Submission
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INQUIRY INTO RURAL WIND FARMS

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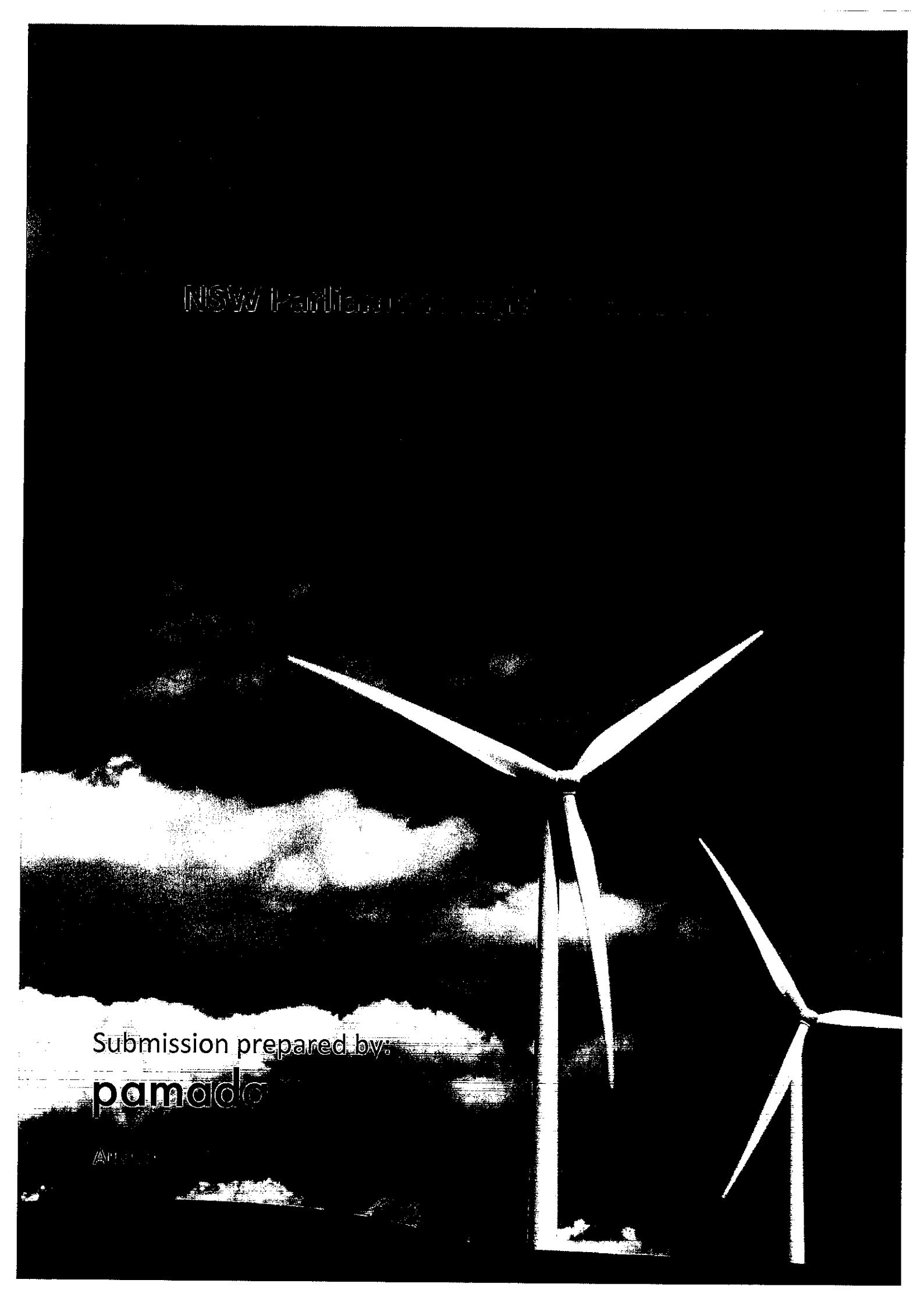
NSW Parliament
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Submission to the NSW Parliament Legislative Council August 2009 Inquiry into Rural Wind Farms

