



ENGINEERS  
AUSTRALIA

21 January 2013

Australian Renewable Energy Agency  
Submission – Draft General Funding Strategy  
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– BY EMAIL –

Dear Sir/Madam

**Re: Regional Australia's Renewables Program – Response to Consultation Paper**

Engineers Australia is the peak representative body for the engineering team in Australia. With over 100,000 members across Australia, we represent all disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia is organised geographically and into Colleges, National Committees and Technical Societies that facilitate the conduct of its learned society functions. This submission has been prepared by the Sustainable Engineering Society.

The Sustainable Engineering Society exists to promote information transfer regarding environmental issues of relevance to the environmental engineering profession and other environmental practitioners. Environmental Engineers are involved with all aspects of the natural and built environment and the Sustainable Engineering Society provides opportunities for members to network within their profession, as well as maintaining programs for continual professional education.

### **Overview**

Engineers Australia supports ambitious targets for reducing Australia's emissions. Reductions of the order of 25 percent (on 2000 levels) in greenhouse gas emissions by 2020, and 80 percent by 2050, would be an appropriate contribution to a global effort to contain greenhouse gas emissions to 450 ppm CO<sub>2</sub>-e (or less) in order to limit global average temperature rise to 2°C.

Nonetheless, the Sustainable Engineering Society strongly believes that a truly sustainable future path demands the more stringent target of 350 ppm CO<sub>2</sub>-e, noting that it is not certain that 450ppm will indeed limit global average temperature rise to 2°C.

Engineers Australia supports maintaining the Large Scale Renewable Energy Target (LRET) at not less than 41,000 GWh per annum.

Engineers Australia strongly endorses the Australian Renewable Energy Agency's (ARENA) remit to improve the competitiveness and increase the supply of renewable energy in Australia, strengthen energy security, and reduce greenhouse gas emissions. Engineers Australia considers investment in the Regional Australia's Renewables (RAR) program to displace fossil fuel-based generation with renewable energy, is essential to communities requiring energy for agriculture, water treatment, food processing, refrigeration and communications as the effects of climate change are felt across inland and coastal Australia.

## **Purpose of RAR Energy Investment Plan and Consultation Paper Scope**

### **Bold Vision**

Engineers Australia recommends that ARENA establishes a clear renewable energy vision that engages regional communities across Australia, embracing the economic, environmental and social/community benefits. This should include bold targets for each domain and encourage appropriate behavioural change/demand management – people can choose to change their usage patterns (i.e. elasticity) if the motivation to do so exists.

The RAR Investment Plan objective of economical displacement of fossil fuel power generation requires careful modeling of the levelised cost of energy (LCOE), when compared to grid-connected and 'fringe of grid' systems, and a more complete understanding of what is meant by 'economic' as distinct from financial.

Transmission and distribution costs of long rural and regional connections (for which there is little publicly available accurate data), and various subsidies, excise and tax concessions by state and federal Governments, should be considered and regulatory changes made to ensure pricing agreements are in place and returns to investors and communities are generated.

Major expansion and interconnection of the National Electricity Market (NEM) and (South West Interconnected System) grids is already underway, driven by the mandatory renewable energy target (large-scale renewable energy target and small-scale renewable energy target) and the need to balance major wind, solar and peak loads. This will provide grid connections to regional areas and 'fringe of grid' connections could expand rapidly. For off-grid systems, the modeling of renewable energy compared with fossil fuel systems will similarly need to recognise and reflect the various subsidies, tax and excise concessions, and provide community grid management, pricing and billing systems to ensure energy security and investment returns.

Some consideration should be given by ARENA to the emerging trends in renewables. Significant research and early stages of commercialisation are occurring around the world and within a relatively short timeframe we can expect to see some game-changing technologies being commercially ready. Hence, flexibility and a mindfulness of the likelihood of hybrid solutions becoming the norm would appear prudent.

