV) with Australian and international recognition as an industry leader.

The company is interested in identifying opportunities for using distributed electricity generation based on renewables where it has an economic advantage over proposed network augmentation, thereby reducing network infrastructure expenditure and the overall costs of supplying electricity to the WA community. The company is therefore pleased to see that the State Government has commissioned a study on the opportunities for maximising the penetration of renewable energy generation on the SWIS.

General Observations

Our overall comment is that the Econnect report is restricted to an evaluation of the technical constraints to increasing the amount of renewable energy connected to the SWIS. The report itself concludes that the technical issues do not constitute the primary barriers to increased renewable energy generation. The real issues are such things as the high costs of connection.

The real barriers to renewables are the rules and arrangements relating to the:

- 1. policy support for renewable energy,**
- 2. access to the grid,** and
- 3. high cost of connecting to the grid.**

For example, a small wind farm project less than 10 MW connected to the distribution system faces an annual network access charge that amounts to around 20% of the total project annual turnover, including the sale of both electricity and Renewable Energy Certificates.

Hence, while we are happy to comment on the report, we do so with the belief that even if the report's recommendations are adopted, this will not be likely to result in increased investment in renewable energy generation. The report is therefore interesting, but does not address the fundamental issues.

The report prepared by Econnect is professional and is a useful document in forming an understanding of the operation of WA's South West Interconnected System (SWIS), which is based on a conventional design approach characterised by unidirectional power flow from large centralised generators to dispersed regional areas.



The intent of the report, however, is not entirely clear. It states that the report forms part of “a broader project entitled ‘Maximising Renewable Energy on the Southwest Interconnected System (SWIS)’”. We would be interested to learn more about the broader project as this is the first that we have learned of it. We assume that this project is related to the Electricity Reform Task Force’s Recommendation 69 and/or to the State Government’s 6% renewable energy target for the SWIS. It would therefore be useful if the report indicated whether or not it is the first of a suite of reports and what other reports are to be commissioned. We are also unaware of the consultant’s brief and we suggest that the brief be included in the final report.

If the Government is genuine about a policy of increasing the proportion of electricity from renewable energy, now the Government has the information at hand to allow it to do what has to be done to facilitate greater investment into renewable energy in this state in terms of making connections to the state-owned network possible.

However, we are unclear if the recommendations of the report are meant to go to the State Government, the Office of Energy, the Department for Planning and Infrastructure, the Economic Regulation Authority, the Minister for Energy, the Independent Market Operator or to Western Power Corporation.

In that respect including an overview in the final report explaining the accountabilities, powers and interactions of the various authorities and agencies in what appears to be a complex regulatory framework would be of assistance.

The terminology used in the report could be misleading as it is inconsistent with the terminology in use elsewhere – as is acknowledged in the report. The report focuses on renewable “Intermittent Generation”, which is assumed to be predominantly wind generators. Solar energy is treated in less depth. We suggest that the report uses the term “renewable energy generation”, while making it clear from the outset that its focus is renewable energy generation systems such as wind.

We find the heavy focus on wind somewhat disappointing and like to see the report expand to address issues relating to photovoltaic. PV is likely to be the key renewable energy technology in many regional areas on the SWIS, such as the Wheatbelt, where wind regimes are poor. The report needs to look at the issues affecting connection of PV generation given that it has a role to play in avoidance or deferring network upgrades and in stabilising the system’s reliability and safety of supply during high summer peak loads.

This report is a valuable contribution to an ongoing debate over the limitations on renewable energy generation capacity, such as wind generation, that can be connected to the SWIS without causing major system problems, and the nature of those limitations. The report lists the critical technical limiting factors and then comments on the real extent to which each of these factors represent real constraints, and how current arrangements for managing these constraints compare to best-practice arrangements used in other jurisdictions. And the conclusions of the report - that there are no major or serious technical network constraints limiting increased penetration of renewable energy generation and that technical factors will not become a major issue until the renewable energy penetration level reaches 20 to 30% - is very encouraging as it dispels a myth that there are very serious, insurmountable technical network constraints already impacting on the penetration levels of renewable energy generation.

The report suggests that the costs of providing frequency stability for a penetration of renewable generation of 30% would result in an increase in retail electricity prices of around only 2%, that the current market rules in place in Western Australia for balancing and providing reserve capacity are best practice and result in an increase in retail electricity



prices that is relatively small (2%). Similarly, the report concludes that locational or site specific issues do not present any undue impediment to the increased penetration of intermittent generation in the SWIS.

While fault ride through is an issue, the report claims that the current requirements on renewable energy generators are too onerous. The major barrier to increased penetration of renewable energy is therefore considered by the authors of the report to be lack of information, a problem that the authors believe could be remedied at a relatively low cost.

