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Submission to the Review of the Renewable Energy (Electricity) Act 2000

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Background

The Mandatory Renewable Energy Target Scheme (MRET), established by the Renewable Energy (Electricity) Act 2000, requires Australian electricity retailers and other large buyers of electricity (liable parties) to collectively source qualifying electricity in increasing annual amounts between 2001 and 2010 to a plateau of 9,500 GWH per year between 2010 and 2020 when the scheme terminates.

The MRET scheme is a baseline and credit scheme. It permits a Renewable Energy Certificate (REC) to be created for each qualifying MWH of electricity generated above an assigned baseline, which is zero for generators installed after 1997. RECs can also be created for solar water heaters. "Liable parties" are obligated to surrender their quota of RECs to the Renewable Energy Regulator each year or pay a penalty of $40 per REC for any shortfall.

The Act requires an independent review of its operation to be undertaken after two years. This review is now underway and in this submission, we address in turn:

- the objectives of the Act, and how these support the wider climate change policy objectives of the Federal Government,
- the underlying design of the MRET scheme, and the broader policy framework in which it is embedded, and
- the terms of reference for the review.

Policy Objectives of the Renewable Energy (Electricity) Act

The objects of the Renewable Energy (Electricity) Act 2000 are:

(a) to encourage the additional generation of electricity from renewable sources; and
(b) to reduce emissions of greenhouse gases; and
(c) to ensure that renewable energy sources are ecologically sustainable.

Encourage additional generation of electricity from renewable sources

The term "additional generation" is well defined for a generator that entered service after 1997 but is less well defined for a generator that entered service before then. For pre-1997 generators, the intent of the scheme is to encourage investment in improved conversion efficiency. However,

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the inflow into a hydro storage or the average wind speed experienced by a wind farm vary from year to year and it is difficult to separate additional generation due to an enhancement in conversion efficiency from additional generation due to an increase in the (stochastic) annual renewable energy flux available to the generator.

Furthermore, in the case of an isolated power system such as in Tasmania that in most years is supplied solely by renewable energy from pre-1997 hydro generators, the annual generation of electricity from renewable energy resources cannot exceed the total demand for electricity (including network losses). The annual renewable energy generation will increase with load growth, so long as it does not become resource-constrained. In this situation, an increase in generation due to load growth may be mistaken for an increase in generation due to efficiency improvements. The ambiguity is further complicated by the presence of multi-year storage and because the conversion efficiency of a hydro power station varies with pond level and generator power level.

Difficulties in interpreting "additional generation" for existing generation have manifested themselves in controversy surrounding baseline setting for pre-1997 generators and in the asymmetric treatment of annual generation above and below a non-zero baseline. Thus, a renewable energy generator is permitted to create RECs when its annual energy production is above its baseline but is not required to surrender RECs when its annual production is below its baseline.

The term "renewable resources" is well defined for resources such as wind and solar (so long as the fraction of resource utilised remains low) but is less so for biomass resources, which usually form part of an ecosystem (municipal waste landfill may be an exception). This has created difficulties in the application of the term renewable resources, which will be discussed further under the topic of ecological sustainability.

Thus there have been practical difficulties in the interpretation of both "additional generation" and "renewable resources" in the application of the Act. These are particular manifestations of the "free-rider" problem that arises in any credit-based scheme.

Reduce emissions of greenhouse gases

The construction of any renewable energy generation facility requires some "investment" of energy and other resources, which may have greenhouse emission implications. However, the energy payback time for a renewable energy conversion device is usually much shorter than its operating life.

Some biomass resources, such as municipal waste landfill and hydro storages, may emit greenhouse gases throughout their operating lives through naturally occurring decay processes. Other renewable resources, such as wind and solar energy, have zero greenhouse gas emissions in operation. Renewable energy generators reduce the overall greenhouse gas emissions associated with electricity generation so long as they displace generators with higher emission coefficients. This will generally be true if renewable energy resources are used to displace fossil fuels.

Furthermore, fossil fuels are in mineral storage, where they have been sequestered for millions of years and are likely to remain so without human intervention. Using current power station technology, the extraction and combustion of fossil fuels returns their stored carbon to the atmosphere, from which it may be extracted and sequestered through biological processes. Biological carbon is only re-sequestered as fossil fuels at a very slow rate and is at far greater risk of re-emitted into the atmosphere than carbon sequestered as fossil fuels.

