



Infigen Energy Limited - ABN 39 105 051 616
Level 22 - 56 Pitt Street - Sydney NSW 2000 - Australia
T +61 2 8031 9900 - F +61 2 9247 6086 - www.infigenenergy.com

February 11th, 2011

Senator Rachel Siewert
Chair
Community Affairs References Committee
Department of the Senate
PO Box 6100
Parliament House
Canberra, ACT 2600
Lodged via email to: community.affairs.sen@aph.gov.au

**Submission to the Senate Community Affairs Committee Inquiry into
The Social and Economic Impact of Rural Wind Farms**

Dear Senator Siewert,

Infigen Energy thanks the Committee for the opportunity to make a submission to the inquiry into the social and economic impact of rural wind farms.

Infigen Energy is Australia's leading specialist renewable energy business. Infigen Energy is also the largest wind farm owner and operator in Australia with five wind farms totalling over 500 MW (megawatts or million watts) of generating capacity. These wind farms, which generate enough electricity to power over 300,000 typical Australian homes, include the:

- 279 MW Lake Bonney Stages 1, 2 & 3 Wind Farms near Millicent, SA;
- 89MW Alinta Wind Farm near Geraldton, WA; and
- 141MW Capital Wind Farm east of Canberra near Bungendore, NSW

In addition to these operating wind farms, the 48MW Woodlawn wind farm, near our existing Capital Wind Farm, is also currently under construction.

Infigen Energy, with its partner Suntech, has been successfully shortlisted for the Photovoltaic segment of the Commonwealth's Solar Flagships Program.

Infigen Energy also owns and operates wind energy facilities in Germany and the United States, taking its aggregate wind energy business interests to 2,194 MW. Infigen Energy is listed on the Australian stock exchange (ASX:IFN), and more information about the company is available on our website www.infigenenergy.com.

As a member of the Clean Energy Council (CEC), we have taken note of their submission and its attachments. We have referred to some of the attachments to the CEC's submission, but have not included them to avoid redundancy.

POTENTIAL HEALTH EFFECTS OF RURAL WIND FARMS

Infigen Energy is not aware of a scientific peer-reviewed study that has found any detrimental health effects of living near wind turbines.

Besides our company, many other scientific, government, and medical authorities have come to the same conclusion. For example,

- The Australian Government's National Health and Medical Research Council (NHRMC) have studied this issue and concluded that,

"Based on current evidence, it can be concluded that wind turbines do not pose a threat to health if planning guidelines are followed."

The complete report is included as an Appendix in the CEC submission.

- The South Australian Environment Protection Authority revised their Wind farms Environmental Noise Guidelines¹ in July 2009 and included the following text block in Section 4.7 concerning infrasound.

Infrasound was a characteristic of some wind turbine models that has been attributed to early designs in which turbine blades were downwind of the main tower. The effect was generated as the blades cut through the turbulence generated around the downwind side of the tower.

Modern designs generally have the blades upwind of the tower. Wind conditions around the blades and improved blade design minimise the generation of the effect. The EPA has consulted the working group and completed an extensive literature search but is not aware of infrasound being present at any modern wind farm site.

It is worth noting that the SA EPA is the regulatory agency with the most experience measuring and monitoring wind farm noise in Australia as they are the only Australian agency to have issued wind farm noise regulations, and in addition, there are far more wind turbines installed in South Australia than in any other State.

- The Royal Australasian College of Physicians and the Public Health Association of Australia called for Governments last year to act on climate change. A joint media release, attached as Appendix A, stated,

"Immediate actions should include...recognising coal as a health hazard and supporting alternative energy source like wind and solar power"

¹ Available for download at: http://www.epa.sa.gov.au/xstd_files/Noise/Guideline/windfarms.pdf

While not the results of a specific "study", it would be a pretty safe assumption that these two independent health organisations, representing over 10,000 physicians, would not be advocating for more wind farms to be constructed if they believed there was any potential for detrimental health effects to result.