The overall conclusion that the reader is left with is that the SWIS can, at relatively low costs, increase the penetration of renewable energy above, say 20%. This is certainly possible by the availability of WA's natural resources such as sunlight (vast greenfield sites for solar farms, particular in the Wheat Belt) and wind energy (sparsely populated long coast lines); and building roof space for PV in metropolitan areas like warehouses, train stations and residential houses.

Specific Comments

The report forms part of ongoing debate over the limitations on the capacity to connect renewable energy generation to the SWIS without causing major system problems. This is obviously a debate of critical importance to the industry. While investment in grid-connected renewable energy generation is supported by such initiatives as the 2% MRET scheme, such initiatives can only be applied if there is the capacity to connect renewable energy systems to the grid. The report is useful as it is difficult for individuals or organisations other than the network service provider to comment on network issues as they lack the expertise or intricate knowledge of the system. An independent expert view is therefore essential in this debate.

The problem with the report is that it is qualitative rather than quantitative. It is also quite generic and without a lot of change could be used as a report on the barriers to the connection of renewable energy generators on almost any network. As a result, it does not provide a clear picture on what needs to be changed, or what those changes will cost, in order to increase the penetration of renewable energy by a given percentage. It is all a bit vague. It almost reads as if very little needs, if anything, to be done, in terms of technical network issues, to significantly increase the penetration of renewable energy on the SWIS. However, this appears not to reconcile with the network owner's view of accommodating renewables.

The report leaves unaddressed what will be the costs to remove or reduce the barriers. It is not clear if all of the barriers have to be removed simultaneously for there to be any material change in terms of renewable energy generation capacity that can be connected to the grid.

The report appears to suggest that the real barriers to increased renewable energy generation are not technical network constraints but the planning approvals and a lack of information that developers are able to use to determine where network connection will provide the greatest system benefits at lowest costs.

The report's recommendations are therefore welcomed and supported, but we do not expect that on their own they will be sufficient. However, the answer to questions such as how much renewable energy can be installed before it becomes necessary to "undertake a system-wide upgrade", and where the renewable energy can be located, is left unclear? These questions will only be answered when the recommended scenario analyses are undertaken. The report is therefore an initial step in answering these sorts of questions.

Our specific comments on each recommendation are:



Priority 1 - Information: Difficulty of access to information required during the feasibility stage of a project for intermittent generation may delay and/or limit development.

1. *Develop a number of potential scenarios for the high penetration of renewable energy in the SWIS. Use these scenarios to test and 'future proof' plans for development and change to networks, regulatory or commercial frameworks.*

The development of scenario analyses is strongly supported and is valuable only if they provide information on the costs of investing in renewable energy at specific network locations based on the renewable energy resources, network capacity, potential for deferment of network upgrades, and likely costs of any network upgrades, etc.

Scenario analyses substituting fossil fuel at a 10%, 20% and 30% penetration target for renewables on the SWIS are vital and we strongly recommend that the scenario analyses are conducted within a defined timeframe in consultation with the WA renewable energy industry.

2. *To facilitate the future development of renewables, ensure NSP is obliged to publish network data for modelling and operational data for events.*

Good information is essential for the operation of a market. If the NSP has information that can be used by potential investors to assist them model their investment proposals, this data needs to be made available.

3. *Ensure that good data and information on renewable energy penetration and availability in the SWIS is collected, maintained and analysed. This would include information on generator outages, large output swings, and estimates of generators contribution to network losses.*

This relates to recommendation 2. The NSP cannot publish data unless it has collected the data.

4. *Collect and publish detailed information on wind resources and land use in South Western Australia, following existing practice in Victoria and New South Wales. Review the need for similar information on other renewable energy resources when these technologies reach a mature stage.*

It is not clear how useful this published information has been in increasing investment in wind generation in other jurisdictions. Very costly wind maps have been produced but these do not appear to have influenced investment in wind in NSW, and in the case of Victoria, most of the investments are likely to have occurred in the absence of the wind maps. Proponents are capable of undertaking their own assessments of wind, solar or other resources and may prefer to do so and to keep this as commercial-in-confidence.

In other words, the risk for proposed investments in renewable energy projects is the highest in identifying where network capacity can accommodate projects and at what costs.

In the case of Western Australia, the wind farms to date have not required pre-assessed and detailed knowledge of wind resources. It is not clear that the provision of such information would result in any increased investment. In the absence of other support for investment in renewable energy, such as a state-based MRET scheme, the information would be academic.



5. *Undertake a review of international data provision requirements of NSPs, including the UK, for comparison with requirements for the SWIS 132 kV and 66 kV networks.*

As for recommendations 2 and 3, anything that provides commercial and technical information regarding the operation of the network would be valuable to potential investors.

