



**ARREA**

*Researching Australia's Renewable Energy Future*

## ARREA Submission

### Select Committee on Wind Turbines

Select Committee on Wind Turbines  
PO Box 6100  
Parliament House  
Canberra ACT 2600

## Introduction

ARREA believes Renewable Energy is very important for the sustainability of Australia's future. As outlined in the ARREA Submission of May 2014<sup>1</sup>, Review of the Renewable Energy Target, it is of grave concern that the *Renewable Energy (Electricity) Act 2000* ("the Act"), and associated Acts, and associated Regulations ("the Regulations"), together hereafter referred to as ("the legislation") have not achieved its objectives to date and therefore will not achieve its objectives by 2020.

## Terms of Reference

This submission directly addresses the second headline terms of reference being the "**economic impact of wind turbines**", including the associated matters on how effective the Clean Energy Regulator (CER) has been, the adequacy of monitoring, the 'energy and emission input and output equations' and related matters.

## Economic Impact of Wind Turbines

In order to assess the economic impact, historical performance data is a crucial and fundamental benchmark against which the Select Committee can verify the economic impact of wind turbines.

This historical data provides the performance measures (key performance indicator – KPI's), which can then be assessed against the Objects of the Act, namely being to encourage additional generation from renewable energy sources, reduce greenhouse gas emissions (GHG) in electricity sector and ensure renewable energy sources are ecologically sustainable.

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<sup>1</sup> <https://retreview.dpmc.gov.au/sites/default/files/webform/submissions/ARREA%20Submission%20-%20Review%20of%20Renewable%20Energy%20Target.pdf>

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Under the current regime adopted by the CER, it appears that no real effort has been made by the CER to verify the claims of the wind industry as to the actual performance of wind turbines as they relate to the fundamental task of reducing GHG emissions in the electricity sector.

This is despite voluminous data being collected and publications being released – that have no direct financial impact under the Act (which this issue does) but rather support the wind industry.

In particular the CER refers to early/preliminary assumptions (including in external consultants reports) of a 100% effectiveness of wind in offsetting CO<sub>2</sub> – but has taken no known action to verify these assumptions, or if it has, the CER has failed to advise the Government or the wider Australian community that under current policy settings subsidises the wind industry through higher electricity prices to the tune of many millions of dollars each year.

The current lack of performance measurement is not acceptable – it would not be tolerated in any other industry let alone one reliant on mandated subsidies. The CER should be admonished for this failure to properly monitor the true impact of an industry that comes at a high cost to the nation's economy and electricity consumers in particular.

Many are asking is this 'regulator' asleep at the wheel (refer to HIH Royal Commission findings) – or do they already have information they are not acting upon or have failed to provide to Government or the community?

While performance measurement should be a fundamental and first step in any management regime, particularly where taxpayer funds and electricity consumers are involved, of equal concern is the impact this lack of measurement has on the CER fulfilling its responsibilities under the Act and the Regulations. There are

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financial flow-on impacts to electricity consumers and in respect of Public Monies received (via inappropriately issued RECs).

If the CER has already carried out – as ARREA has done – a detailed analysis of the actual performance of the wind industry operations, it should make its analysis of that data public. The CER should have taken action as we have outlined below, and if it has not, the CER should be held accountable to explain to both the Australian Parliament and the Australian public why it has not acted.

Ultimately, it is through Federal Government legislation that the public funds the wind industry. The CER should as a result and as is required by the legislation, have a wider view of their role than unquestioningly supporting the wind industry as it openly seeks to maximise its financial claim on the public purse.

That claim is very substantial: between 2015 and 2031 the LRET requires electricity retailers to purchase and surrender 587 million RECs; with RECs soon to trade at a price in order of \$94 (as designed under the policy), the total value of those certificates will exceed \$55 billion.

That entire sum will be recovered by retailers via retail power bills, as a federal tax on all Australian electricity consumers, and returned mainly to wind power generators as a government mandated subsidy. This represents the largest single industry subsidy scheme in the history of the Commonwealth.

Yet despite its scale, there appears to have never been a cost/benefit analysis to determine whether there is any net benefit attached to the LRET policy and/or the value of the subsidies mandated under it.