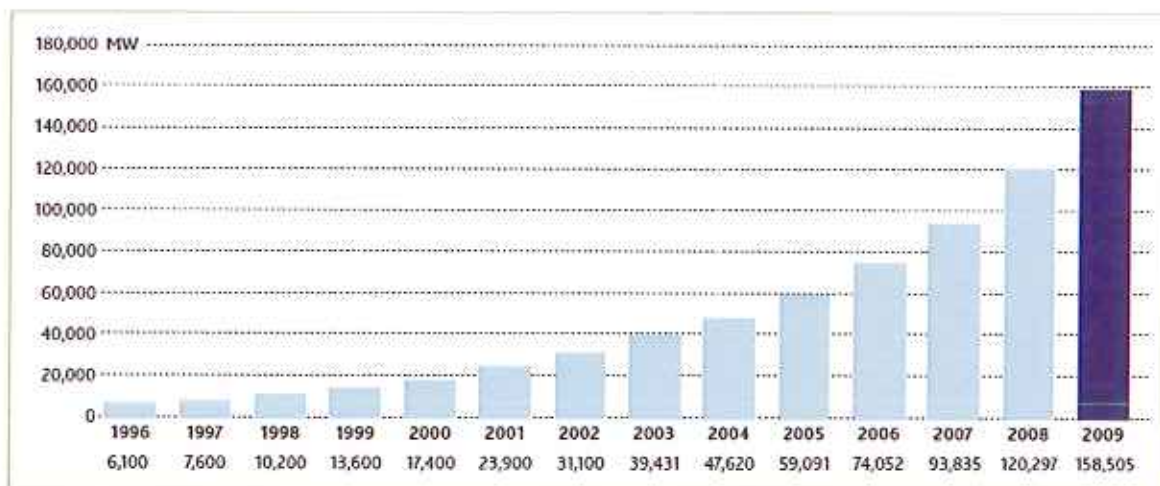
- Sonus Pty Ltd, a recognised expert in acoustic monitoring and engineering, was commissioned to actually measure infrasound levels at two wind farms as well as from other natural and non-natural sources by Pacific Hydro (who provided them access to the two wind farms). Their conclusion was that,

"The [infrasound] measurement results indicated that the levels of infrasound in the vicinity of the two wind farms are well below the perception threshold established by in International research as 85 dB (G)...and of the same order as that measured from a range of sources including the beach, the Adelaide Central Business District and a [gas fired] power station."

(Complete report included in the CEC submission.)

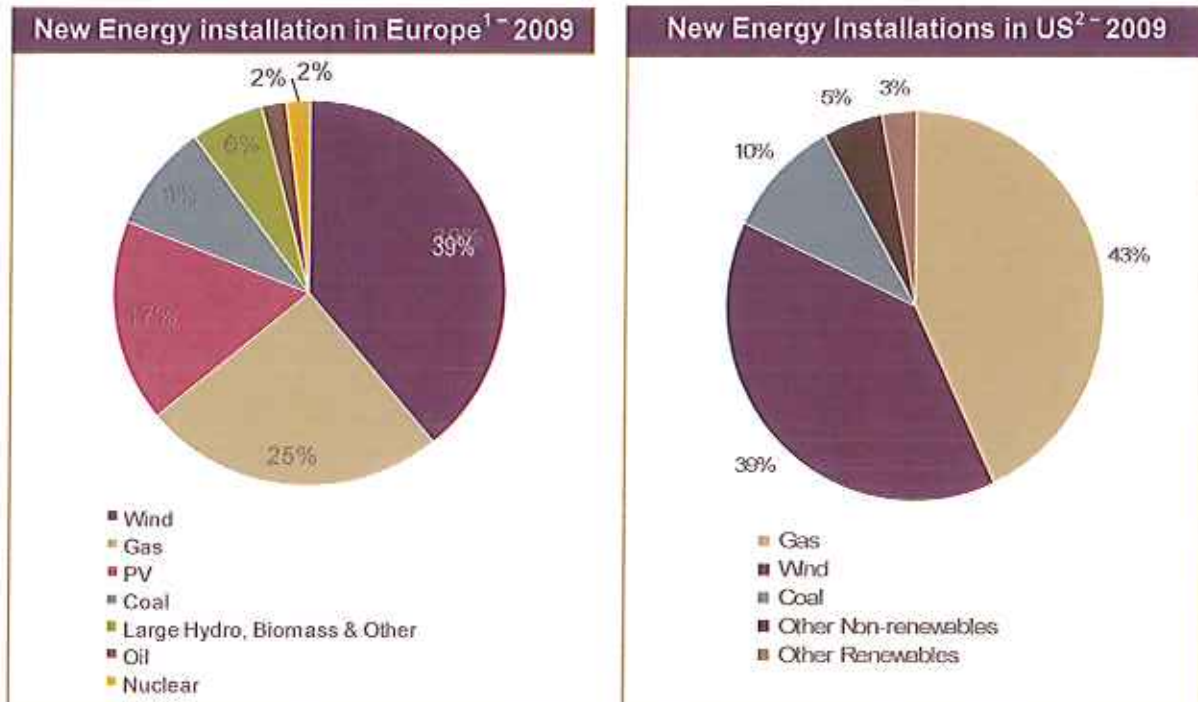
As the history of wind energy in Australia is more recent than in Europe and the USA, it's useful to step back and understand how the wind industry is performing worldwide.