In principle, CO_2 can be captured after fossil fuel combustion and returned to mineral storage as "geo-sequestration" (PMSEIC, 2002). However, except in unusual circumstances geo-sequestered carbon would still be at greater risk of returning to the atmosphere than the fossil fuel resource from which it was first extracted, particularly if that fossil fuel resource was coal. Re-injection of CO_2 from the combustion of natural gas into old gas reservoirs seems more likely to be in balance from the perspective of long-term climate change risk.

The use of renewable energy resources to displace fossil fuels has a long-term benefit of risk reduction as well as an immediate benefit of emission avoidance. Moreover, because of sequestration risk issues, the highest priority should be to displace the use of coal. The Australian electricity industry is heavily dependent on coal-fired power stations. Therefore, electricity from renewable energy resources can make a particularly important contribution to reducing Australia's climate change emissions. The MRET target should be increased rather than held constant or reduced and a complementary policy of emission taxes or emission permit trading should be introduced.

Ensure that renewable energy resources are ecological sustainable

The Act defines *ecologically sustainable* to mean an action that:

> 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;
> (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;
> (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;
> (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making;
> (e) improved valuation, pricing and incentive mechanisms should be promoted.

The generation of electrical energy from renewable energy resources is not necessarily ecological sustainable (Outhred et al, 2002). Threats to environmental sustainability can arise from the characteristics of the renewable energy resource (most biomass forms part of an ecosystem) or as a result of the energy conversion process (a hydro power station will disturb a river ecosystem even if the water is returned to the same river after use, and wind turbines may kill birds). There are also the social and economic dimensions of ecological sustainability to consider. Absolute sustainability may not be an achievable option, thus judgements have to be made about what is an acceptable approximation.

Thus renewable energy projects should be assessed for the adequacy of their ecological sustainability, which may depend on evaluation processes associated with other Federal and State legislation as well as the Act. In some cases the assessment can be safely undertaken at a project level, in other cases a regional assessment is required because of the scope of the issues involved.

Federal and State legislation does not yet appear to provide a coherent and consistent assessment of ecological sustainability for renewable energy projects, particularly in the context of regional rather than project level evaluations.

Climate change policy and the role of renewable energy

The objects of the Renewable Energy (Electricity) Act 2000 are consistent with the wider climate change policy objectives of the Federal Government. These are for Australia to meet its Kyoto target and prepare for the large-scale reduction in emissions required over the coming century, in a way that best supports continued economic development (Australian Government, 2002).

Renewable energy will play a vital role in climate change response strategy (IPCC, 2001; MacGill and Outhred, 2003a). However, innovation will be required for renewable energy technologies to contribute effectively to the challenging long-term goal. RD&D is important, particularly for technologies that are still in an early stage of development. However, commercialization also presents great challenges and requires demand-pull as well as supply-push policy measures (Norberg-Bohm, 2000). In particular, the 'costs' of new energy technologies can be greatly lowered through government support that drives learning from experience and economies of scale in these industries. MRET provides demand-pull by 'creating' a market for increased renewable generation.

The short-term economic costs of greater renewable energy generation seem to be very modest (MMA, 2002). Renewable energy can also offer other environmental, social and economic benefits. For example, renewable generation projects have advantageous investment and job creation opportunities in comparison with conventional energy options (MacGill et al, 2002). The creation of a vibrant and competitive renewable energy industry in Australia would provide many economic benefits over a medium to long time frame.

Demand-pull measures for renewable energy are necessary but unlikely to be sufficient to meet the government's long-term objectives without a wider policy framework that prices the 'externalities' of fossil fuel usage, and addresses other barriers to the longer-term transformation of the Australian energy sector away from conventional fossil fuel generation. It is important to note that the MRET scheme is compatible with emission taxes or emission permit trading, which would raise the wholesale price of electrical energy. Assuming an efficient market in RECs, the price of RECs would then fall to a level at which the combined cash flow from electricity and REC sales was sufficient to make the marginal renewable project viable. Renewable energy technologies are also likely to become more competitive with fossil fuel technologies over time. If this happened, the price of RECs would again fall accordingly.

