AUSTELA
Australian Solar Thermal Energy Association Ltd

13 September 2011

Matt Zema
Chief Executive Officer
Australian Energy Market Operator Limited
530 Collins Street
MELBOURNE VIC 3000

National Transmission Network Development Plan (NTNDP) - Australia Solar Thermal Energy Association Limited (AUSTELA)

I write to introduce the Australian Solar Thermal Energy Association Ltd (AUSTELA) and to seek to record AUSTELA's views in relation to AEMO's Revised NTNDP Scope and Consultation Report for the 2011 NTNDP, issued 11 July 2011.

AUSTELA was incorporated on 31 January 2011; this timing made a submission to AEMO's 2011 NTNDP Consultation impractical. AUSTELA has however reviewed the 2010 NTNDP, submissions made in the 2011 NTNDP Consultation process and AEMO's responses in the Report of 11 July 2011.

AUSTELA asks that our interest in the development of the NTNDP be noted and that AUSTELA be henceforth included in stakeholder engagement processes relating to the NTNDP.

About AUSTELA

AUSTELA is the industry body solely dedicated to concentrating solar thermal power generation (CSP) in Australia. Composed of some of leading national and international solar thermal industry participants, AUSTELA's membership is open to organisations involved in the development of solar thermal power systems on a large scale to supplement or replace existing power requirements in Australia, whether in the electricity sector or in other industry sectors.

Companies involved in large-scale solar thermal energy observe significant misconceptions among policy makers and investment decision-makers in Australia about the cost of solar thermal power, and a lack of understanding of the rapidly improving cost dynamics of large-scale solar thermal energy production emerging from research and deployment at scale in other markets.

AUSTELA's goal is to significantly improve the investment environment for solar thermal power generation in Australia by providing information, analysis and data to assist policy and investment decision-makers to better understand the value, cost and potential importance of solar thermal power in Australia's electricity system.

2010 NTNDP - Generation cost inputs

AUSTELA notes and agrees with the submissions of CEC, ESAA, Melbourne Energy Institute and others in relation to the need for AEMO to undertake a thorough review and re-appraisal of generation cost assumptions in NTNDP modeling.

In particular, AUSTELA notes that, as observed by the Melbourne Energy Institute, cost assumptions for solar thermal electricity production used in the 2010 NTNDP are

significantly higher than comparable cost analyses and projections developed internationally before and since the 2010 NTNDP[1].

It is notable that, of the potential Generation Clusters identified in the 2010 NTNDP, in only one zone (NQ – 7.2.1) did AEMO's generation simulations include any solar generation.

By comparison, long-term assessments of generation composition in the North American market, conducted by AEMO's system reliability and adequacy counterpart, the North American Electric Reliability Corporation, indicate solar power as comprising the most significant new renewable generation capacity after wind generation in the period 2010-2019, with over 10,000MW new solar capacity planned.[2] Portfolio standards in some US jurisdictions explain part of this difference, but Australian and US market and resource conditions are not so dissimilar as to explain the virtual absence from AEMO's planning projections, in comparison to US projections, of solar power.

While only further modeling (applying contemporary data and projections consistent with international research and experience) will confirm or dismiss this concern, AUSTELA is concerned that the use of outdated and inaccurate data in the 2010 NTNDP in relation to solar thermal power generation costs distorted the 2010 NTNDP's modeled generation simulations.

Other submissions[3] pointed to the fact that NTNDP generation simulations projecting large-scale geothermal power generation by 2020 were not consistent with the present state of geothermal technology development and commercialization in Australia. While AUSTELA would concur, AUSTELA believes the more important point to note for the purposes of the 2011 and future NTNDP reviews is that solar thermal generation assets are operating today, at large scale, in major markets in the US and Europe; there is no technical impediment to the deployment of large-scale CSP technologies in Australia today.

Internationally, there is more installed capacity of solar thermal power generation than all Australia's current wind generation capacity, and many times more than Australia's projected installed photovoltaic generation capacity at the end of 2011.

Since the 2010 NTNDP, solar thermal power generation has continued to attract major investment from the world's leading energy and EPC firms including Alstom (Brightsource Energy), GE (eSolar), Solel (Siemens), Solar Millennium (MAN Ferrostaal), AREVA, Abengoa, ACS Cobra, ABB and Transfield. Major new projects have commenced construction, and significant projects have been commissioned and announced[4]. In Australia, Novatec Solar (Transfield) is expanding solar augmentation at Macquarie Generation's Liddel power plant and Areva is developing a 44MW solar augmentation project in Queensland. An Areva-led consortium is progressing plans for the 250MW Solar Dawn CSP project, also in Queensland.

---

[1] Refer for example to *Solar Thermal Electricity 2025*, AT Kearney, June 2010; *Power Tower Technology Roadmap and Cost Reduction Plan*, Sandia Laboratories, April 2011.

[2] *Reliability Assessment of North America, 2010,* NERC, October 2010, at 13

[3] Infigen, ElectraNet

[4] For example: Brightsource Energy Ivanpah (www.brightsourceenergy.com/projects/ivanpah), SENER Gemasolar (http://www.sener.es/EPORTAL_DOCS/GENERAL/SENERV2/DOC-cw499d86ce46da1/GEMASOLARPLANT.pdf), Brightsource Energy brightsourceenergy.com/projects/hidden_hills,

CSIRO and Mitsubishi have successfully demonstrated high temperature Brayton cycle technology with potential application in arid locations.