### **Funding Streams:**

Engineers Australia supports the general thrust of the three funding streams: 'community', 'large-scale', and 'removing roadblocks'. However, what is not clear is the threshold limits for each of these streams. Does this mean that no capital subsidies apply to projects less than 100kW? Similarly, what about community projects larger than 1MW that are not large-scale? It is also unclear what is meant by 'hybrid-grid/off-grid' or 'hybrid renewable energy solutions'.

Engineers Australia strongly supports energy efficiency measures and would like to see this recognised in the ‘removing roadblocks’ stream. It is also unclear whether the funding streams would extend to the whole supply chain for renewable energy. An example of this could be building a local/regional manufacturing facility that develops and assembles the infrastructure, plant and equipment used in renewable energy systems, as this would support local capacity building, skill transfer and support long term economic activity. This supports Question 4.

#### Adoption of Relevant Measurement Indicators

Engineers Australia recognises that an important consideration and foundation for ‘sustainable development’ when examining longer term renewable energy options is to go beyond the LCOE metric by recognizing the Energy Return on Energy Invested (EROEI). Current solar photovoltaic technology requires little energy once operating, however the manufacturing cost and environmental and societal impact is very significant due to the energy required to produce the silicon wafers/cells. Typical EROEI are: solar photovoltaic 10, wind 50, hydro 50+, nuclear 6.5, coal 7, and gas 16.

Adopting EROEI as an important metric would encourage the necessary innovation required to develop/deploy the most appropriate renewable energy technologies that can best meet the objectives of ARENA.

#### MW or MWhrs:

Engineers Australia assumes that ARENA is aware of dispatched power (MWhrs) as a key metric for assessing renewable energy power delivery. A renewable energy system may have a theoretical capacity expressed in MW, however with utilisation of less than 20 percent (e.g. solar photovoltaic), the effective comparative capacity of such a facility to deliver power may be much less than an alternate renewable energy option with a higher utilisation factor.

#### **Removing Road-blocks to Renewable Energy Uptake (Question 3)**

Regional communities are challenged by droughts, floods, fires and changing rural economics and landscapes. Many envisage that projects to deliver renewable energy will cost them more than current fossil-based energy.

#### Incumbent Energy Providers

A potential road block is the role of the larger corporate energy providers whose role is almost exclusively commercial in orientation. As such, regulation may be required to encourage alternative behavior and/or the emergence of alternative providers that recognise and ensure the environment, social/community are each reflected in the commercial decision making process, leading to the building of local capacity, capability and economic wealth.

The existing large energy companies have the ability to create significant profit margins between the wholesale and retail price that is a significant disincentive to renewable energy solutions being developed<sup>1</sup>. Indeed, their aim of maximising profits for shareholders does not necessarily place the needs and interests of regional communities foremost, as this need

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<sup>1</sup> For example, the highly acclaimed Hepburn Community Wind Farm (4.1MW) sells its power into the grid at a lowly 6c/kWhr and its members are then required to buy back the power at standard market rates of up to 30c/kWhr. Such pricing disparity becomes a disincentive for others to replicate this otherwise excellent model. Hence, more effective power purchase agreements would encourage the adoption of such innovative renewable energy projects.

combines the provision of affordable energy, social equity and environmental responsibility. The latter two considerations are not a prerequisite for incumbent energy companies to generate profits. Notwithstanding these local constraints, community based renewable energy solutions are growing in popularity and success in northern Europe.

### Adoption of Cleaner Fuels

Engineers Australia recommends that the current fuel tax for alternative fuels be reviewed and brought into line with the objectives of ARENA. Creating a demand for biofuels, over fossil fuels, could have a tremendously positive effect on regional economies (and supply chains), environment and communities. It could also play a pivotal role in the future mix of renewable energy hybrid energy solutions.