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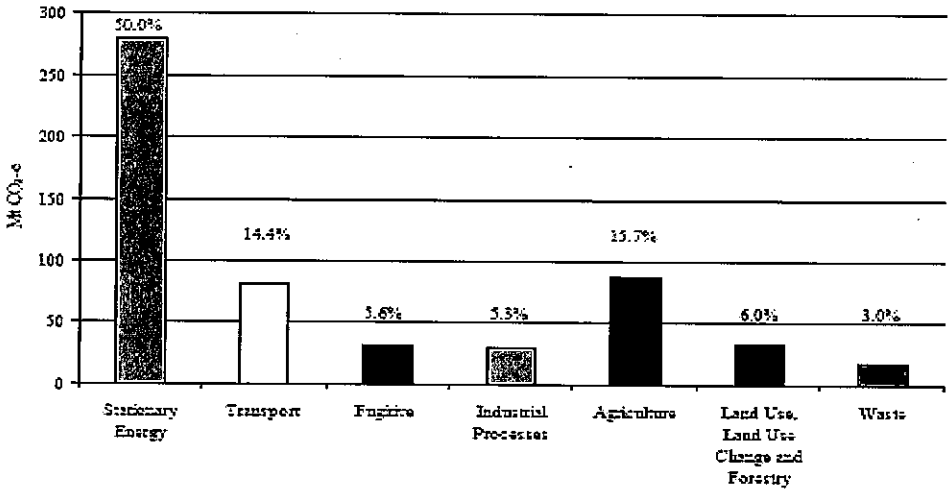
1. a) Greenhouse Gas (GHG) Emissions

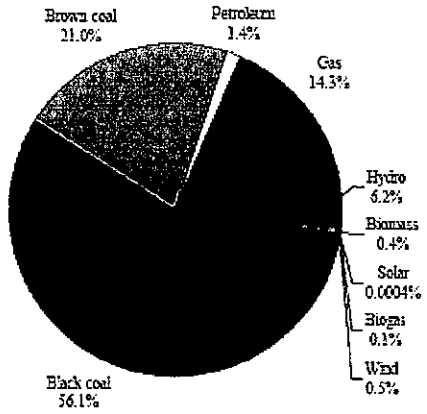
Australia has the second highest greenhouse gas emissions per capita in the world, the highest belonging to the US. Fixed or stationary energy production represents a large proportion of Australia's total contribution to global warming. The Figure below shows the contribution of the respective sectors of the economy to Australia's total greenhouse gas emissions. Electricity generation contributes a large part of the emissions from stationary energy and in 2005 accounted for 70% of stationary energy and represented 35% of Australia's total GHG emissions for the country. Greenhouse



Contribution to GHG emissions in Australia by sector (AGO 2005)

Gas Emissions from electricity generation increased by 50% between 1990 and 2005 (Australian Greenhouse Office 2005).

Therefore over a third of Australia's GHG emissions are from the electricity supply industry. The Electricity Industry is currently dominated by fossil fuel based energy production of coal (black and brown) and gas with renewable energy production represented mainly through hydro schemes. The Figure below illustrates the mix or energy resources making up the electricity supply sector across Australia.



Australian Electricity generation sources (AGO 2005)

According to DEUS figures, approximately 6% of NSW's current energy usage is sourced from renewable energy. 82% of this is from hydro with 3% from wind and 1% from solar.

Renewable energy refers to electricity generated from energy sources that naturally replenish. Renewable energy limits the production of greenhouse gases relative to the generation of equivalent amounts of electricity from fossil fuel.

Greenhouse Gas Emissions are generally expressed in terms of "CO2-equivalent" with over 95% of the greenhouse impact of energy production a consequence of the CO2 from fuel combustion. There is also some effect from methane (from black coal mining and natural gas production) and nitrous oxide.

Other Climate change threats

Climate change impacts are also projected to have an impact on electricity generation and supply particularly coal fired electricity generation. Climate changes within Australia as a result of the Greenhouse effect could be catastrophic.

The negative economic impacts of climate change are likely to be felt much more considerably in rural areas already stressed with drought conditions than in urban areas of NSW, therefore the benefits of rural wind farms are also likely to be significantly weighted infavour of the local community and local enterprise.

Other climate change risks inlcude:

- increased threats from storm, lightening and bush fire damage which may increase damage related to electrical infrastructure transmission over long distances associated with centralised power generation;
- reduced water availability for cooling of thermal and coal fired power stations;
- increased costs for wholesale electricity as the cost of process cooling water increases and water supply decreases;
- reduced operational capacity of main network feeders during periods of very high temperatures
- increased peak demand from air conditioners due to periods of above average temperatures
- Impacts on existing hydro projects such as the Snowy Scheme (6% of NSW's total electricity supply) through drought affected water shortages

The proliferation of wind farm and renewable energy schemes will have a significant effect on rural communities as a result.