Wind energy is one of the fastest growing industries in the world as shown in the graph below. Very few industries can claim to match the 28% annual growth rate year-on-year of the worldwide wind energy industry for the past 14 years.



Source: Global Wind Report, GWEC 2009

In 2009, wind energy was the leading technology for new electricity plant investment in Europe and a close second to gas-fired generation in the US as shown in the pie charts below.



1. European Wind Energy Association: 2009 Industry Statistics

2. American Wind Energy Association: 2009 Annual report

Wind Energy is not “alternative energy”; it is the predominant generating technology for new electricity generating plants.

Given the huge and sustained growth of wind energy which has resulted in over 150,000 wind turbines being installed worldwide, it would be reasonable for one to conclude that if any detrimental health effects were being caused by wind farms, there would be scientific documentation to this effect by now.

WIND FARM NOISE LEVELS

The noise levels from a wind farm can only be “excessive” if the noise limit the wind farm is required to stay below is set too high and/or the wind farm is exceeding the required noise limits, and therefore is not compliant with its development approval conditions.

Sonus Pty Ltd completed a thorough review of wind farm noise limits for the CEC last year, *Wind Farms Technical Paper - Environmental Noise*, which explains the acoustic performance of wind turbines, describes how wind farm noise is measured and compares noise limits from different jurisdictions. The paper is included in the CEC submission.

Several particular points from the Sonus study are worth noting. First, Australian wind farm noise limits are 5 or 10 dBA (depending on the jurisdiction) below the World Health

Organisation's recommended noise limit of 45 dBA to prevent sleep disturbance as described in Sonus' study below:

- *The base noise level requirement of 35 or 40 dB(A) provided in the main assessment tool in Australia, the South Australian EPA Wind Farm Guidelines, represents a low (stringent) noise level in an environmental noise context. It is significantly more stringent than the World Health Organisation's recommended guideline value of 45 dB(A) for sleep disturbance effects and than the recommended noise levels for road or rail infrastructure development that might occur in a rural environment, where levels of the order of 55 and 60 dB(A) respectively are typically recommended.*

In addition, two of Sonus' conclusions are also worth highlighting; namely:

- *The standards and guidelines used for the assessment of environmental noise from wind farms in Australia and New Zealand are amongst the most stringent and contemporary in the World.*
- *The rate of complaints relating to environmental noise emissions from residents living in the vicinity of operating wind farms is very low;*

As the decibel scale for noise levels are logarithmic in nature, the 5 or 10 dBA "buffer" between Australian wind farm noise limits and the WHO guidelines is significant. The fact that Australia has significantly stricter wind farm noise limits than countries with much more experience with wind energy, such as Denmark, the UK and USA demonstrates that Australia's noise regulations are very conservative.

Therefore, it is clear that based on the WHO guidelines and overseas practice, the Australian wind farm noise limits are not set too high, and if anything, could be said to be quite conservative.

The acoustic performance of wind turbines has always been an important design consideration and very significant efforts have been undertaken to minimise the noise levels of modern wind turbines while maintaining, or improving, the efficiency of the wind turbine to generate electricity.

