Hamilton Energy Consulting

www.hamiltonenergy.com.au

8th September, 2014.

Submission in response to the Tasmanian Energy Strategies Issues Paper.

1. Introduction.

My qualifications are in physics. Following a career as an occupational hygienist, I moved to Tasmania where I have a small energy consulting practice and work as a volunteer in community organizations. Energy has long been of interest to me, and my last two decades as an occupational hygienist were spent in energy industries, mainly working for ExxonMobil.

Both the community organizations I am involved in have an energy connection:

- I am the Convenor of the Tasmania North Branch of the Alternative Technology Association (ATA). The ATA is an Australia-wide association whose mission is to encourage, assist and advocate for more sustainable living, with particular emphasis on energy efficiency and water conservation. Please see www.ata.org.au for more information.

- I am the Chairman of Dorset Renewable Industries (DRI), which is a community focussed enterprise aimed at developing new industries for the Dorset region of North East Tasmania which utilize the region's renewable resources in ways which makes the community more resilient and improves the environment. One of the opportunities which DRI is looking at is a 30 Ml/yr cellulosic ethanol plant using a process under development in Australia.

Despite the above two connections, the views in this submission are entirely my own and not those of either the ATA or DRI.

2. Elephants.

There is a great deal of good discussion in the Issues Paper, and the open-ended nature of many of the questions suggests that the desire for input and consultation is genuine. It was refreshing, for example, to see a direct reference to the electricity supply industry death spiral. It was also good to see a discussion of energy efficiency.

It is unfortunate, therefore, that the paper ignores the two energy policy elephants in the room: climate change and peak oil. The main way these are overlooked is by saying "energy" and mostly meaning "electricity", and by deciding that since the Tasmanian Government has little influence on the price of liquid fuel, there was little point in discussing it; a point with which I profoundly disagree.

This submission will attempt to grapple with those elephants, and will do so within the context of some of the specific questions in the paper. However, some direct discussion of both is necessary in order to better define the problem of climate change and the predicament of peak oil.

3. Climate Change.

Deciding the policy response to the threat of climate change is in principle very simple: as the threat arises because of the accumulated carbon dioxide in the atmosphere because of the burning of fossil fuels, then we need to stop burning fossil fuels. In the Executive Summary of their 2012 World Energy Outlook, the International Energy Agency said (their emphasis):

> **Successive editions of this report have shown that the climate goal of limiting warming to 2 °C is becoming more difficult and more costly with each year that passes.** Our 450 Scenario examines the actions necessary to achieve this goal and finds that almost four-fifths of the CO2 emissions allowable by 2035 are already locked-in by existing power plants, factories, buildings, etc. If action to reduce CO2 emissions is not taken before 2017, all the allowable CO2 emissions would be locked-in by energy infrastructure existing at that time. Rapid deployment of energy-efficient technologies – as in our Efficient World Scenario – would postpone this complete lock-in to 2022, buying time to secure a much needed global agreement to cut greenhouse-gas emissions.
>
> **No more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2 °C goal, unless carbon capture and storage (CCS) technology is widely deployed.**

The "etc." in the first paragraph of the IEA quote includes, of course, fossil fuel burning transport equipment: cars, trucks, locomotives, ships and aircraft.

My understanding of the predicted effects of climate change on Tasmania is that the outlook for our island's climate is better than the outlook for the mainland's climate. I think that a bigger impact on Tasmania than the actual changes to the climate will be the need to quickly and severely limit the use of fossil fuels,

particularly as our reliance on fossil fuels for transport is very large. We are an island community with low population density and essentially no electrified transport, making us very vulnerable to the absence of liquid fuels.

Climate change was not mentioned in the Issues Paper, which is unfortunate, since:

- Climate change policy and energy policy are inextricably interlinked, and it is not possible to have good policy in one area without good policy in the other.
- Regardless of the current political fashion to pretend climate change does not require a meaningful response, eventually those with that approach will be mugged by reality and will have to deal with a populace clamouring for action. That action must involve the active phase-out of fossil fuels.
- Compared with the rest of Australia, Tasmania starts from a position of less dependence on fossil fuels that the other States. However, once the de-carbonisation of electricity supply is well underway in the rest of Australia, Tasmania's situation will be less favourable because of our total reliance on liquid fuels for transport.