Renewable energy will be an essential part of any long-term response to climate change. The MRET scheme is an innovative, market-based mechanism that drives innovation in renewable *energy technologies through demand-pull, reducing the cost of meeting the government's long-term climate change policy target. It is compatible with emission permit trading because the price of RECs would automatically fall if an emission cap were to be introduced. Thus there is no justification for withdrawing the MRET scheme on the introduction of emission trading as recommended in the COAG Energy Market Review Final Report (COAG, 2002).*

Design of the MRET scheme

There is worldwide interest in market-based approaches to achieve environmental objectives (MacGill, Nolles and Outhred, 2003). They may offer economic efficiency advantages over 'command and control' regulatory measures by letting market forces 'determine' the least cost means to achieve particular environmental ends. Note, however, that there are other barriers to renewable energy apart from financial ones. For example, there is as yet poor understanding of renewable energy within the community and institutional arrangements favour incumbent technologies. Therefore the policy framework that surrounds the MRET scheme is also important in minimising cost.

MRET is a baseline and credit scheme that supports electricity from renewable energy resources through a mandated 'designer' market. Specifically, the objects of the Act are achieved:

> …through the issuing of certificates for the generation of qualifying electricity and requiring certain purchasers[2] (called liable entities) to surrender a specified number of certificates for the electricity that they acquire during a year. Where a liable entity does not have enough certificates to surrender, the liable entity will have to pay renewable energy shortfall charge.

Renewable energy certificates (RECs):

> …are created by people who generate power from accredited power stations using renewable energy sources where the amount generated exceeds the relevant 1997 eligible renewable power base line. The certificates are also created for approved installations of solar hot water heaters.

To avoid inefficiencies, designers of credit-based schemes face the difficulties of defining the "good' for which the credit will be given, establishing a baseline above which credits will be granted and determining a horizon beyond which credits will no longer be awarded. As previously discussed, the MRET scheme is controversial in all respects.

While there is probably no way to completely eliminate the controversy surrounding the design of the MRET scheme, the following steps would assist:

- *introduce a tax or permit-based trading scheme for climate change emissions, which would increase the price of electricity and thus reduce the price of RECs necessary to make qualifying electricity cost-effective*
- *rather than terminating the scheme at 2020, define a maximum period following entry into service for a new generator, or following scheme commencement for an existing generator, during which a generator could could create RECs from qualifying electricity (a period such as 15 years would be sufficient to justify the behaviour that is sort - investment in new generation or upgrade of existing generation; award of credits beyond such a period could be regarded as superfluous)*

[2] Qualifying self-generators are not liable entities

- *set a baseline equal to long term expected yield for generators in an isolated renewable-energy only power system, such as in Tasmania*
- *require any generator that created RECs for annual energy above its (non-zero) baseline to also surrender RECs equal to the shortfall when it produced below its baseline*

The MRET scheme uses an annual acquittal procedure. This is too infrequent to support good price formation and thus market efficiency. Also, the MRET scheme does not place a time limit on creation of RECs, which is not conducive to well-informed forward trading. These features detract from the effectiveness of the scheme, as they increase the risk faced by potential investors in renewable energy projects and thus the REC price required to induce investment.

The effectiveness of the MRET scheme could be improved by the following design changes:

- *acquittal by liable parties on a quarterly basis according to a seasonal pattern*
- *determination of baseline overs and unders on a quarterly basis according to a seasonal pattern (with associated creation and surrender of RECs)*

Terms of reference for the review

The Renewable Energy (Electricity) Act 2000 incorporated an independent review of its operation to be undertaken after two years and specified a list of issues for the review to consider. The Review Panel has added to these in establishing the final terms of reference, on which we have the following comments.

(a) the extent to which the Act has:

(i) contributed to reducing greenhouse gas emissions

There is little doubt that the MRET scheme has contributed to investment in new renewable energy generation as well as enhancements to the conversion efficiency of existing power stations. The increased renewable energy generation has displaced some fossil fuel generation, although the amount to date is minor. By 2010, the MRET scheme would reduce emissions by the order of seven million tonnes per year (approximately equal to the emissions from a 1000MW black coal power station), assuming that the 9,500 GWH pa was additional to renewable generation that would otherwise have occurred (there are likely to be some “free rider” effects). The longer-term contribution of the scheme will depend on how its rules evolve.

(ii) encouraged additional generation of electricity from renewable energy sources

All “credit” schemes carry risk of “leakage” through eligibility and baseline ambiguities and award of credits beyond the period needed to achieve the desired behaviour. Hydro baselines, biomass accreditation and solar water heater deeming appear to be the main areas of controversy for the MRET scheme. The deeming provisions for small photovoltaic systems may undervalue their production.

iii) ensured that renewable energy sources are ecologically sustainable.

Some renewable energy projects are controversial and it seems unlikely that the Act alone could ensure that all renewable energy projects were sustainable. Rather, the set of Federal and State legislation that assesses projects for sustainability should be reviewed with regard to its overall consistency and efficacy, particularly for sustainability issues that are regional in nature rather than project-specific.