Therefore, the noise levels emitted by wind turbines are well understood and can be predicted with very good levels of accuracy. Wind farm development companies run very sophisticated computer models to analyse and predict the worst case noise levels at nearby residences as part of the environment assessment process. These noise reports are then reviewed in detail by the responsible authority to look for any potential inconsistencies or areas needing clarification. Most importantly, every wind farm is obligated to perform compliance noise testing to verify the applicable noise standard is not exceeded at neighbouring residences after the wind farm is operational.

In the unlikely event that the compliance testing shows the wind farm is operating above the noise limit at certain residences, the owner of the wind farm would then be required to

operate wind turbine(s) in a noise reduction mode for the applicable wind speeds and/or directions to ensure compliance. As the noise reduction modes are also electricity generation reduction modes, there is a very strong incentive for wind farm owners to avoid this situation which results in operating very expensive wind turbines at less than their generation capacity.

Every wind farm in Australia undergoes a rigorous assessment of its predicted noise levels that is then verified by extensive compliance testing to the satisfaction of the responsible planning authority. Therefore, the possibility of a wind farm operating at noise levels in excess of its applicable noise limits is prevented.

In conclusion, Infigen Energy considers that wind farms do not emit "excessive" noise as all wind farms in Australia comply with some of the most stringent noise limits in the world which are well below World Health Organisation guidelines.

PROPERTY VALUES, EMPLOYMENT OPPORTUNITIES, AND FARM INCOME

Potential Impact on Neighbouring Property Values

Accurately and definitively determining the impact of an infrastructure project on a neighbouring property's value is extremely difficult. Many factors can influence a given property's sales price with the nearby infrastructure project being just one. Therein lies the first problem with regards to the potential impact of developments on neighbouring property values--they can only be estimated, and the estimates can vary widely.

That being said, there are valuation methodologies that can estimate the property price impact of a given type of development by examining a larger number of sales and identifying and quantifying trends. An authoritative overseas study was commissioned by the US Department of Energy's Lawrence Berkely National Laboratory and is included in the CEC submission. The report, *"The Impact of Wind Power Projects on Residential Property Values"*, released in December 2009, found that,

"Neither the view of the wind facilities nor the distance of the home to those facilities is found to have a consistent, measureable, and statistically significant effect on home sales prices."

The only major study of the potential impact of Australian wind farms on neighbouring property values was commissioned by the NSW Valuer General which is also an Appendix of the CEC submission. This report entitled, *Preliminary Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia*, examined 45 property sales near wind farms in Australia and concluded that,

"40 out of the 45 sales investigated did not show any reductions in value" (due to the nearby wind farm)...No reductions in sale price were evident for rural properties or residential properties in nearby townships with views of the wind farm." The result for lifestyle rural residential properties were "mixed and inconsistent; there were some possible reductions in sales prices indentified in some locations alongside properties

whose values appeared not to have been affected. Consequently, no firm conclusions can be drawn on lifestyle properties."

While this study was not absolutely conclusive, such studies will always find it difficult to conclusively rule in, or rule out, the impact of certain developments on property prices for the reasons already cited. Still, this is the most authoritative study to date in Australia and was commissioned by the independent office of the NSW Valuer General.

It is also worth noting the recent NSW Land and Environment Court case appealing the Planning Minister's approval of the Gullen Range Wind Farm². In the court's decision, Senior Commissioner Tim Moore and Commissioner Judy Fakes of the NSW Land and Environment Court responded to the Landscape Guardian group's arguments that neighbours should be compensated for the "blight" and perceived loss of property value, by stating

"Such a proposition faces a number of insurmountable hurdles.

The first is that the wind farm, as earlier noted, is a permissible use on all of the parcels of land upon which it is proposed to be located... 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".

In other words, if every proposed infrastructure development--- rail line, hospital, power line, shopping centre, freeway etc., were subject to every neighbour putting their hand out for compensation according to their perception of the detrimental amenity impact, the planning system would descend into chaos and few, if any, projects would likely proceed.