4. Peak Oil.

In a way, the peaking of the oil production rate is of secondary importance, as an effort to contain climate change to the 2°C warming agreed internationally would see significant efforts being made to reduce the use of petroleum as a fuel. The Chief Economist of the International Energy Agency, Fatih Birol, has said: "we must leave oil before oil leaves us." However, since significant actions to contain climate change are not being made, and since energy transformations are usually slow, the threat of disruptions to oil supply because the production rate has peaked needs to be factored in to energy policy.

The potential for oil supply disruptions due to the limited availability of oil should not be taken lightly. Figure 1 is a graph from an article which appear in the Wall Street Journal on 28th January 2014. It shows relative changes to the capital expenditure ("capex") on oil exploration and production by three large listed oil companies, ExxonMobil, Shell and Chevron from 2009 to 2013 and the relative changes in their oil production rates over the same period.

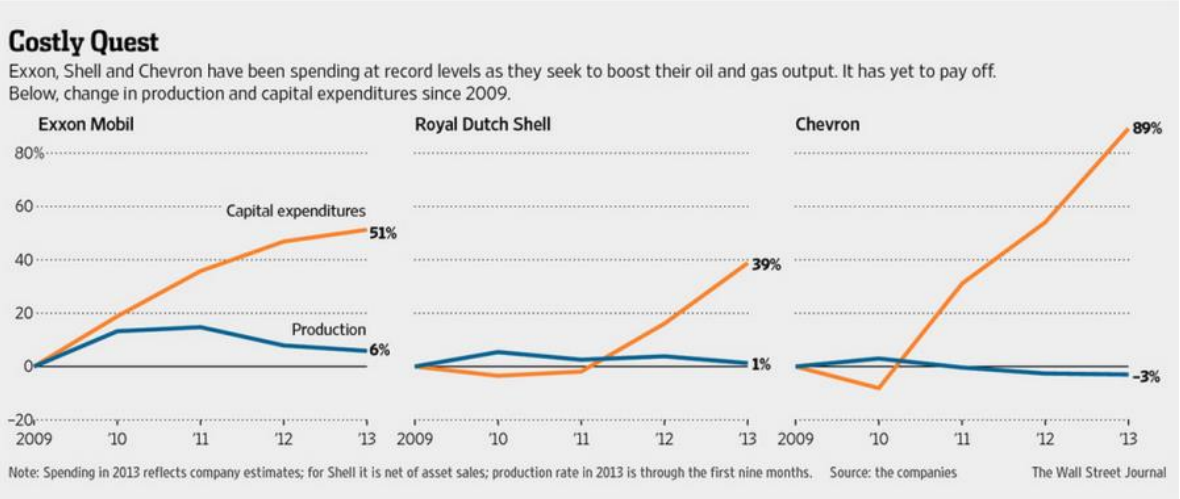

Figure 1: Wall Street Journal, 28th January, 2014.

Figure 1 shows the stark financial implications of the common phrase "all the easy oil has already been found", particularly if for "easy" one reads "cheap". Put simply, the oil majors have been in the position of the Red Queen in *Alice in Wonderland* – they have had to run faster and faster to stay in the same place. An argument that this outcome is not about the underlying oil supply situation but is about the competence of those three companies is not believable – I used to work for ExxonMobil, and I know how disciplined their decision-making is, and how careful they are with their capital.

The real punch line in this story, however, is that all three of those companies subsequently announced significant reductions in their capex budgets for 2014. It follows that production rates must drop in the next few years – oil supply reductions are on their way.

5. The Role of Government.

Section 1.5 of the Issues Paper discusses this, but no questions are posed. The paper discusses the Government's role as a policy maker, but misses the important role the Government has, which is to do what it can to protect the community from the problem of climate change and the predicament of peak oil. Given that both these could be very disruptive to the way our society currently operates, this is a major oversight. Indeed, in my opinion there is no greater task for energy policy than to assist the community to make the transition away from fossil fuels as quickly as possible and with the least adverse impacts as possible under the circumstances.

The Issues Paper avoids these difficult matters and is much the poorer for it. It really does ignore the elephants in the room.

6. Specific Questions.

I will discuss these in the order which best presents the themes I wish to develop.

Question 13: the future energy system

As already discussed, the key issues are climate change and peak oil: the need to phase out fossil fuels and the need to prepare for possible oil shortages. There are significant economic opportunities in the energy transition, and there are opportunities for improving the resilience of the Tasmanian community.

The economic opportunities are localization and fixing economic leakage. The move from fossil fuels means, by definition, a move to renewables. In most cases the renewables will be locally sourced, and there are significant economic benefits from communities relying on local businesses for essential services. Indeed, an economic development strategy used with considerable success is to first identify goods and services purchased in a community from outside the community: economic leakage – and then work towards stopping the leaks by encouraging the development and use of local alternatives. In Tasmania, for example, petroleum products are a major cause of economic leakage. Fixing this economic leakage by transitioning us away from fossil fuels towards local renewable resources will provide an opportunity to keep much of the money which now leaves the State in the State.