6. *Produce a connection guide - as per UK market and Australian BCSE.*

Given that the BCSE has already produced a connection guide, a connection guide for the SWIS will be useful only if it provides more specific information in relation to network connection and costs.

Priority 2 - Network Stability: Although it is essential for large intermittent generators to play an active role in the network recovery following a system disturbance, excessive or inadequate fault ride through requirements imposed upon these same generators will limit their penetration.

7. *Undertake studies to estimate the impact of transmission network faults and the propagation of voltage dips on the system, especially at 132 kV where the clearance times are extensive.*

As for recommendations 2 and 3, any additional information regarding the operation of the network that could be valuable to potential investors should be made available.

8. *Allow negotiated project specific requirements where the project can be demonstrated to have an overall balanced effect on the network.*

Negotiated agreements are always the lowest cost, and therefore preferred option in a competitive market. However, the market is far from an ideal market and in reality there are likely to be disputes with the NSP having the upper hand. Any negotiation process will therefore need to involve the Independent Market Operator.

It has been possible, in theory, to negotiate arrangements in terms of sharing of benefits arising from investment in embedded generation. It is not clear if the recommendation in this case refers to negotiated technical connection or other requirements. If so, that needs to be made clear.

Given that the network is a public good, it would be useful for the NSP to share what arrangements have been negotiated on the existing and proposed wind farms.

Also it needs to be made clear who decides what will be the “overall balanced effect on the network” and what the deciding criteria will be.

9. *Make existing conventional generators aware of the new requirements and ensure that they can meet these requirements.*

Electricity reform has been pursued on the grounds of a “level playing field”. It would therefore appear to be axiomatic that incumbents are required to be aware of the new requirements as well as any new entrants to the WA market.

10. *Consider a market based alternative to FRT (e.g. the payment of spinning reserve charge).*



“Consider” is cautious and a recommendation to consider can hardly be rejected easily. It would be interesting to know if any other jurisdictions or countries have “considered” such market based alternatives to FRT.

Priority 3 - Network Frequency Stability: - As intermittent generation penetration is increased in significant proportion, issues related to system frequency stability will need to be addressed.

Forecasting

11. *Prepare a plan for forecasting to implement as soon as possible. Consider appropriate persons to be responsible - IMO, NSP or independent third party. Consider multiple providers with additional rewards for best forecast.*

One of the important roles of the independent system operator elsewhere is to publish an annual planning statement that contains information on where investment may be required. Load forecasting is a critical part of that exercise. It is therefore surprising to see it listed as a recommendation when it is essential.

Forecasting is an expensive exercise and multiple forecasting is likely to be excessively costly. Most system operators therefore tender for their forecasting, and this appears to be the sensible and preferred option.

Frequency Control Ancillary Service (FCAS)

12. *Develop and implement a process for FCAS estimation based on a probabilistic assessment of credible output swings, taking into account the differing timescales over which these occur for conventional and intermittent generators.*

As for recommendations 2 and 3, any additional information regarding the commercial and technical operation of the network that could be valuable to potential investors should be made available.

Inertial Control

13. *Undertake studies and analysis to determine the value of inertia to the system. If appropriate develop and modify the charging methodology to reward generators and loads for providing inertia.*

As for recommendations 2 and 3, any additional information regarding the commercial and technical operation of the network that could be valuable to potential investors should be made available.

Priority 4 - Geographical Diversity: - Geographical diversity can play an important role in the level of penetration of intermittent generation that can be achieved. The latter may be discouraged due to prohibitive system augmentation costs in particular areas of the network.

14. *Review international developments in differential Use of System (UoS) charging mechanisms, including those in place in the UK, and their applicability for the SWIS.*

Reviewing processes used elsewhere is a low cost and is supported.



15. *Ensure that the market system incorporates an option to create and change locational use of system price signals which can:*
- *encourage distributed generation at the lower voltage levels where it will tend to reduce distribution network reinforcements.*
 - *encourage generation to locate in areas of the network where it provides greater benefits and imposes lower costs on the system.*

Anything which encourages cost-effective investment in distributed generation or generation to be connected near to loads would be beneficial and is supported.

Priority 5 - Energy Balancing and Reserve Capacity: – Achieve high penetrations of intermittent generation while maintaining adequate system energy balancing and adequate reserve capacity.

Load Following

16. *Assess the benefits of replacing the existing charging methodology for load following services with a method that assigns to loads the full cost of their variability, and to intermittent generators, the marginal cost of their variability relative to aggregate system load.*

An assessment of such benefits is low cost and is supported.

Reserve Capacity

17. *In the short to medium term, maintain current practices for determination of reserve (contingency) requirements. In the longer term (as penetration of intermittent generation approaches 20 per cent) undertake a study into the requirement for reserve capacity at high penetrations of intermittent generation, and review capacity calculation methods based on the outcome of this study.*

“Undertaking a study” and reviewing are not likely to be prohibitively expensive exercises and these are supported.