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In a recent report carried out by Rupert Darwall, "*Central Planning with Market Features*"<sup>2</sup>, the author observes in relation to the UK's energy policy, inter alia, that:

Foundational Error. The turning point which led to the demise of the market was not proceeded by extensive policy appraisals or analysis of alternatives to the market, but from the adoption of the renewables target at a European Council meeting. Target-driven policy objectives are inflexible. They prevent exploration of trade-offs. The more compressed the deadline, the higher the costs. The overriding focus on meeting the target narrows the field of vision, so that emerging difficulties from other countries, notably Spain and Germany, were ignored as evidence for reappraising the target.

#### **Policy Lesson #4**

Setting a target before analysing the costs, operational implications and likely unintended consequences, without considering alternatives constitutes the foundational error in the entire process from which, in one way or another, subsequent errors flowed.

Form over function. Having decided to adopt a renewables target, there has been no comprehensive analysis of its costs, benefits and implications for the market. In particular, decision - makers did not ask what exactly electricity consumers get in return for the use of high cost private sector capital and whether it represented value for money for them.

#### **Policy Lesson #6**

Before adopting EMR [Energy Market Reform], policymakers should have evaluated it against a public sector comparator so that the net cost/benefit of

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<sup>2</sup> "Central Planning with Market Features: How renewables subsidies destroyed the UK electricity market", Rupert Darwall, March 2015.

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using private sector capital is identified and quantified, rather than being implicitly assumed.

ARREA adopts those observations, and Mr. Darwall's report, as part of its submission; they are directly applicable to the LRET and the cost of the subsidies awarded under it. Moreover, the failure of the CER on behalf of the Australian government to have carried out a cost/benefit analysis of the policy, upon which the LRET is based, represents a regulatory policy failure of monumental proportions. The economic implications flowing from that failure for Australia, both in terms of its electricity market and the broader economy, are precisely those identified in Mr. Darwall's report.

There can be no justification for permitting that failure to continue: with more than \$50 billion in subsidies to be directed to wind power generators over the remaining life of the LRET, a proper, independent cost/benefit analysis must be carried out as a matter of urgency and advised to Government and the Australian public who ultimately fund the scheme.

At least one aspect of such an analysis should involve an investigation into the veracity of claims made by the wind industry that wind power generation reduces or abates CO2 emissions in the electricity sector.

If those claims can be verified, to any extent, that analysis should go on to investigate what actual reduction or abatement of CO2 emissions is attributable to wind power generation; and further investigate the total cost to electricity consumers (whether through direct subsidies or other components of their retail power bills) of any such reduction or abatement found to exist.

If the 2<sup>nd</sup> Object under the Act (reducing GHG CO2 emissions) and the 3<sup>rd</sup> Object (be ecologically sustainable) are to be met, the *encouragement of additional*

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*generation* (1<sup>st</sup> Object) must be achieved by displacing thermal production not by duplicating it. If not, it is not 'additional', it is 'duplicated'.

**ARREA will provide an important preliminary analysis of this historical performance data.**

We are pleased to advise the Select Committee that to fill this key gap in the CER and Government's knowledge we have taken the very necessary step of commissioning international research to independently investigate the effectiveness of wind power in reducing GHG emissions from electricity generation in Australia during 2014, crucially using empirical 5 minute data from the 256 grid connected generators.

**CO2 Emissions Savings from Wind Power in the National Electricity Market (NEM), by Dr Joseph Wheatley, Biospherica Risk Ltd, Ireland.**

This research will be provided to the Committee as a completed Phase 1 report made available by 3 May 2015. Appendix A provides further details.

**Stage 1 Report Findings - CO2 emissions savings from wind power in the NEM.**

#### **Key Findings**

- 1. The best empirical estimate of emissions avoided was found to be 6.2MtCo2 in 2014.**
  - 2. Wind power generated 8.7TWH or 4.5% of the NEM's electricity but only reduced emissions by 3.5%. With a 95% confidence level wind power in the NEM in 2014 has an effectiveness in terms of emissions reduction of only 78% (being 3.5%/4.5%).**
  - 3. The possibility that wind power is 100% effective (as is the current basis for issuing REC's) is rejected.**
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4. **The 34 industrial wind turbine complexes have installed capacity of 3394MW and produced on average 970MW – they have a capacity factor of under 30%.**

As a result, of analysis of the actual data in the NEM in eastern Australia in 2014 shows that wind power production has overstated the emissions reductions by 22% (100%-78%) and this percentage will continue to increase if the percentage of wind power entering the NEM increases.

