A combined submission to the Renewable Energy Feed-in Bill Inquiry from:

‘Plug-in Australia’ and ‘Concentrated Solar Systems’; both initiatives of Transocean Investments Pty Ltd - 12 Aug 08

Summary

This submission supports the introduction of national Feed-in Tariff legislation to provide a financial incentive for investment in both centralised and de-centralised, grid connected, renewable energy systems.

This submission focuses on Solar Energy Systems, since that is our area of expertise.

Such systems will help reduce emissions that would otherwise occur from coal-burning electricity generation. They will also help reduce emissions from petrol-fuelled cars, since these are expected to migrate to Electric Vehicles over the next 10-15 years.

The world demand for oil (and therefore its long term price) is increasing in the face of depleting supply. Australia’s oil has already peaked and its trade deficit due to oil purchases is due to reach $20Bn/p.a. within a decade.

As well, the effects of Climate Change, now accelerating in the Arctic and Antarctic, at a rate beyond the 2007 expectations of the IPCC scientists, make such investments an increasingly urgent need - if we are to keep average temperatures from rising more than the critical two degrees centigrade.

Thus there are increasing country strategic, environmental, economic and life threatening reasons for introducing such legislation.

Whilst federal and state governments concentrate on reducing emissions from centralised coal-burning electricity generation over the next 15-20 years, business and home owners, in a ‘Dunkirk’ type movement, can substantially contribute to the total Australian emission reduction over the same period. How? By generating clean, peak-time energy at the local, de-centralised level, generating considerable economic activity in the process.

Ideally, the national Feed-in Tariff legislation would allow a person or business installing a grid-connected renewable energy system, to borrow up to 80% of the total installed cost, at an interest rate whose annual re-payment would be no more than his annual electricity bill, including re-payment of the principle over 10 years. A 3:1 Feed-in Tariff (meaning: 3 x actual kWh usage x $’s/kWh paid) would achieve this objective. It needs to be in place for 20 years to provide certainty.

Rationale

The convergence of Peak Oil and Climate Change, make it:

a) An urgent strategic necessity for Australia to achieve energy independence by progressively migrating our internal combustion engine (ICE) vehicles to those that can be fuelled by alternative energy sources.

b) A matter of human survival to progressively reduce our CO2 emissions towards 1960 levels.

An intrinsic outcome of the government's **Carbon Pollution Reduction Scheme** (aka, Emissions Trading Scheme) will be to add to the existing retail price of electricity the cost of reducing emissions from coal burning power stations using Carbon Sequestration and Storage (CSS).

Once that enviro-economic playing field has thus been leveled, it is expected that fueling power stations with renewable energy will be able to compete on a price basis with coal.

However CSS technology is expected to take between 15-20 years to be developed and installed in Australia's existing centralised power generation network.

Since the last IPCC report was issued, accelerating ice melts in both the Arctic and the Antarctic are raising considerable alarm that Climate Change is happening faster than scientists previously expected (see Ref 5).

The need to reduce emissions more quickly to avoid an averaging temperature rise exceeding two degrees Centigrade is therefore even more urgent.

This implies that whilst the coal industry is working towards reducing pollution in the production of centralised electricity, the development of alternative energy for both centralised and de-centralised systems is a critical objective for the next 15-20 years.

Technology Enablers for Clean Electricity

There are two basic technology enablers that can provide the basis for realising the above objectives:

a) Centralised Solar Farms
Two alternative energy technologies are capable of generating base load power and are likely to become preferred solutions – **Geo-Thermal** (such as GeoDynamics 24/7 power from Hot Rocks), **Solar Thermal** (such as AUSRA, Utility-scale concentrated solar thermal technology).

Centralised base load power is probably the domain of government because the number of companies operating in this field is relatively small and manageable. Also their location is frequently environmentally sensitive requiring political intervention.