The resilience of the Tasmanian community will be enhanced by using a spectrum of local renewable energies, avoiding the current long supply lines for petroleum.

As a practical example of these opportunities, consider natural gas and LPG. While both are used to fuel engines, their major use is for heat, and this use could largely be replaced by biomass sources: wood pellets, wood chips and perhaps a little biogas where available. In a mature system, both wood pellets and wood chips are likely to have many small to medium suppliers, with most sawmills being able to provide either or both pellets or chips. Thus Tasmania would go from an energy source (gas/LPG) located outside Tasmania with a supply line with little redundancy (only one gas pipeline) to an energy source (pellets, chips) with many suppliers, mostly servicing their own local areas, but able to supply further afield in the event of a supply problem there. Almost all the money paid for the energy leaves the State in the gas/LPG case, while almost all the money paid for the energy stays in the State in the biomass case. Thus the transition away from gas and LPG to biomass based fuels would improve the economy and increase the resilience of the community.

Question 9: Energy Efficiency.

Energy efficiency is one of the keys to a workable energy future without fossil fuels. Fossil fuels have been a veritable bonanza of cheap, energy dense fuels we have not learned to use efficiently. The Issues Paper itself shows transport as the second largest energy end-user segment, but comments that the complete electrification of transport in Tasmania would only increase electrical load by 10%, a measure of how inefficient our current liquid fuelled transport system is. It is a truism that the more efficiently we use energy, the easier it is to provide that energy.

There are some comments about energy efficiency in the Issues Paper that I do not agree with:

- On page 5, it is claimed that current liquid fuel prices already provide "strong signals to consumers to increase fuel efficiency in transport". If strong signals are being provided, then they are being comprehensively ignored: look at the light vehicle sales data to see that fuel efficiency is not being valued, or better still, look at the driving behaviours of Tasmanians. If Tasmanian drivers are aware of fuel efficient driving practices, then they certainly do not adopt them!

- On page 19: "It is assumed that larger commercial and industrial customers (particularly those in energy intensive industries) should be already aware of the measures required to improve energy efficiency and generally have the resources to implement them as 'standard' cost control measures." My understanding is that the Australian Government's recently closed Energy Efficiency Opportunities scheme found nothing to justify that assumption.

As I said in my introduction, I have a small energy consulting practice. Most of my work is in the area of energy efficiency, and most of that domestic energy efficiency. By and large my clients, wonderful people though they are, have no understanding of energy. They can't read their electricity bills, they do not understand the difference between energy and power, they do not understand the fundamental advantages heat pumps have over resistive heaters, and so on. Our education system appears to have completely failed in this area. On the basis of my experience I think it most unwise to assume that any part of energy efficiency is currently working – apart from MEPS, which is successful and should be widened and strengthened.

So, to answer the question: the Government needs to do a lot in this area. Programs need to be comprehensive, aggressive and well-resourced and should include:

- A review of the energy content of high school and TAFE curricula to ensure that students have the necessary knowledge and skills to make energy decisions.

- A review of driver licence training and testing to ensure that new drivers know how to drive in a fuel-efficient way.

- Strong support for strengthening current national schemes such as MEPS and the house energy rating scheme.

- A version of the Energy Efficiency Opportunities program for Tasmania scaled appropriately for Tasmania and including all sources of energy.

- A revenue neutral "feebate" system should be applied to vehicle registrations to provide incentives for the most efficient vehicles in a weight class and a disincentive for the least efficient.

Question 8: Building Energy Efficiency.

Tasmania is fortunate to have significate expertise in building energy efficiency in the form of Dr Mark Dewsbury and the UTas Centre for Sustainable Architecture with Wood. It would concern me if their expertise were not being used by the Government to inform policy in this area. I don't have their breadth of expertise, but my understanding is that:

- The current 6 star rating requirement should be seen as only the beginning of the journey to where we need to be and would be seen as inadequate in much of Europe.

- Low interest loan schemes for building retrofits are an excellent idea (the loans are paid off through energy savings), but have suffered in the past through low uptake rates. The Government could consider incentivizing a retailer or a Council to find candidates for the loans. Indeed, Councils could provide the loans, with repayments made via the increased value of the building and hence the increased rates.

