

Ctrade International's response to Issues Paper 4 of the Garnaut Review, Research & Development: Low Emissions Energy Technologies

1) Background

Ctrade International is a renewable energy company formed to expand the choice and affordability of renewable energy in Australia and the international community. Representing government, commercial and residential generators, Ctrade has developed the world's first business model to allow a single renewable generator to operate in a completely decentralised manner. Employing multiple sites and technologies, the Ctrade network has the capacity to supply low emission distributed power in a reliable and managed way. Essentially we offer the infrastructure for an intelligent grid and the business model to make embedded generation viable in both a community and national model.

Australia's energy future cannot be the same as it's past. Ample amounts of coal and gas have been used as a cheap power source to underpin our economy for decades. Fossil fuels have a central place in the power industry but now face the financial reality of paying for emissions. They will require significant re-positioning to hit a 90% reduction in emissions by 2050. To meet these targets we need to revolutionise the way we produce and use power in Australia. This is a massive task and will require the support of all Australians.

2) Future Energy Possibilities

But what model should we move to? Table 1 represents technologies available and the strengths and weaknesses of each model.

Table 1 Energy Technologies Available

Energy Source	Strength	Weakness
Renewables	Clean energy source Essentially no emissions Small environmental impacts Limited maintenance required Can work in a decentralised environment No lead in time required	Perceived high initial cost
Geothermal	Cheap clean energy Small environmental impacts Large power production that is controllable for peak power delivery Huge reserves in Australia	Requires a centrally dispatched network Large amounts of water may be required
Bio	Clean energy source Medium power production that is controllable for peak power delivery Can work in a decentralised environment Potentially utilises waste materials. Has the ability to diversify business models. e.g. cane farmers	Overall high cost. Possible detrimental effects on other industries such as food production
Nuclear	Large power production that is controllable for peak power delivery Limited emissions. Medium cost power production	Large initial cost Long lead-in time 10-20 years Problems associated with nuclear waste disposal Uses a centrally dispatched network Finite fuel source
Fossil fuels	Perceived cheap power production Existing infrastructure	Significant emissions Uses a centrally dispatched network High polluter and limited social acceptance (the “not in my back yard” effect) Finite fuel source
Fossil fuels with carbon capture & storage (CCS)	Medium cost power production Utilises Current infrastructure	Long lead-in time 10-20 years Uses a centrally dispatched network High polluter and limited social acceptance ***explained above Finite fuel source Limited study on long-term effects associated with depositing large amounts of carbon into the ground. (<i>the cane toad effect</i>) No current functioning models

If we are going to take on this problem we must make sure the alternative is not transient. The cost and effort associated with such a transformation should only be done once. By employing such technologies as nuclear or fossil fuels with carbon capture & storage (CCS) we are still relying on finite fuel sources. After we have solved this initial problem we will be faced with the same dilemma as these sources are depleted. The lead time for CCS and nuclear is 10-15 years from now. This time frame is concerning as we need to make a start now. To delay addressing this problem for 10-15 years will place us in the dangerous territory of a 550 ppm model and therefore uncontrollable climate change. At these levels the expense associated with greenhouse gas reforms will be amplified. Currently we mainly use centrally dispatched coal fired technology to supply our energy needs. With no fees associated with emissions and inefficiencies created by large distribution distances it has been successful. In reality it is a highly polluting inefficient model.

We should be looking at renewables in the bid to solve this problem forever. Low Emission Distributed Energy (LEDE) is the only available technology that can reach these targets without massive financial impacts. Geothermal has great promise but is still a centrally dispatched process. Its role may be complimentary to LEDE in a future model. This is a technology that is ready to go now. The immediate stimulation and growth of the current Australian renewable industry is essential to meeting the challenges ahead.

This view is supported by the CSIRO

“Potential benefits from Distributed Generation (DG) are lower cost, higher service reliability, high power quality and increased energy efficiency. DG is a promising solution for the security of electricity supply, providing distributed and diverse energy source infrastructure. The use of renewable distributed generation can also provide a significant environmental benefit in terms of reducing Greenhouse Gas Emissions.”
Agent-based Simulator for Australia's National Electricity Market. Energy Transformed Flagship research program

Distributed (or embedded) generation will be essential to the national electricity system giving communities the ability to operate in a more efficient and secure environment.

“The full potential of DE could be realised with small scale renewables (wind, solar) or high efficiency clean engines, located close to consumption, coupled to energy storage and demand management with intelligence that provides 100 per cent supply reliability and sustainability and offers any surplus to support other consumers on the Grid.” *CSIRO Energy transformed flagship.*

Australia has already made great reforms to its electricity market with a move from a vertically integrated structure to a more open and transparent operation. The separation of retail and distribution as well as the establishment of NEMMCO has placed Australia in a position to encourage innovation. This competitive environment

has already driven the NEM to a greater level of efficiency. The Energy Reform Implementation Group supports this view.

“The increase in the level of independent, decentralised decision-making in generation and retail in the NEM, driven by an increase in the extent of competitive forces, has been the primary driver for the efficiency gains to date. The increase in the level of competitive pressures has increased the utilisation and performance of generation assets and lowered operating costs and driven real efficiency gains through the NEM-wide dispatch of generation.”

Energy Reform Implementation Group. Council of Australian Governments 2007

This is somewhat unusual as many other countries in the world are still highly regulated. But to reach the levels required to meet a 450ppm threshold by 2050 will require yet more reform. Renewables must be able to compete with fossil fuels in an open market. Currently the advantages of a low emission distributed system are not rewarded financially. The development of a robust market to reward low emission distributed energy is essential to encourage the technical advances required to drive a low emissions grid.