(b) the extent to which the policy objectives of this Act have been achieved and the need for any alternative approach

The Act provides essential demand-pull for renewable energy generation but cannot, in itself deliver its objectives in a cost-effective way. It should be seen as an important part of a broader, coherent and consistent policy framework that in total delivers the government's policy objectives. Planning regimes and support for innovation are important parts of this broader framework. For example, investor confidence has been undermined by the recommendation by the CoAG energy market review panel to abolish the scheme (Parer et al, 2002).

(c) the mix of technologies that has resulted from the implementation of the provisions of this Act

The nature of the MRET scheme is that it promotes technologies that are closest to commercial viability. Existing hydro, solar water heaters and wind energy appear to be the main beneficiaries to date. However, this may change over time as the best available options are exploited. Biomass projects may face a harder challenge than other technologies in establishing ecological sustainability. Some photovoltaic technologies are mature but all are currently expensive and only those who perceive values other than electricity generation install grid-connected photovoltaic systems. Other electricity generation technologies, such as wave, tidal and solar thermal, have yet to achieve near-commercial status.

(d) the level of penalties provided under this Act

Given the objects of the Act, the shortfall charge should be set above the value needed "to encourage additional generation from renewable energy sources". Otherwise it would simply become a tax on electricity purchasers. The shortfall charge has yet to have a significant effect on the scheme to date. This may change over time as the most competitive projects are exploited.

(e) the need for indexation of the renewable energy shortfall charge to the Consumer Price Index to maintain the real value of the charge and the associated penalty charge

The failure to index the shortfall charge to CPI is a policy decision in itself. Unless the shortfall charge is indexed to maintain its real value, there will be a time at which the scheme simply becomes a taxation measure. This would not be consistent with the objects of the Act.

(f) other environmental impacts that have resulted from the implementation of the provisions of this Act, including the extent to which non-plantation forestry waste has been utilised

This question goes beyond the powers of the Act to the broader legislative framework that assesses the ecological sustainability of renewable energy projects. As previously indicated, there appear to be deficiencies in that regard, particularly for issues that require regional, rather than project-specific consideration. This applies to all renewable energy projects including but not limited to biomass.

(g) the possible introduction of a portfolio approach, a cap on the contribution of any one source and measures to recognise the relative greenhouse intensities of various technologies

The MRET scheme should not be regarded as a panacea for solving all problems faced by renewable energy technologies. Rather than a portfolio approach to the MRET obligation, which would inevitably introduce more controversy, it would be better to develop the broader policy framework surrounding the MRET scheme to promote the development of less-commercial technologies and lower-emitting fossil fuel options.

For example, an emission tax or permit trading scheme would "recognize the relative greenhouse intensities of various technologies" while also preferentially supporting low-emission fossil fuel options. Likewise, a compatible innovation strategy would provide more appropriate support for renewable energy technologies that still at a pre-commercial stage. Photovoltaic systems, which are commercial in niche markets but not yet competitive in cost for grid-connect applications in Australia, require market pull on a global scale to overcome the cost barrier that they currently face.

(h) the level of the overall target and interim targets

The interim targets are sufficiently small to be seriously affected by "leakage" issues associated with baseline setting and the asymmetric treatment of baseline "overs and unders". These problems could be overcome either by lifting the interim targets or by reducing the leakage problems through design changes such as those previously discussed. The latter approach would be more economically efficient than the former. Increasing the overall target would enhance the prospects of a strong vibrant renewable energy industry that could contribute to the challenging task of substantially reducing emissions in the longer term. The present flat target between 2010 and 2020 is not compatible with on-going renewable energy industry development beyond about 2005, which is far too short a period of support in which to establish a viable renewable energy industry.

i) the appropriateness of the operating environment including the:

i) level of participation in and transparency of the Mandatory Renewable Energy Target measure

Transparency with baseline setting has proven to be a problem. The "commercial in confidence" argument doesn't stand up given that the community is providing financial benefit to those given credits. The intent of the scheme is to drive the development of a renewable energy industry rather than to provide wealth transfer.

ii) scheduled end-date of 2020

The twenty-year life is short for a scheme with industry development & ecological sustainability objectives, even if it could be argued that the scheme is only transitional. Rather than a scheduled end date for the scheme as a whole, each generation project should be given a fixed period (such as 15 years) in which it is eligible to create RECs from qualifying electricity.