- The Government should set the highest standards in its own buildings.

- As well as moving past 6 stars by regulation, the Government could provide incentives for the highest efficiency classifications (e.g. 10 star, passiv haus, etc)

Question 11: Further potential for renewable energy.

I interpret this question as not just applying to electricity. As discussed, because we must phase out fossil fuels to protect our climate, we need to work towards a 100% renewable future. I'm not suggesting this will be easy!

On the slightly easier question of electricity, I suggest the following:

- The PV genie is definitely out of the bottle; it is a genuinely disruptive technology. It would be foolish (and politically dangerous) to try to put it back into the bottle. Instead, the change will need to be embraced. The North Queensland network operator has said that in the far flung corners of their network it is now cheaper to move individual families off grid and whole isolated communities to mini-grids based around PV than to extend or maintain the grid. Is this is also true in Tasmania?

- PV as well as wind does have the advantage for Tasmania as a whole that it saves water and helps drought-proof our electricity system. So while PV may not help meet the load on cold winter mornings, it will help make sure that sufficient water is available then.

If renewable electricity is the easiest renewable energy to implement, then renewable heat is surely the next. Tasmanians already use a significant amount of renewable heat domestically in the form of wood heaters and heat pumps driven by electricity which is mostly renewable. Tasmania should have a wood pellet industry in which bulk pellets are widely used, delivered by trucks into storage hoppers from which they are fed automatically to pellet boilers – a clean burning fuel which is as convenient as gas, oil or LPG but which is renewable and can be sourced locally. There are few technical obstacles to having such an industry here, as the technology is regarded as mature in Europe. The main obstacle in Tasmania is the economic chicken-and-egg problem of no one wanting to invest in pellet making in the absence of a demand for pellets, and no one wanting to invest in pellet burning equipment in the absence of a supply. The Tasmanian Government is going to have to kick-start this industry by deciding to use pellet systems in all new and refurbished Government buildings. I suggest that the Government should also look at the UK's Renewable Heat Initiative.

Liquid fossil fuels will obviously be the most challenging to replace with renewable alternatives.

- The electrification of much of transport will need to be the principal strategy.

- The cost of new electric vehicles (EVs) is too high for mass market adoption, but is expected to reduce significantly over the next few years. An

alternative is to encourage conversions of existing vehicles: TAFE could provide training, and the Government could provide low-interest loans for approved conversions, with repayments coming from fuel and maintenance savings. Conversions could be done by vehicle owners themselves or by service providers.

- The Bass Strait Islands, with their limited travel distances could be a test-bed for trying different transport electrification approaches.
- Liquid biofuels will have a place (it is possible, for instance, to manufacture diesel engines to run on 100% ethanol), but because of the low efficiency of photosynthesis, biofuels derived from plants will have only minority application, perhaps around the edges of mainstream transport.
- Farm tractors should be an early focus for biofuels because of the improved community resilience offered by having local fuel sources for tractors.

Question 4: Information Enhancements.

The Government owned energy businesses should be asked to report on their fossil fuel usage in their annual reports, and should be asked to also provide an estimate of how long they expect to be able to maintain generation and network reliability following a lack of supply of liquid fossil fuels. Such reporting is intended to increase the focus on whole of system resilience.

Question 10: Facilitation of electricity load growth.

The only role the Government should play in this area is to facilitate the electrification of transport, which should be a priority.

Question 12: Government role with respect to gas.

The Government should most certainly not do anything to facilitate the additional use of fossil methane. The Government should, however, look at enforcing an open access regime for the natural gas network to allow biogas producers to sell non-fossil methane into the gas network.

Question 14: Tasmanian Energy Strategy outcome.

In a way, this whole submission has been an answer to this question. In outline, we need to:

- Phase out our use of fossil fuels,
- Increase our use of locally sourced and owned renewable resources,

- Make increasing the resilience of our community one of the objectives of energy policy.

The tools for achieving those objectives are:

- Energy efficiency,
- Electrification of transport where possible,
- Upgrading local skills in both energy efficiency and electric transport,
- Making the best use of available biomass resources in an environmentally sensitive and sustainable manner.

I admit that the idea of phasing out fossil fuels is scary. The alternative – to live on a planet with runaway climate change – is even more scary. We need to stop refusing to notice the climate change elephant and to look it in the face and to come to terms with what we must do. Here in Tasmania I am convinced we are up for this challenge. We can acquire and apply the skills needed; we can solve problems and develop affordable approaches; we can work together to do this. What we need is leadership, and that is the role of the Tasmanian Government.