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SUBMISSION

AUSTRALIAN GOVERNMENT'S ENERGY STRATEGY

lodged by

ENERGY PACIFICA

a subsidiary of

PACIFIC ENERGY PERFORMANCE SOLUTIONS (PECS)

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This submission has been lodged by the Directors of Energy Pacifica, a subsidiary of Pacific Energy Performance Solutions, a company focused on the promotion, development and application of devices able to generate energy in an efficient, sustainable and environmentally benign manner.

Generally, the directors fully support the policies and programs being reviewed by the government and in that context plan to facilitate attaining these goals along real and pragmatic pathways.

Recent developments world wide are revolutionizing the ways in which societies presently are and will be generating energy without inflicting unacceptable levels of carbon emissions upon the environment. Full implementation of these new developments will:

a) Mitigate societies present excesses in energy consumption, by introducing energy saving techniques known and applied in Europe and the Americas for decades, but yet to be implemented in Australia

b) Circumvent undesirable conditions (humidity/fungal and hence detrimental health effects) in our homes and thereby improve the Society's standard of health, whilst improving living conditions generally.

c) Enhance the efficiency of power generation, transmission and consumption, with increased emphasis on implementing renewable and sustainable energy generation close to the sources of demand (micro-distribution).

These general points shall be considered in turn with specific recommendations and approaches for facilitating efficient local generation, transmission and utilization of energy.

A. LOCAL ENERGY GENERATION

Historically, Australia's power generation has relied primarily on thermal combustion based on abundant resources of coal and gas, while negligible investment has been made toward developing the country's extensive, renewable/sustainable energy resources, particularly solar and marine energy. Marine and solar energy resources often are available close to large population centers, and therefore could be used to produce energy locally to avoid excessive levels of transmission losses. Further, sustainable energy generation would mitigate vast amounts of carbon production and hence reduce the country's present and future global impacts on climate change.

The country's present dependence on thermal-based energy has led an almost total reliance on an extensive and centralized, high-voltage, AC transmission system that conveys power throughout the country whilst incurring huge energy losses. While electric power generated in Australia may be shuttled in many directions, depending on demand, >16% is lost to the environment in the form of heat dissipation from high-voltage power lines. This average loss includes the substantially more efficient transmission (only 3-4% losses) through the few existing high-voltage DC links. Consequently, the average power loss incurred by electrical transmission through the overhead, high voltage AC transmission must be substantially higher.

Two conceptually simple changes would alter this scenario:

First, all overhead AC transmission lines can be converted, over time, to underground DC links. Simplistically, this would offset the need for large amounts of new generation, a not inconsequential savings in energy. Other countries throughout the world are making this transition presently. Why not Australia?

Secondly, micro-distribution of future energy generation would help circumvent the present transmission crisis by focusing power generation near local centres of high demand – Sydney, Melbourne, Brisbane, Adelaide, etc. Fortuitously, many of Australia's major population centres are situated adjacent to harbours, lakes and/or rivers, where it is entirely feasible to introduce river- or tidal marine energy generation.

Thus, local power generation (micro-distribution) together with high-voltage DC transmission would circumvent excessively high losses presently a consequence of long distance, high-voltage, AC transmission. This would offset, completely, the need for constructing multiple major power generation stations.

B. IMPLEMENTING SIGNIFICANT CHANGES IN ENERGY CONSUMPTION

Consumption of electricity is influenced in part by power costs, consumer habits and the Government's policy doctrines. The days of low cost electricity are drawing to a close; in part due to the higher costs of coal and gas production, and in part to the need to switch to higher priced energy generation from new renewable resources (although the cost of

tidal power portends to be reasonably lower than the present cost of generating power from wind turbines). It is essential; therefore, that Australia substantially reduces its level of energy consumption and unwanted dumping of carbon into the environment, and hence injurious climate change.

These objectives can be achieved in several ways.

1. Increase the use of power generated by homes and businesses through solar, wind and/or river and tidal technologies. The intensity of sunshine in Australia is very high due to the country's proximity to the equator, and hence the high incident, sun angles, and also the cloudless skies over central Australia. Some coastal locations afford the possibility of generating power from micro wind mills and/or the new technology of Run-of-the-River turbines. Both options have or are becoming technological feasible and economically viable.

2. Reduce household and commercial energy consumption. The following either are encouraged or required at present: 1) installation of wall and ceiling insulation, 2) usage of low-wattage, eco fluorescent and LED light bulbs, and 3) double or triple glazing in windows and doors. Double-paned glazing only adds 10-12% to the cost of windows, compared to single-paned glazing. Yet, introduction of the second pane, with its entrapped air, substantially improves the level of insulation, with a quick pay-back period in energy savings.

3. Introduce geothermal heat pumps for provision of heat, rather than using thermal combustion. Geothermal heat pump applications throughout Europe, Canada and USA abstract heat from the ground (16-17°C), via in-ground bores, and then through heat exchangers and compressors build the temperature up to 32-34°C for distribution. Applications include in-floor heating systems or generation of 70°C potable hot water. Indeed, a New Zealand inventor holds seven national and international patents for heat pump technology that enables generation of heat to 105°C, when the water is stored under slight pressure. Significantly, reasonable numbers of less-efficient geothermal heats pumps have been installed in southern Australia, but further applications could be implemented throughout Australia for heating and/or cooling in residential and commercial sites.

   It is feasible, therefore, to abstract heat under relatively low ambient ground temperatures (16-17°C), with greater efficiencies than any air-based system, and with a 6- to 8-year-pay-back period. Moreover, simple solenoid technology is applied to reverse the flow of heat back into the ground in the summer, or to direct it to other purposes. The best analogy is that of a reversible refrigerator, where the choice can be made to remove heat from food and dispense it into the home's atmosphere, or to take the ambient heat and return it to the refrigerator's chamber. Advanced, geothermal heat pumps have efficiencies (COP) of ~5.0, where the thermal heat output exceeds the electrical input (circulatory pump, compressor) by five-fold; i.e. 1 joule of electricity generates five joules of heat.

Modulating heat in expansive horticultural glass houses is an excellent application for geothermal heat pumps. It has been projected that installing a geothermal heat pump would reduce a large glass house's energy consumption by >40% annually, even when using single-paned glazing. Incidentally, misleading notions pervading the NZ window/door-glazing industry contend double-glazing incurs 50% higher capital costs, rather than the actual 10-12%. Often proven, energy-saving technology is not used due to perpetuation of popular misconceptions.

C. CONCLUSIONS

It is our opinion that timely applications of existing and relatively simple technologies would enable a drastic change in the character of energy consumption in Australia. We would like to congratulate the Australian government on undertaking the present review and hopefully the required initiatives to encourage development of integrated strategies to evaluate and implement renewable energy generation and sustainable energy saving technologies. This present concepts are being proposed in the belief that encouraging the full complement of initiatives will reduce the demand for and cost of energy in the near future, to the benefit of all Australians.

D. We wish to be heard on these issues

Yours sincerely

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