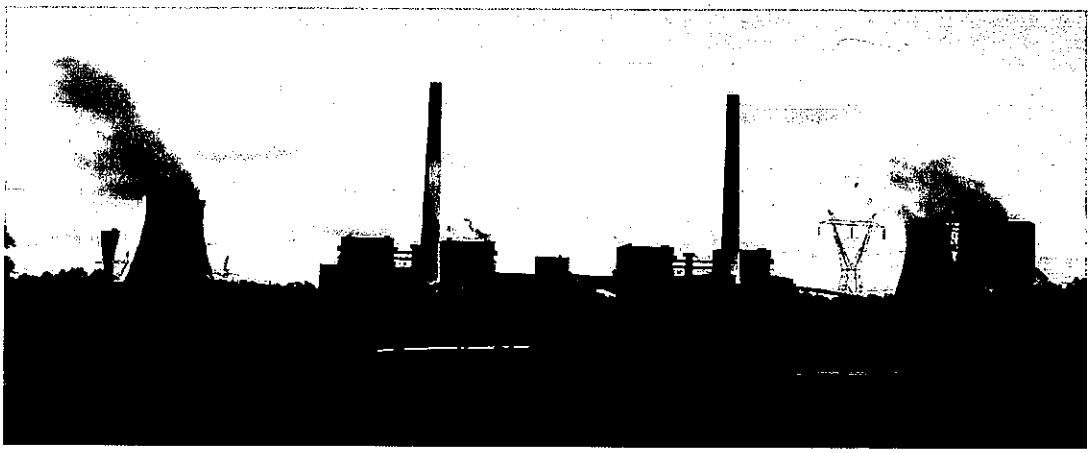
Less reliance of fossil fuel prices

Domestic and industrial consumers have become use to cheap and efficient supply of electricity with little barriers to supply. However changing environmental and geo-political circumstances means the risks to energy supply and associated costs are changing. The rising cost of oil and gas due to strong global demand means Australia is vulnerable to the fluctuations of world prices for these commodities.

With the projected introduction of the Emission Trading Scheme (ETS) in 2011, the cost of electricity from conventional coal fired power stations is predicted to increase mainly as a requirement to balance carbon emissions from these sources. Wind farms will generate carbon offsets under the ETS which would be taken up by carbon intensive emitters such as coal fired power stations.

Decentralised power generators

A single coal fired power station in NSW can generate up to 2640 MW or approximately 20% of the total NSW capacity. Centralised power generation increases the potential risk attached to the loss of supply, be it from potential terrorist attacks, major network damage and faults, storm or fire damage resulting from changing climatic conditions. Renewable energy technologies are generally considered 'embedded generation' as they are decentralised and distributed throughout the network. By decentralising power sources the losses from large scale transmission of power is minimised.



Bayswater Coal-fired Power Station, Muswellbrook NSW

Contribution to the Rural and Regional Communities

Australia is recognised as one of the driest continents in the world and will be one of the most affected by climate change. The rural and regional communities will be particularly affected. The development of renewable energy has the potential to diversify communities away from traditional industries, such as farming that will be heavily impacted by climate change and furthering drought conditions.

In July 2008 a report was released by the Bureau of Meteorology and the CSIRO that predicted the impacts on rural communities and particularly drought affected regions from climate change. According to the report droughts could occur twice as often, cover twice the area and be more severe in key agriculture production areas within the next 20-30 years, commencing by 2010. These climate forecasts are causing both governments and farmers to reassess land usage and diversify their earnings away from being totally reliant on farming incomes. Hosting a renewable energy park can be another income source for rural communities operating and benefiting from adverse climate conditions.

In recent years many local rural communities have realised the potential for adding new pollution free industries into communities. Many wind farms have developed in regional areas and these are looking to the renewable energy sector as a source of future prosperity. As an example the rural town of Ararat City in western Victoria, already the home to the Challicum Hills Wind Farm, is now looking to establish a renewable energy business precinct, with the potential as a manufacturing and transport hub for southeast Australia.

Local network integrity and reduced risk of faults

The connection of wind farms will involve upgrading the existing lines in the area and associated electrical infrastructure. This will contribute to network infrastructure development in the area improving the network integrity, distribution and security for all stakeholders including local community.

Public Opinion about Wind Farms

Opinion polling conducted in October 2006 by AC Neilson on behalf of Australian Wind Association (Auswind) showed an overwhelming acceptance of wind power by the broader community.
Key findings included:

- Nine out of ten Australians are aware of climate change and concerned about environmental issues.
- Seventy eight percent say Australia should be a leader in greenhouse gas reduction
- Nearly three out of four Australians recognize coal fired red power stations as a major contributor to climate change.
- Three out of four believe the federal government should do more to support wind energy and reduce carbon emissions.
- 68% are willing to pay more for environmentally friendly energy sources.