Their investment incentives and needs are likely best negotiated directly with the companies involved rather than be locked in to a feed-in tariff scheme oriented to a large number of small de-centralised power generators. However similar investment incentives will be needed, certainty of long term investment criteria being the most critical.

b) De-centralised Solar

The next generation of solar is based on 'Triple Junction Cells' or '3J' cells, as they are known (ref 3). These Concentrated Photo Voltaic (CPV) systems are 2-3 times more efficient than flat panel PV systems and cost half to two thirds as much. To generate sufficient electricity to fuel 100% of the needs of an average house will cost around $19,000 after the government grant.

Due to their sun tracking device, CPV systems harvest up to one and a half hours more solar energy than flat panel PV can during the day. This means they can supply more electricity during the peak demand times. This reduces the power stations' (expensive) peak loads required to power air conditioning systems.

CPV systems have already started to be manufactured in Australia (see GGE (ref 4). Other manufacturers exist in Spain (see Sol3g) and Emcore in the US). They are highly suitable for solar farms, rural areas and flat factory roofs, whereas flat panel PV is more suited for sloping roofs in the suburban and city areas.

'Thin film' solar is another emerging technology that shows great promise, but is unlikely to gain the required efficiency to compete with CPV until nano-solar versions emerge from the labs into production in about 4-5 years time.

To manufacture CPV modules in Australia requires that the relatively inexpensive (when purchased in large quantities) 3j cell high tech, high volume components be imported, usually from the US (Spectrolab or Emcore) or Europe (Azure Space). However the tracking systems and framework can be manufactured in Australia and the modules assembled regionally for local installation.

It is critical that CPV technology be included in the Feed-in Tariff Bill, otherwise the government will be penalising the more efficient and therefore less expensive product.

The popularity of purchasing Green Energy in Australia is already surprisingly high. At last count, there were over 600,000 subscribers in NSW alone, which shows that there is considerable consumer willingness to pay a premium price to reduce emissions.

As reported by Peter Garrett, this is also evidenced by the recent escalation in the sale of 1kW flat panel PV systems, which has been assisted by an innovative co-operative marketing technique.

As CPV technology becomes widely available and financially equivalent to the grid, it would make sense to make it part of the Energy Efficiency Building Codes.

Australia could reasonably aim to have 3-5mil of such CPV installations within 10-15 years, perhaps more given sufficient incentive, which could generate enough clean electricity for 40-50% of consumer usage.

It is also important to re-emphasize that the primary objective is to convert as many households as possible to generating their own electricity, connected to the grid.

Let there be no political nonsense about 'middle class welfare'. Soldiers on the beaches at Dunkirk did not care whether the boat that saved them was owned by a millionaire or a fisherman. Humanity is now in the same situation with regard to Climate Change and Peak Oil.

b) Electric Vehicles (EV's) and Plug-in Hybrid Electric Vehicles (PHEV's)
Around 90% of cars are replaced after 15 years of useful life. The world's auto manufacturers are moving to introduce electric vehicles, starting in 2010.

The faster that we can migrate our cars to EV's and PHEV's, the faster Australia gains energy independence and we reduce CO2 emissions.

The state and federal governments have helped to ensure that Toyota's Camry Hybrid will be produced in Victoria, starting in 2010. This hybrid car is likely to become a Plug-in Hybrid along with the Prius. The industry forecast for this to happen is 2010/11.

PHEV's will be charged from the grid. GMH are also scheduled to introduce a version of the 'Volt' EV around 2012.

With suitable investment incentives, Australia could aim to be 90% EV's by 2025. This would certainly help reduce pollution from cars to around the 1960 levels.

The high acceptance rate for green electricity from the grid is a clear indication that many people are prepared to pay more for electricity - if it's pollution free. And that's before we can even buy plug-in electric cars.

The same sort of people (this writer for one), are looking forward to the time when we can cut our petrol bills from around $3,000 p.a to around $450 for green electricity to fuel an EV covering the same annual Kms. Commuters in the western suburbs of Sydney are already suffering (see ref 1). **To fuel an EV with green electricity costs around $0.025/Km.**

In the context of Feed-in Tariff legislation, given that such savings will exist, to maximise their emission reduction, the government could seriously consider mandating that all types of EV be required to re-charge their batteries using alternative energy,.