Globally, solar thermal power generation development is accelerating, and cost reductions will follow as project deployment experience, manufacturing capacity and financial sector familiarity with CSP projects and technologies increases.

AUSTELA submits that the NTNDP must recognize that solar thermal power generation is now rapidly emerging as a mainstream generation technology internationally, and must now be considered in significantly greater detail and with significantly greater seriousness and priority in Australia's electricity network planning future.

Additional value of solar thermal power - dispatchability and thermal energy storage

AUSTELA urges AEMO, in the design of the 2011 and subsequent NTNDP modeling and analyses, to develop tools enabling analysis of the economic benefits of dispatchability and thermal energy storage associated with solar thermal power generation.

Just as electricity market evolution requires that least-cost analysis must now more effectively integrate demand-side response analysis, it will be necessary for modeling to consider the cost/benefits of energy storage and dispatchability available with solar thermal energy storage, within regions and in the NEM as a whole, including for example:

- As an alternative to other forms of generation (including OCGT) in response to evening peak demand
- To better manage network congestion challenges
- For ancillary service provision
- To balance peaks and troughs of wind generation in zones/regions with high levels of wind capacity
- As non-network solutions in distribution and transmission network development.

New data and research into CSP

As noted earlier, AUSTELA's members observe significant misconceptions in Australia's energy sector as to the current costs of large scale solar thermal power generation being achieved in projects in Europe and the US, and lack of awareness of the rapid cost reduction projections emerging from international research and development.

A clear example of the different perspectives internationally and in Australia as to solar thermal costs is the comparison of the projections of achievable LCOE for power tower (central receiver) systems in the US (~$82/MWh at 2020[5]) and source data used for generation simulations for the 2010 NTNDP, which AUSTELA understands to assume power tower costs in the region of $210/MWh at 2020. AEMO will also be aware of the US DoE 'Sun Shot Program', which aims to reduce the cost of solar thermal power even more rapidly to 6c/kWh by 2020.

Clearly these cost reduction goals are ambitious and may not be fully achieved, but it cannot be ignored that leading international research, produced through industry/agency

[5] *Power Tower Technology Roadmap and Cost Reduction Plan*, Sandia Laboratories, April 2011

collaboration, is projecting cost levels for CSP by 2020 very significantly lower than those apparently assumed in NTNDP modeling to date.

As noted earlier, a key objective for AUSTELA is to assist investors, policy-makers, planners and regulators in Australia to access the most contemporary data and analysis available internationally in relation to solar thermal generation. AUSTELA will be pleased to work with AEMO to assist in accessing data and information that may be of value in AEMO's analyses.

Following proposals from AUSTELA in early 2011, the Australian Solar Institute (ASI) has now commissioned a CSP Review, to be led by IT Power and guided by a Stakeholder Reference Group of which AUSTELA is a member (along with CSIRO, Boston Consulting Group and others). The purpose of the CSP Review is to review and compile current data and research in Australia and internationally as to issues such as the cost, technology status, network value, storage value and projected cost improvements achievable for solar thermal power in Australia[6].

The ASI CSP Review is a timely and vital input into network development and regulatory reviews underway, including the 2011 and future NTNDP processes and the Transmission Frameworks Review, and into broader strategic energy issues to be addressed in the DRET Energy White Paper.

AUSTELA, in collaboration with the Institute for Sustainable Futures and UNSW, is also currently developing the scope for complementary research to investigate (among other attributes) the potential for solar thermal power systems to deliver capital efficiencies at a network level.

The period 2011-2012 will see the development and publication of material new information and analysis as to the role and value of solar thermal power in Australia's electricity system over the period to 2020 and beyond. AUSTELA urges AEMO to ensure that the progress and outcomes of the ASI CSP Review are closely monitored and factored into the data and information considered in the formulation of the 2011 and future NTNDP processes.

Close

Evolution of solar thermal electricity generation internationally has accelerated rapidly in the past 2-3 years.

There is more CSP generation capacity operating and under construction internationally than all the wind capacity in Australia today, and many times more than Australia's photovoltaic generation capacity.

CSP is a proven technology, now attracting strategic investment from the world's leading energy companies and utilities. Second-generation technology, large-scale deployment and significant new investments in cost-reduction programs are combining to accelerate the rate of cost reductions being projected and delivered.

Understanding is developing, and quantification is beginning to emerge, of the capital efficiencies available from solar thermal power generation at a network level through the

[6] www.australiansolarinstitute.com.au/documents/CallforProposals-ReviewofthePotentialforCSPinAustralia_000.pdf

dispatchability, ease of hybridisation, cost effective energy storage, and alignment to peak demand of solar thermal power generation.

It is vital that, in the development of the 2011 and future NTNDPs, AEMO ensures that simulations and scenarios are developed utilizing the most contemporary data and research available internationally in relation to solar thermal electricity generation systems.

AUSTELA stands ready to assist AEMO in this task.

Yours sincerely

Andrew Want| **Chair** | AUSTELA
M +61 408 956 210 | **E** andrew.want@vastsolar.com
Skype andrewwant09