iii) baselines for pre-existing generators

Baseline setting has been one of the contentious aspects of the MRET scheme. An error in baseline is important because, under the present rules, it remains indefinitely. Thus if a generator is awarded to high a baseline it will be unnecessarily penalised, while if the baseline is set too low there will be an on-going free-rider gain to the generator. The related issue of asymmetry of treatment of baseline unders and overs represents a windfall gain to the generator and gives it an incentive to increase the variability of its annual output. Baseline setting is particularly difficult for existing hydro generators in an isolated power system such as Tasmania's, where the combined annual output of the generators is determined by demand. While there is no perfect answer to these problems, some partial remedies were suggested earlier in this submission:

- rather than terminating the scheme at 2020, define a maximum period following entry into service for a new generator, or following scheme commencement for an existing generator, during which a generator could create RECs from qualifying electricity (a period such as 15 years would be sufficient to justify the behaviour that is sort - investment in new generation or upgrade of existing generation; award of credits beyond such a period could be regarded as superfluous)
- set a baseline equal to long term expected yield for generators in an isolated renewable-energy only power system, such as in Tasmania
- require any generator that created RECs for annual energy above its (non-zero) baseline to also surrender RECs equal to the shortfall when it produced below its baseline.

iv) need for future reviews

It would be desirable to conduct future reviews of the Act in the broad policy context in which the MRET scheme operates. Thus the Act should be seen as an integral part of a policy framework designed to enhance ecological sustainability.

j) the appropriateness of policy settings including the:

i) extent to which this Act has provided an ongoing basis for commercially competitive renewable energy

Because fossil fuels represent a very cost-effective form of concentrated and stored biomass energy, it is very difficult for renewable energy forms to compete in direct cost terms. In fact the only reasons not to use fossil fuels are the climate change implications of the release of carbon from mineral sequestration, local and regional pollution, and concerns about resource depletion and resource security. To date, only large hydro has been able to compete directly with fossil fuels in Australia and then only in favourable circumstances.

Thus until the costs of climate change are internalised into the price of fossil fuel combustion, investment in renewable energy generation will continue to require sufficient support to deliver an adequate return on investment. However, ongoing subsidy of a particular generator beyond a suitable period after entry into service, such as 15 years, could be regarded as an inefficient subsidy.

ii) relevant economic and social impacts that have resulted from the implementation of the provisions of this Act

As identified in (Parer et al, 2002) and (MacGill et al, 2002), renewable energy projects are often located in regional areas and have positive social and economic impacts. Improving the coherence and effectiveness of the broad policy framework that evaluates the sustainability of renewable energy projects would further enhance these positive outcomes.

iii) inclusion of renewable energy sources and technologies not specified in the Act or Regulations

The Act defines the following energy sources to be eligible renewable energy sources:

(a) hydro;
(b) wind;
(c) solar;
(d) bagasse co-generation;
(e) black liquor;
(f) wood waste;
(g) energy crops;
(h) crop waste;
(i) food and agricultural wet waste;
(j) landfill gas;
(k) municipal solid waste combustion;
(l) sewage gas;
(m) geothermal-aquifer;
(n) tidal;
(o) photovoltaic and photovoltaic Renewable Stand Alone Power Supply systems;
(p) wind and wind hybrid Renewable Stand Alone Power Supply systems;
(q) micro hydro Renewable Stand Alone Power Supply systems;
(r) solar hot water;
(s) co-firing;
(t) wave;
(u) ocean;
(v) fuel cells;
(w) hot dry rocks.

There is no apparent need to extend this list. Fossil fuels and wastes from fossil fuels are correctly defined to not be eligible.

iv) interaction with relevant Commonwealth, State and Territory energy, environment and industry policies.

As previously indicated, the MRET scheme is compatible with emission taxes or permit trading. As an emission target was made more binding, the price of RECs would naturally fall. A similar effect would occur as electricity from renewable energy generation became more competitive with electricity generation from fossil fuels. Thus there would be no need to terminate the MRET scheme to coincide with the introduction of emission trading.

There is some overlap with the NSW benchmark scheme for electricity retailers. However, this arises from design problems in the NSW scheme and should be solved by modifications to the NSW scheme not the MRET scheme (MacGill et al, 2003; MacGill and Outhred, 2003b).

Conclusions

The Act implements an innovative scheme to support growth in renewable energy generation while reducing climate change emissions. Design weaknesses should be eliminated, the target increased and the lifetime of the scheme should be extended. The scheme is fully compatible with emission taxes or permit trading.

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