### Exemplar of Success

The Centre for Appropriate Technology (CAT) and the Bushlight project, (2011 Engineers Australia Excellence Award winner, and winner of the Sir William Hudson award) have successfully rolled out 140 systems in remote indigenous communities. They have also developed a number of >100kW grid-connected systems under the Alice Solar City project. CAT remote community 100kW systems demonstrate the community consultation, project management, training and maintenance model that could apply to larger systems on a national basis. Here we draw attention to the submission from CAT General Manager Lyndon Frearson (Engineers Australia Young Professional Engineer of the Year Award winner in 2011).

### **The RAR Program Proposed Program Outcomes (Question 1)**

The proposed 50MW offset of (mostly diesel) renewable energy by 2020 is too low and is likely to have little material impact. Indeed, one renewable energy installation at one or two mining facilities could account for 50MW alone (e.g. a large drag line consumes 6MW). Demand for 100kW to 1MW community off-grid systems ('mini grids') may well be high, with at least 80 percent backup (diesel) required to make them viable. Petroleum diesel<sup>2</sup> and gas generation could be phased down (to 20 percent) as confidence in renewable energy storage and system management is gained. The technology and commercial viability of such systems is well established and proven, with potentially further innovation in mini grid management, storage systems and component cost reductions.

The 2 X 10MW remote site renewable energy target is not sufficient, as there are many sites where agriculture, tourism, food processing and refrigeration, water treatment and community require a 10MW system or greater. 10MW is sufficient for mining, milling, concentrating and transport of some minerals, however miners generally minimise capital expenditure, have short investment write-off times and are opposed to renewable energy unless it is cheaper, as reliable and flexible as diesel generators, and easily managed and maintained. Changes in commodity prices, ore quality and corporate ownership may leave renewable energy investment stranded, although coupling renewable energy investments to life-of-mine capital investment criteria could be an attractive proposition from the project initiation stage.

Mining companies are increasingly sensitive about ensuring their operations are environmentally responsible and have a community engagement benefit. Hence, renewable

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<sup>2</sup> The use of biodiesel/ethanol (Generation 2) ought to be encouraged as a liquid renewable energy.

energy systems, within acceptable commercial constraints, are likely to be attractive to some miners, and they do have the technical capability and motivation to ensure that community benefit of renewable energy system solutions is an inherent part of managing business risk. However, most miners are unlikely to venture down the renewable energy path without a compelling commercial and risk-adjusted basis.

#### **Knowledge and Information Sharing (Question 4)**

A knowledge sharing system and database will be required to support communities and projects and ensure information is valid and accessible. This will include financial and contract advice, progress and cost tracking, management, and training and maintenance issues. Intellectual property, commercial and contract confidentiality and other project rollout issues have to be addressed. Engineers Australia strongly supports the concept of piloting regional renewable energy programs that demonstrate a high level of replication and facilitate local capacity building and knowledge/skill transfer.

#### **RAR Successful Implementation Assessment (Question 5)**

As previously indicated, the target of 50MW by 2020 should be revised upwards as we believe this figure is too low to affect the type up uptake ARENA is seeking.

- Community Projects (<1MW) contributing up to 200MW by 2015: Early identification, feasibility assessment and community engagement for projects contributing to a total of 100-200MW. This would see hundreds of small projects spawning across Australia (e.g. Hepburn Community Wind Farm has a capacity of 4.1MW).
- Larger Projects (up to 10MW) contributing up to 200MW by 2015: Early identification, feasibility assessment, community engagement and a bankable business case for projects contributing up to 200MW would contribute significantly to off-grid mining requirements.

This submission has been prepared in consultation with the Alternative Technology Association (ATA). The Sustainable Engineering Society has a cooperative relationship with ATA and broadly supports its aims and objectives.

Should you have any questions about this submission, or Engineers Australia's position more broadly, please do not hesitate to contact me directly, either by telephone on 02 6270 6544, or by email on [BJackson@engineersaustralia.org.au](mailto:BJackson@engineersaustralia.org.au).

Thank you for consideration of this submission.

Sincerely

**INSERT SIGNATURE**

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