In general, people are very supportive of renewable energy.

Water Consumption of Coal fired Power Stations

Fossil fuel fired power stations use large amounts of potable water in their operations, primarily for cooling water (in cooling towers) and for boiler make-up water. Any reduction in the use of fossil fuel fired power stations will lead to a reduced demand on NSWs finite sources of water. This in turn will free up water for more productive uses, and is also likely to have longer term benefits to creek quality and thereby water quality.

Conventional plants generating power from fossil and nuclear fuels use large amounts of water for cooling. Wind turbines do not use water for cooling purposes. In some arid countries small amounts of water is required for cleaning of blades (dust and insect build up) where rainfall is insufficient.

Increased tourism to rural communities

The addition of a tourism component provides further economic benefit to a local area. It provides employment on the site and additional income from visitors. As a consequence other businesses in the area may benefit; especially those equipped to supply the tourist trade such as accommodation and food providers. Other tourism drawcards in the area may also benefit from the increased profile that a wind farm brings.

The presence of a wind farm will also provide an additional source of revenue, in terms of leases, to the landowners where the farm is located. The expenditure of this income by the owners in the local area will further benefit the economy.

1. b) Wind Energy as a base load power

Conventional power stations are generally classified as reliable and dispatchable and wind and solar energy without storage as 'unreliable' or 'not dispatchable. However a wind farm can be considered to be partially reliable, because wind speeds are predictable over hours or days with a probability that is substantially above that of pure randomness.

Furthermore, a group of wind farms located at across differing geographic locations (different wind regimes) provides a net contribution which considerably less variable than each of the wind farms alone. Combinations of efficient energy use and disaggregated or embedded renewable sources of electricity can replace electricity generating systems based on fossil fuels and nuclear power.

2. Location of wind farms

We believe that it is imperative to build the wind farm around the networks (embedded generation) and not vice versa. There are three fundamental reasons for this:

- Capital investment in network construction is significant and requires maintenance and replacement after service life (i.e. maintain and improve existing core network in preference to extending network into wind regions in outlying areas).
- Line losses. Big is not always better. By extending networks to western wind precincts larger networks are required with considerable line losses.
- Increased environmental impacts from extending networks. By extending networks to reach wind regions increase environmental and social impacts are a direct result.

3. Impact of wind farms on property values

Pamada have dealt with this issue during the preparation of an Environmental Assessment for the Kyoto Energy Park Project in Scone (www.kyotoenergypark.com.au) . During the assessment some market evidence was discussed relating to potential for land value impacts.

A panel report for the the Bald Hills Wind Farm in 2004 showed that there was some consensus on the potential for devaluation of non-agricultural development in view of a wind farm. However empirical market evidence to date from the US and Australia on the effect of wind farms on land values indicates that there is no reduction in land values as a result of a property being in the view shed of a wind farm development.

In the Kyoto Energy Park project research was undertaken on impacts on property values. Enquires from the valuer revealed that in wind farm areas of Victoria and principally the Codrington area recent sales of residential property within 2 kilometres of a wind farm indicated there was no discernable effect on values. The valuer concluded that based on market evidence, valuation experience and enquiries with other valuers in wind farm areas of Victoria, a temporary reduction in value of surrounding non-agricultural development could occur over 1-2 years based on perception of negative effect rather than actual outcome. This assumption was made based on sales evidence to date within Australia and abroad and market predictions involving a worst case scenario.

Bearing this in mind it is important to remember that land values can be affected by a range of overlapping factors including economic conditions, existing and future land uses, transport and employment opportunities, lifestyle features etc. In addition public perception of wind farms are highly subjective and varies based on individual decision to purchase.

Therefore there is the potential for a range of factors to affect land values on surrounding non-agricultural land and there are limitations on any conclusions that may be drawn. Real land value impacts for a wind farm project are likely to relate to impacts of visual, noise, surrounding land use, traffic generation and tourism. Successful mitigation of these impacts can reduce the potential for devaluation and will provide assistance to ensure adverse impacts are not manifested in any lowered value of nearby properties. There will also likely be a positive effect on the local economy from an increase in tourism movements within the area could have a positive impact on land values.

Also in a more recent decision in the NSW Land and Environment Court NSWLEC; *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd [2007] (12 February 2007),* the court decided rejected the argument that a requirement to pay compensation to adjoining landholders could be imposed.