### **Impact of key findings**

#### **a. Legislative**

Under S18(1) of the Act the nominated person for an accredited power station may create a certificate for each whole MWh of electricity generated. That is one certificate for one MWh (1:1 relationship).

However under S18(3) of the Act, the amount of electricity generated by an accredited power station is to be calculated in accordance with the regulations.

**Under Regulation S15A(a) Electricity omitted from this calculation includes electricity that was generated by using an eligible renewable energy source that is not ecologically sustainable.**

Ecologically Sustainable (S5) means that *an action is consistent with the following principles of ecologically sustainable development:*

*(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*

Including the 22% of ineffective wind production in this calculation is clearly not consistent with this decision making process, particularly concerning long and short-term economic and equity considerations.

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*(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*

Including the 22% ineffective wind production does raise a threat of serious environmental damage through the relative financial impacts on other renewable energy sources particularly given the wind industry's already high renewable subsidy market share. Excluding the 22% of ineffective wind is an action consistent with this principle, while using the current 100% figure is not. 'Pinpointing' the exact effectiveness percentage at a given point in time should not be a reason for postponing. The CER needs to take action on this as a matter of priority.

*(c) the principle of inter-generational equity, which is that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*

Including the 22% ineffective wind production is clearly not consistent with this principle. In particular, asking this generation of Australians to pay for the wind industry's ineffectiveness is not appropriate and does nothing to maintain or enhance the environment for future generations – it actually reduces this capacity.

*(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*

N/A -Including the 22% ineffective wind production does concern biological diversity and ecological integrity.

*(e) improved valuation, pricing and incentive mechanisms should be promoted.*

Including the 22% ineffective wind production is clearly not consistent with this principle. In particular, it clearly diminishes valuations and distorts pricing. This includes the displacement of gas as a significant energy producer of energy, particularly when its emissions are around half that of coal.

Excluding the 22% ineffective wind production promotes improved valuation, pricing and incentive mechanisms.

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**The approach taken above is also what Parliament intended for Regulation S15A(a).** This regulation was inserted by Selected Legislative Instrument 2007 No336, the Explanatory Statement of which includes:

- The purpose of clarifying the meaning of eligible renewable energy sources **and sources that are not eligible renewable energy sources.**

This issue was also at the core of the Amending Act – REE (Amending Act 2006), with the same Explanatory Statement stating it “**enhances market transparency** and improves business certainty, provides increased opportunities for solar and bioenergy technologies, and **improves the operational effectiveness and efficiency** of the Act”.

1. **Through the ARREA sponsored study, it has now been clearly established, using the empirical actual 2014 data, that 22% of the electricity generated by using wind as the eligible renewable energy source, is not ecologically sustainable.**
2. **Under S18, this shows clearly that nominated persons can now only create 0.78 of one certificate for every one MWh produced by wind (0.78:1 relationship).**
3. **Furthermore this (0.78:1) relationship will continue to decline if more turbines are placed in production.**

**b. REC Register**

The [official REC Registry](#) confirms 8,399,885 certificates (excluding WA and NT) in generation year 2014, by wind.

Based the best empirical estimate of emissions savings, only 6,200,000 have been appropriately authorised under S18(1) of the Act.

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Based on the 78% effectiveness shown, with 95% confidence level, the number appropriately authorised therefore under S18(1) of the Act, should have been 6,551,910.

**That means the number of unauthorized 2014 certificates is between 1,847,975 and 2,199,885 with a high degree of confidence.**

Using the CER published 2014 volume weighted average market price of \$35.24 per certificate. **The dollar value of these unauthorized certificates that did not lead to a reduction in emissions is between \$65.1M and \$77.5M in 2014.**

While the immediate abatement and cost of abatement implications of this empirical evidence are compelling, it is of concern that the situation will only further deteriorate over time.