Wind Energy' s Impact on Employment Opportunities

There is no doubt that construction, and operation, of a wind farm delivers important economic benefits to a region, by:

- Providing direct employment for people particularly during the construction period

² King & anor v Minister of for Planning; Parkesbourne-Mummel Landscape Guardians Inc v Minister for Planning etc. NSWLEC 1102 7 May 2010



- Increasing business opportunities for local construction contractors (quarry owners, transport operators, track construction, electrical cable laying, to name a few)
- Increased business for hospitality and other industries that provide services during the construction phase

During the construction of Infigen Energy's 141MW Capital Wind Farm, over 100 people were directly employed on site during periods of the construction phase. In addition, local hospitality businesses in the Bungendore area experienced substantial increases in their trade, and continue to do so today.

The most authoritative study of the positive impact wind farm development can have on a local regional community was conducted by Sinclair Knight Merz (SKM) entitled, *The Economic Impact Assessment of the Hallett Wind Farms*. The report for the Hallett wind farms owner, AGL, found the first three stages of the Hallett wind farm had:

- Resulted in \$88 Million of additional expenditure --- just within the Hallett region
- Provided 450 FTE construction job years (i.e. 150 people employed for 3 years) through June 2010 averaging about 100 direct employees during the different stages of the Hallett wind farm's construction
- Added 3.3% to the Mid-North Gross Regional Product in 2010
- Resulted in 2000 indirect job-years being created nationwide

The complete SKM study is included in the CEC's submission.

Wind Energy's Impact on Farm Income

Every wind farm in Australia makes payments to the landowners who host wind turbines on their properties. The media has reported that some farmers are paid \$8000-\$10,000 per turbine per year. Therefore, a farmer with five turbines on his property might receive \$50,000 per year, every year the wind farm is operational.

These payments can be counted on by the farmers even in times of drought, flood, and/or low commodity prices, thereby significantly contributing to the viability of these farming business. Several families participating in Infigen Energy's Lake Bonney wind farm project have indicated that the wind turbine payments have been the difference between them being able to continue farming and having to sell out. In this way, wind energy facilities significantly contribute to the planning objectives of the rural and farming zones by facilitating and encouraging agricultural production.

During better times, the landowners who are hosting wind turbines are likely to use a portion of their wind farm payments to buy equipment, upgrade facilities on their farm, or undertake other purchases thereby positively contributing to the local economy.

INTERACTION OF COMMONWEALTH, STATE AND LOCAL PLANNING LAWS

In Australia, the State Governments are the responsible planning authorities, although State Governments delegate this authority to local Councils for many types of planning decisions.

Therefore, the Federal Government has essentially no role to play with regards to planning policies, regulations, or decisions. The only significant exception to this is the Commonwealth's review of developments under the Environment Protection and Biodiversity Conservation (EPBC) Act. Most of the issues covered in the EPBC Act refer to international treaties, the enforcement of which is a Commonwealth responsibility. However, the EPBC Act covers only a very limited range of issues--mostly to do with protection of federally listed threatened and endangered species. Any other issues with regards to planning policies or decisions are the province of the State (or Local) Government.

With this in mind, Infigen Energy considers that the intervention of the Commonwealth Government by its development of (draft) National Wind Farm Guidelines is counterproductive. It is a fundamental tenant of any planning system that there be one set of planning rules and regulations and one "responsible authority" to approve or reject planning applications. If there are two sets of planning "rules", there will inevitably be conflicts between the two sets of rules and how is the proponent, or the community, to know which of the two rules are to be followed?

The current draft of the National Wind Farm Guidelines is some 200 pages long and contains innumerable conflicts and contradictions with State and Local government wind farm planning policies and guidelines. If the National guidelines were to be finalised and released, wind farm proponents would not know when to follow the State planning rules and when to adhere to the National Guidelines. While the stated objective of the National Wind Farm guidelines is to improve clarity and consistency, the inevitable result of them being finalised and implemented would be confusion and inconsistency.

The draft National Wind Farm Guidelines state that,

"Each state, territory and local government jurisdiction has a well-developed assessment framework for new developments (not just wind farms), including environmental assessment."

Infigen Energy considers that the Commonwealth should let each State continue to utilise their well-developed environment assessment framework for wind energy facilities without the imposition of a complex and conflicting set of National Guidelines.