Additional Recommendations:

Constraints

18. *Due to the low demand at night on the SWIS, and the inflexible operation of the thermal coal generation, wind generation may need to be constrained at night. Wind generation must be paid for the constraints imposed on it, at the full value of its output so that the system operator has clear cost signals to inform the management of constraints. If the market design is effective, this should lead to lower power prices at these periods and incentivises energy use, which will reduce peak loads.*

Payment of wind generators for the full value of any constraints imposed on them is equitable, and any market arrangement that encourages increased utilisation of electricity during periods when generators needed to constrain outputs would provide generators and consumers with a benefit. The costs of wind generation projects could increase, however, unless the design of the market for managing those constraints is effective.

Planning Controls



19. *Develop renewable energy development strategies and guidelines that take into consideration land use, connection requirements, noise compliance and other planning issues.*

It is understood that planning guidelines for wind energy generators have already been produced by the Department for Planning and Infrastructure. SEDO has produced draft guidelines for renewable energy generators, which include summaries of the planning requirements. In other jurisdictions, the Environmental Defenders Office has produced generic planning guidelines for developers, not only renewable energy generators. The Australian Wind Energy Association and the BCSE also have prepared such guidelines already. It is not clear how useful these summaries and guidelines are but they appear to exist already.

20. *Develop a participatory process, involving State and Local government and community groups, by which particular areas may be designated as 'permitted use' zones for wind farms and/or other renewable energy projects. These areas would be nominated on the basis of transparent criteria, full information provision and the support of local communities.*

While the concept of having all of the planning issues sorted out ahead of any actual proposal is extremely attractive, the amendment of all local government planning schemes to create permitted use zones for wind generation in all local government planning areas on the SWIS would be a mammoth task requiring massive consultation. Given that there is very little financial incentive for wind farm developers to investment in wind energy projects in Western Australia at the moment, this exercise would appear to be very ambitious. Nor is it clear that it would resolve all of the planning issues. And planning issues have not been the major hurdle for most wind energy developments in Western Australia to date, suggesting that developers are generally capable of selecting appropriate sites and working with communities and through local government planning processes.

Comments beyond the scope of the Econnect report

There appears to be a focus on cost-reflective pricing to interconnect renewables. In the report no comment and no comparison has been made to best-practice jurisdictions, where renewable energy is given priority access over conventional generation at much lower network access costs to renewables acknowledging the inherent sustainable and socio-economic benefits to the broader economy (climate change, resource depletion).

This is of particular importance especially now that the federal 2% MRET and its RECs market have ceased being stimulation for further investment into renewable energy in WA and Australia-wide. Additional measures are required to fill this gap to attract investments in renewables in WA, such as:

- a State-based renewable energy target,
- a licensing requirement on electricity retailers and large users to source renewable energy,
- a State-based trading mechanism for RECs,
- an electricity feed-in tariff for renewables.



We feel that any possible outcomes of the report are meaningless without the State Government providing the monetary resources and/or financial mechanisms for the WA renewable energy industry to unlock the investment capital. In other words; translating renewable energy policy into return-on-investment.

Considering the return-on-investment needs of the industry this could take the form of the following possible mechanisms for funding:

- locally-owned (ie. community equity) solar and wind farms;
- private public partnerships: An example is community equity in a solar farm shared with the state utility Western Power Corporation, or by Treasury providing below-market interest rates to stimulate investment in renewables;
- electricity feed-in tariffs providing returns to investors at going market rates;
- tax incentives; and
- capital cost (investment) rebates.

Some relevant policies appear to exist already that either need to be amended or modified with a commitment to provide measurable economic benefits to the WA market from active climate protection measures such as investments into renewable energy projects.

It is our observation that the current grid-connected renewables are a result of external (federal) policy making. However, we welcome the proactive energy policy promise by the State Government for a WA 6% renewable energy target by 2010. We appreciate this initiative, however, upon inquiry at several levels of State Government (Office of Energy, SEDO, Western Power Corporation) we could not find out how and when this policy will be implemented, funded or how its effectiveness will be measured.

We learned that Western Power upgraded the North Country network with a 132 kV transmission line. Apparently, this line was initially planned to be a higher capacity 330 kV line. Considering that the Geraldton Mid West region is going to be the likely centre for numerous large-scale wind farms. It appears that in the decision-making process renewable energy has not been given the appropriate priority. We express our concern and strongly recommend that this reason be revisited in a timely manner. In particular with a view to establishing renewable energy scenario analyses for the SWIS.

We would appreciate the opportunity to discuss this matter with you at your earliest convenience and look forward to your immediate response.

Yours faithfully,

John Hall
Managing Director

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