3) Policy Direction to support low emission technology

3.1) Feed-in Tariff

With the privatisation of the retail market it is difficult for renewables to compete on a for cost basis. With emissions and distribution inefficiencies not considered in costing, investment in renewable infrastructure has been unattractive. The immediate introduction of a tariff system is required to place renewable energy on an even playing field with fossil fuels. This has to be set at a level to stimulate the industry and encourage a rollout of renewable products. To stimulate and reward the core business of low emission distributed energy is the only way to “*reduce the capital shortfall for firms passing through the ‘valley of death’*”.

An effective scheme would involve a feed-in tariff mandated at least 60 cents per kWh, paid on the entire output of the distributed system. Offering a similar tariff with net export would mean the householder or business would essentially never receive the tariff. It would be unusual for a house or business to be producing more than they were using considering current technology. Only during holidays or periods of limited activity would this situation reverse. It is also difficult to put a business case forward for a photovoltaic system for example where it is not possible to calculate the return from the panels. Obviously efficiency is very important when looking at this problem but the roll out of low emission generation is so essential that all market barriers must be removed. The consideration of incoming (*demand side*) and outgoing (*low emission generation*) electricity must be separated and run as separate cases on their own merit. Both of these areas are essential to reach a 90% reduction in emissions by 2050.

3.2) Who will be responsible for the cost of the tariff?

The roll-out of distributed generation should not penalise current distributors or retailers. Placing a financial disincentive to either business structure will have a negative effect on uptake. All industries should be rewarded for the uptake of low emission technology. Currently states are rolling out their own solar tariff structures with ranges of support. While a very positive sign, none of the current tariffs are at a level to allow renewables to operate on a level playing field with fossil fuels.

For a feed-in tariff to be effective, it is essential that the tariff offered is designed in a way so as to adequately reward solar proponents. A central tariff on entire output is the only environment that will encourage a market led renewable roll-out. A single federal tariff structure would simplify the market for all players. Currently retailers have to administer five schemes with a few more on the way. A central set of rules tied into the National Emissions Trading design would simplify the process. Offering more clarity in the market and increased levels of efficiency. In the interim the market requires more direction and clarity on tariff structure to stimulate investment.

3.3) An immediate indication of emissions trading structure.

It is difficult to attract true investment in the industry until investors are aware of the rules of the game. Once business is aware of the market rules they will make a decision on future investment. The ability for companies to aggregate credits now to be used once emissions trading is introduced will encourage immediate uptake. Once again LEDE must be able to compete in an open market if investment is to be found.

3.4) Encourage low emission distributed networks to operate in the NEMMCO process

It is not financially viable for a distributed network to operate in current NEMMCO structure. This reduces investment and innovation in the key areas of technology. The Ctrade network could operate in the NEMMCO spot price market resulting in peak load reduction with low emission technology. This is a direct market barrier to a distributed model and integration between demand side management and the supply of distributed low emission generation.

3.5) Advanced metering infrastructure

The support and roll-out of advanced metering infrastructure (AMI) will be one of the key technologies in the transition to a low emissions grid. It is essential that the framework encourages all the benefits that advanced metering infrastructure can provide and does not limit its potential. Limiting the access to the smart metering market with exclusivity will create lock-in for a technology in its infancy. A robust and competitive market is essential to drive the advancing technology in this area.

3.6) The reform of the NEMMCO structure to dispatch to renewable generation first rather than on a perceived cost basis

Renewable forms of energy should be exhausted before we utilise fossil fuel technology. With the current NEMMCO dispatch structure based on a cost basis the most attractive technology is brown coal. Renewable forms of energy are unattractive in this environment often coming at the back end of the dispatch process. A system encouraging dispatch to renewables would simulate the industry and encourage investment in renewable forms of energy. Unfortunately this would have an immediate negative effect on the price of electricity. But as a carbon tax and emissions trading comes into play this may be an effective model.

Conclusion

It is now time to act before we lose this problem. The longer we wait the more expensive the solution becomes. New technology and innovation should be encouraged through market means. There are many Australian companies waiting to compete in this market but it requires a positive environment to implement change. Australia has developed significant innovation in areas of low emission technology. Companies have the opportunity to compete offshore in a widening market. We must accept the realities of climate change and move to a new market.

Definitions

Abbreviation	Definition
Fossil fuels	Gas, oil, coal
Carbon Capture & Storage. CCS	An approach to mitigate global warming by capturing carbon dioxide (CO ₂) from large point sources such as fossil fuel power plants and storing it instead of releasing it into the atmosphere
Renewable	Photovoltaic, Solar thermal, Wind, Hydro, Wave.
Distributed generation. DG	Generates electricity from many small energy sources. It has also been called on-site generation, dispersed generation, embedded generation, decentralized generation, decentralized energy or distributed energy.
NEM	The National Electricity Market (NEM)
NEMMCO	NEMMCO is the market operator of the National Electricity Market (NEM) and the system operator of the national grid.
Smart Meter	Typically an electricity meter that records electricity consumed (and potentially generated) in intervals throughout a day rather than just accumulating the total usage. Smart meters also usually have mechanisms to allow them to be able to be read remotely rather than by a person going out periodically to read the meter. Smart meters can usually also allow some information or control to be sent to the meter and in turn the household that could be used (for example) to control appliances or inform the consumer of cheaper electricity periods.