OTHER RELEVANT MATTERS – ARBITRARY BUFFER DISTANCE TO WIND TURBINES

There have been a few local and state governments that have advocated a two kilometre “buffer zone” between wind turbines and neighbouring residences. We are not aware of any studies, research, or scientific justification as to why two kilometres would be the appropriate and optimum minimum distance between turbines and residences. If a wind turbine 1995 metres from a house is not permitted, why would a wind turbine 2005 metres from a residence be completely acceptable? The difference in visual and acoustic amenity between these two distances would be so negligible as to be unmeasurable.

One of the more articulate arguments about why a 2km buffer zone is inappropriate and ill-advised is contained in the aforementioned NSW Environment Court decision concerning the Gullen Range wind farm.

In this case, it was argued by the Upper Lachlin Shire Council's Director of Environment and Planning, as well as the local 'Landscape Guardian' group, that the Shire's Development Control Plan (DCP) specifying a minimum 2km distance between turbines and residences should have been considered, and adhered to, by the Minister for Planning. Tim Moore, one of the most experienced Commissioners of the NSW Land & Environment Court, found the Shire's incorporation of the 2 km setback into their planning scheme to be indefensible, stating,

*“...it is clear from proper consideration of [the Shire's Director of Environment and Planning's] evidence that we have no basis upon which we could establish the provenance or derivation of the numerical controls [i.e. the 2km setback] contained in the DCP. Absent such provenance or derivation, we are left with only the conclusion that what is colloquially described as “the streaker's defence” – **it seemed like a good idea at the time** – could be applied to these numerical controls in the DCP. This is not a proper basis upon which to found numerical controls...”*

OTHER RELEVANT MATTERS – WIND ENERGY’ S BENEIFICAL EFFECT ON WHOLESALE ELECTRICITY PRICES IN SOUTH AUSTRALIA

It is common wisdom that wind energy is more expensive compared to electricity generated by burning coal or gas. While this is true to some extent due to the relatively high capital cost of wind turbine, once a wind farm is built, it is one of the cheapest forms of electricity generation as its fuel cost are zero and its Operation and Maintenance (O&M) costs are very low.

The wholesale electricity market operates similar to an auction system where most generators bid prices above their short run, or marginal, costs of production. Therefore, wind energy facilities typically underbid coal and gas fired generators who are obliged to bid prices high enough to cover their fuel, mining or pipeline and higher O&M costs.

The result is that areas where there is significant wind energy penetration, such as in South Australia, wind farms exert downward pressure on the wholesale price of electricity when the wind farms are operating. The decline in wholesale electricity prices due to increased wind generation has been extensively documented overseas and is termed the wind energy “merit order effect”. This effect has now been documented in South Australia.

In 2009, about 17% of the electricity generated in South Australia came from wind farms. As a result, greenhouse gas emissions in 2009 from electricity generation in SA were 7.5% lower than 2008, which were about 7.5% lower than in 2007³. Therefore, the increase in wind energy generation in SA resulted in exactly what was desired—a significant decline in greenhouse gas emissions from electricity generation.

In addition to reducing greenhouse gas emissions, a study by UNSW of FY 08/09 wholesale electricity prices⁴ showed that wholesale electricity prices in SA averaged:

- \$71/MW-hr when wind generation was below average, and
- \$61/MW-hr when wind generation was above average.

In other words, wholesale electricity prices in SA that year were 11% lower during periods when it was “windy”.

These results were confirmed recently by another study of SA wholesale prices utilising a somewhat different methodology that yielded similar results. Intelligent Energy Systems (IES)

³ Electricity Generation Report 2009, The Climate Group

⁴ “The Integration of Wind Generation within the South Australian Region of the Australian National Electricity Market, CEEM UNSW, 10 November 2009 (available to download at: http://www.ceem.unsw.edu.au/content/userDocs/SAWindPowerEffectOnNEM_workingPaper_10Nov09.pdf)

compared the average wholesale price of electricity in SA each year for the past 4 years to the wholesale price of electricity paid to wind farms when they were operating⁵. The results, summarised in the table below from the report, showed that the average wholesale, or spot, price (TWP) was about 15% higher than the electricity price paid to wind farms (i.e. the wind dispatch weighted price --- DWP) for the past two years.