The Wheatley study commissioned by ARREA shows that by 2020, if the current policy continues and wind was allowed to achieve 15% penetration, its effectiveness is highly likely to drop to around 50%.

For the Government and the Australian community that fund the subsidies that support renewable energy, this means that wind electricity production is ultimately self-defeating in abatement terms, for policy objectives and for the purposes of the Act.

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### **Conclusion**

As we indicated at the outset, ARREA believes renewable energy is very important for the sustainability of Australia's future.

However, the current policy settings in regard to wind turbines are flawed and their implementation has led to systemic failure.

The simple production of electricity from wind, subsidised or otherwise, to the extent it does not effectively offset thermal production volume, does not serve any material economic purpose for the nation.

Wind power duplicates electricity production, distorts market signals, especially compared to other renewable energy sources, and leads to inappropriate public perceptions about the value of wind power to the long-term sustainability of our nation.

We urge the Government to act on this significant flaw in its current policy settings.

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## Recommendations

That this Committee

1. Receive the full Phase 1 report - CO2 Emissions Savings from Wind Power in the National Electricity Market (NEM), by Dr Joseph Wheatley, Biospherica Risk Ltd, Ireland.
2. Obtain an assurance from the CER that nominated persons – the wind energy companies - will be advised of the need to apply, consistent with the Act and its regulations, a 0.78:1 relationship when issuing certificates.
3. Confirm that the Regulator will use its powers under the Act, including Part 15A Civil Penalty Orders and/or Enforceable Undertaking under S15B, to uphold the purposes of the Act.
4. Seek that the Australian National Audit Office (ANAO), conduct a performance audit on the CER's compliance with its role under the legislation. In particular:
  - a. What information did the CER hold on wind effectiveness in offsetting CO2 emissions at both 30 June 2014 (end of financial year) and 3 May 2015?
  - b. What Risk Management and Fraud Mitigation practices and processes are in place, have they been appropriate? If not, who should be held responsible and what rectification actions is required.
  - c. If all public monies collected in respect of the Act are appropriate.
  - d. If there are financial or other incentives, including but not limited to, the collection of public monies under the Act that are distorting the CER's role in achieving the Objects of the Act.
  - e. If the expenditure of public monies by the CER has been appropriately focused on achieving the Acts objects.

Ends

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Appendix 1**Phase 1 - CO<sub>2</sub> Emissions Savings from Wind Power in the National Electricity Market (NEM), by Dr Joseph Wheatley, Biospherica Risk Ltd, Ireland.**

Investigate the effectiveness of wind power in reducing CO<sub>2</sub> emissions from electricity generation in 2014 using a systems-based, empirical method.

**Inputs:** 5-minute generation data for 268 grid-connected generators, 5-minute interconnector flows (including losses), estimated thermal generator characteristics. (AEMO)

**Methods:** Extension of the empirical wind/emissions Ireland model<sup>3</sup> to the larger spatial-scale, interconnected NEM. For the purpose of wind power impacts, the NEM as a whole is treated as a collection of state-level sub-systems coupled via interconnector flows. This model will be implemented via custom-written computer code, with numerical and graphical outputs.

**Milestones:**

- Data acquisition, cleaning, exploratory analysis.
- Empirical overview of grid operation in 2014 including fuel-mix, wind generation, capacity displaced by wind, interconnector flows, role of hydro.
- Estimation of 5-min CO<sub>2</sub> emissions time-series at plant level from generation data and estimated/sourced thermal plant characteristics. Verification.
- Development of grid-scale CO<sub>2</sub> wind/emissions model based on coupled state-level models. Fitting of this model to state-level data and extraction of emissions parameters.
- Overall emissions savings (tCO<sub>2</sub> & tCO<sub>2</sub>/MWh) including statistical error and the influence of parametric uncertainty.

In view of the time-line of the Select Committee, the project will be divided as follows.

- Initial submission to Senate Select Committee in the form of an interim report summarizing the underlying technical issues, giving any available preliminary results and identifying relevant data deficiencies (ASAP).
- Complete phase 1 study delivered before May 15. International comparisons and proposal for further investigation.

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<sup>3</sup> [1] *Quantifying CO<sub>2</sub> savings from wind power*, Joseph Wheatley, Energy Policy, 2013, vol. 63 C, p. 89-96