It is worth realising that the activities of a house and/or business that generates clean electricity and drives electric vehicles will be very close to 100% carbon neutral.

If we could make that objective financially attractive for Australians, how many of us would convert by 2020? Wouldn't you?

So what's needed?

To persuade the large number of people that it will take to make a serious dent in Australia's emissions, to pay up-front for 20 years' worth of electricity, will require a similar investment return that they can reasonably expect from their superannuation investment.

However most working families will simply not have the spare funds available to meet the total capital required. So it is strongly suggested that access to low interest consumer funding will be needed in conjunction with feed-in tariffs.

However the manufacturing and install work involved will create a large number of jobs spread across the nation, as it has in Germany, where they are already providing such feed-in tariffs. There are plenty of precedents in the manufacturing industries here to show that government considers such arrangements make sensible economics.

So the suggestion is that there will need to be a mix of interrelated measures to reach the objectives. They include:

- A feed-in tariff scheme that an investor can rely on for the life of the system – usually around 20-25 years – at probably a 3:1 rate.

- Access to loan funding at a rate such that the principal and interest will not exceed the cost of equivalent green electricity from the grid and can be paid out within 11 years.

- To provide such a loan the lender will probably require a mandatory deposit of a size that is likely to hold the borrower without default for the term of the loan – say around 20%. For an average house this is likely to be around $5,400 (see ref 6).

SHCP or Feed-in Tariff?

Whether a Feed-in Tariff as well as SHCP is required to meet the criteria above is resolved by simple financial calculation to answer the question: 'What is needed to give a

financial return equivalent to the average superannuation return, which is most working families alternative investment.

The Feed-in Tariff, linked to a loan facility as described above, effectively caps the cost of electricity. In our view this gives a working family in the suburbs a choice between locking in today's cost by taking out an affordable loan and installing a CPV system or progressively paying more over time as the grid cost increases as emissions targets are reduced over time.

In our view SHCP's can be scrapped in favour of a Feed-in Tariff because the latter allows users to decide how much electricity they wish to pay for.

This is a better option for everyone and better supports the objective of de-centralising electricity and for Australia to become as energy independent as possible.

What sort of Metering and Accounting?

As intelligent as is affordable. Certainly metering should no longer require meters to be physically read. TCP/IP internet protocols are now communicated over power lines. We should receive Feed-in Tariff accounting and invoices via email where possible, with useful information to help monitor wastage and identify unnecessary usage.

Payments and receipts by via electronic banking will be the normal practice.

Most CPV systems will have their own fault reporting and statistic gathering and management IT system. This will be transmitted to the user either via LAN or wireless internet.

Finally, it is sincerely hoped that bi-partisan agreement will be negotiated on this legislation and that, in the interests of both Australia and the planet, the parties involved will put aside any competitive political considerations in favour of doing what is needed.

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References:

1. SMH 11 Aug 08: '40% of Sydney hit harder by rising prices' and underlying report: *Unsettling Suburbia: The New Landscape Of Oil And Mortgage Vulnerability In Australian Cities*

2. CSIRO: Future Fuels Forum Report 10 Jan 08. Predicts that petrol could reach $4/litre by 2012 and $8/litre by 2018.

3. Directory:Concentrated Solar Power - From PESWiki - Methods of concentrating solar energy to increase conversion efficiency.

4. 'SunCubes'**:** http://www.greenandgoldenergy.com.au
This is a start-up company that offers great promise and looks like being Australia's first CPV manufacturer. They have refcently won a $450,000 contract from the South Australian government. They use the triple junction cells from Emcore used by NASA on the Mars and other missions. They've added dual tracking to follow the sun and harvest maximum solar energy.

5. 'Climate Code Red' published in Australia (2008), by David Spratt & Philip Sutton. This book recognises the gap between the recent dangerously accelerating pace of climate change vs the political will to deal with it in the face of pressure from vested corporate interests. But argues that time is all but run out and urges for action to be taken now.

6. PDF of simplified financial model of CPV costs and benefits at the average household usage level attached.