Specifically, when wind farms were operating and being paid for the electricity they generated, the wholesale price of electricity was 16.1% below the average price in 2009 and 14.6% below the average in 2010.

Table 2 SA Average Spot Price and Wind Dispatch Weighted Price (\$/MWh)

Year	TWP (\$/MWh)	Wind DWP (\$/MWh)	DWP Discount (\$/MWh)	DWP Discount as a % of the TWP
2006	38.68	34.00	4.68	12.1%
2007	57.49	54.88	2.61	4.5%
2008	66.38	50.20	16.18	24.4%
2009	60.48	50.72	9.76	16.1%
2010	44.33	37.85	6.48	14.6%

While the Commonwealth's Renewable Energy Target (RET) scheme results in an impost on electricity retailers that is passed through to electricity customers, the downward pressure on wholesale electricity prices caused by wind energy should also be passed onto electricity customers thereby significantly mitigating the cost of the RET scheme.

⁵ IES Insider Issue 011 "Wind Energy – Penetration and Spot Revenue" 10/12/2010



Infigen Energy would welcome the opportunity to appear before the Committee to provide more detail and answer any questions the Committee may have. Please contact the undersigned in this regard.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Dutailis", written over a horizontal line.

Geoff Dutailis
Chief Operating Officer
Infigen Energy Ltd
02-8031-9900
Geoff.Dutailis@infigenenergy.com



The Royal Australasian
College of Physicians



Public Health Association
AUSTRALIA

CALL FOR HEALTH AND CLIMATE CHANGE ACTION NOW

Health groups are calling on Australian governments to implement a set of specific measures to address the impact of climate change on health.

The Royal Australasian College of Physicians (RACP) and the Public Health Association of Australia (PHAA) say any political stalemate over strategies to reduce global warming must not be allowed to distract attention from the very real effects that climate change will have on health and action that should be taken now.

According to the RACP's spokesperson on climate change, Professor Robyn McDermott, "The impact of climate change on human health is a matter of serious concern. The time has come for specific actions to reduce this impact. Action must also be taken to help people adapt living and working practices in the light of the changes that are the result of an increasing carbon footprint. Working with the Public Health Association of Australia on a population-based approach, we have identified a number of actions that can and should be taken immediately".

Michael Moore, CEO of the PHAA added, "It is important to understand that there will be – and already are – health impacts of gradual climate change and of extreme weather-related events. While the political debate continues, people concerned about health shouldn't be sitting on their hands", he said "There are things that we can do now that will have a positive impact."

The two organizations point out that forthcoming elections in South Australia and Tasmania provide ideal opportunities to raise these issues with candidates, MPs and governments. "We will be working together to reach candidates at these elections and to ask them to commit to taking action," said Mr Moore.

Immediate actions should include:

- Committing to a green health care system with a reduced carbon footprint
- Developing active (healthy) transport systems
- Supporting a national population policy for a sustainable population
- Understanding the significance of a Healthy Food, Healthy Environment approach and developing a national food policy
- Recognising coal as a health hazard and supporting alternative energy sources like wind and solar power

"Health leaders should take the first steps in their own back yards," said Professor McDermott. "As they start to reduce the carbon footprint of health systems, they can use their own achievements to influence others. The important issue is that there are things that can be done now and commitments from across the political and bureaucratic spectrum can help to reduce the adverse health impacts of climate change."

ENDS

About the Royal Australasian College of Physicians (RACP) The RACP trains, educates and advocates on behalf of more than 10,500 physicians and 4,000 trainees - often referred to as 'specialists' - across Australia and New Zealand. It represents more than 25 medical specialties including paediatrics, cardiology, respiratory medicine, neurology, oncology, and public health medicine, occupational and environmental medicine, rehabilitation medicine, palliative medicine, sexual health medicine and addiction medicine. Beyond the drive for medical excellence, the RACP is committed to developing health and social policies which bring vital improvements to the well-being of patients.

www.racp.edu.au

For further information, please contact:

RACP Media Unit: 0408 639 697