Justice Preston stated:

"If the concepts of blight and compensation, as pressed by the Guardians, were to be applied to this private project (a proposition which I reject) then any otherwise compliant private project which had some impact in lowering the amenity of another property (although not so great as to warrant refusal on general planning grounds when tested against the criteria in s 79C of the Act) would be exposed to such a claim. Creating such a right to compensation (for creating such a right it would be) would not merely strike at the basis of the conventional framework of landuse planning but would also be contrary to the relevant objective of the Act, in s 5(a)(ii), for "the promotion and co-ordination of the orderly and economic use and development of land".'

Investigations with the proposed Kyoto Energy Park at Scone suggests that devaluation of surrounding property may be perceived rather that real and exist probably as a result of negative sentiment generated by misinformation and also residents opposed to the farm. Empirical evidence has shown that in some cases surrounding property values have increased above market value. Other factors such as increased tourism specific to the area from a wind farm may have a more significant effect on value of land.

4. Mechanisms to encourage local investment in wind farms

Pamada support the development of rural wind farms in close collaboration with local residents and local investors to achieve ownership and close association with the life cycle of a wind farm. Wind farms are unique in that they are a benign technology with little impacts to local residents during operations in comparison to alternative forms of energy production.

Many communities in which wind farms are constructed are small and rural and the wind farm represents a significant local investment and transition from typical rural industries. In this respect communities can identify from an early stage with the project.

Many local communities throughout Australia and particularly Victoria have shown support from wind farms especially once they are operating as the community affiliates itself with the new structures and adopts the turbines into the landscape.

Local Investment in wind farms can facilitate that process further and from a much earlier stage of the project providing benefits for the developer and the local residents.

5. Wind Energy and the Renewable Energy Target (RET)

In December 2007 the federal government agreed to amalgamate the fragmented state based RETs into a new national MRET. In 2008 the Federal Minister for the Environment announced an increase in the MRET to a new target of 45,000GWh of renewable electricity generation by 2020. An agreement between the federal government and federal opposition has recently been agreed upon and the amended RET is expected to be legislated in the coming months. To reach the 2020 target of 45,000GWh will require an additional 35,500 GWh of renewable energy coming online by 2020.

It is expected that a large proportion of this new renewable capacity will be filled by large scale wind farms and solar projects. The table below estimates the number of MW of installed capacity of wind and solar PV required individually meeting the target by 2020.

Generator	Current Installed Capacity(MW) 2009	Additional Capacity (MW) to achieve MRET target by 2020
Wind	1125	16,000*
Solar PV	71	25,700**

*Assuming a site Capacity Factor of 30% **Assuming a site Capacity Factor of 20%

To achieve these targets large scale solar and wind resources will need to be utilised in the short to medium term. All technologies including wind, solar PV and mini hydro have been proven on large scale applications throughout the world. The integration of these technologies and the modification of these technologies to suit grid performance and demand are vital to ensuring reliable and quality supply of power to the local grid networks within Australia.

6. Kyoto Energy Park - Integration of New technology to match supply with Demand

Pamada are currently undertaking the Kyoto Energy Park (KEP) project at Scone in the Upper Hunter Valley. The KEP project is unique in renewable design in that it seeks to utilise renewable energy generators in combination to produce smart integrated power output to the grid. By generating and supplying power from a range of intermittent resources abundant on site (sun, wind and gravity) the KEP will increase reliability, quality and peak supply of renewable power to the grid to better match consumer demand in the Hunter and Newcastle region.

The KEP has also adopted new technologies support from a range of innovative industries and technologies that are currently ready for commercialisation. These technologies are collectively called 'smart loads' or 'virtual power stations' that effectively match power usage with off peak grid supply or with renewable energy supply. This is effectively a direct storage mechanism as the consumer is storing the renewable supply in domestic or even industrial appliances rather than on site. This reduces the need for large scale storage mechanisms on the generator side and increases the efficiency of supply. By integrating the numerous technologies, the project seeks to optimise the specific characteristics of the location and the local grid network performance.

This technology would be trialed in households throughout the Newcastle and Hunter region to correlate consumer power usage with supply from the KEP Australia.

The key components of the KEP project include:

- 10-30MW Solar Photo Voltaic (PV) Array;
- 42x 2.0 -3.0 MW Wind Turbine Generators;
- 1 MW Mini hydro Plant (Closed loop);
- Visitor and Education Centre

KEP Project Status

A Development application for the KEP was lodged in December 2006 to the NSW Department of Planning under Part 3A of the Environmental Planning and Assessment Act 1979 and SEPP (Major Projects). A detailed environmental assessment for the project was submitted to the Department in December 2008 and is currently under review, by the Department.

7. References

Australian Government Office of Renewable Energy Regulator (ORER)
http://www.orer.gov.au/publications/mret-overview.html