Response to Tasmanian Energy Security Taskforce

Author Ian Howard 8 August 2016

Introductory Comment

The discussion paper is of a high quality and in highlighting key questions the group has focused responses in critical areas.

2 Comments on key questions

I shall comment with reference to some but not all of those posed questions.

1 Risks

How much energy security can Tasmania afford firstly at the state level and secondly in the distribution system and how best to educate the public on the cost v's risk decisions.

There is a risk that "Climate" beliefs and politics will drive non optimum decisions whereas there are tools, science, engineering and historic records to give reasonably accurate risk analysis.

Reliability Levels

The best overview are the reliability statistics below.

The published 2013-14 SAIDI 333.1, SAIFI 2.1 & CAIDI 156.0 are all above the national average of 264.7, 2.1 & 139.9 respectively.

Given the total population density and the relatively high level of regional and non-urban communities in Tasmania this performance is reasonable. Extensive expenditure in duplication, dual supply and undergrounding is hard to justify.

4 Community Risk Understanding

Outage Frequency

In my opinion once events exceed 3-4 per year the customer is rightly concerned.

Outage Duration

The average electricity customer usually only considers reliability when there is an outage and then wants to know "How long?". The worst scenario is not having an estimate of the outage duration so alternate plans can be made be it a short duration say 20 mins or a long duration say 1 day.

Aurora the retail supplier needs to ensure there are reasonably quick & accurate estimates available by phone or internet to answer the "How long "question. At present this is done well. Under no circumstances should this service be it automated or by conversation be located overseas. These overseas call centres are one of Australia's biggest customer service complaint topics.

Question 6 Potential Energy Solutions

Energy sourced from electricity, liquid fuels, gas and wood are, from a customer viewpoint, not interchangeable in the short term. This is true for any scale of consumption be it industrial, commercial or retail so any interruption causes dislocation. In the longer term capital expenditure can facilitate a change in fuel type such as home heating with choices of liquid fuel, electricity and wood.

Of these sources within themselves there is vulnerability

Electricity cannot currently be stored in significant quantities.

Liquid fuels can be stockpiled and in Tasmania but are completely dependent on coastal shipping.

Gas as LPG can be stockpiled but is shipping dependent.

Natural gas cannot be presently stored for reticulated customers and there is very limited storage in the Bass Strait pipeline.

Wood by its dispersed nature, sustainability and mobility of harvesters has the highest security of all Tasmania's energy sources.

In the case of electricity in Tasmania the best security like any investment strategy is diversity.

Present significant sources available are hydro, gas, wind & solar. There is a cost to keeping options available but the risks are diminished. The author recommends none of these options currently available should be abandoned by the public utilities so the most significant question then is what proportions of these should Tasmania plan for.

Sources not used in Tasmania but used elsewhere are nuclear, wave, underground thermal and tidal.

These additional sources can probably be set aside at present for the following reasons:

Nuclear – Tasmania's incremental future loads couldn't justify an economic small scale plant and the regulatory and public opinion barriers would be insurmountable.

Wave – This technology especially reliability plus the isolation of the west coast from the larger consumers would make this unsuitable at present.

Underground Thermal – There has been recent discussion on heat sourcing from "hot rock' technology whereby underground natural nuclear reactions release heat which can be harnessed by piping a fluid through this source and returning it to the surface. This source if developed to pilot scale should be kept under review.

8 Governance

Tasmania currently has no single statuary authority responsible for water storages with the main divisions being the ultimate use of the water i.e. power generation, irrigation and community reticulation be it on industrial or household scale.

Presently this is attempted via Water Shortage Advisory Committee (WSAC)

This is sub optimal especially as it relates to the increasing requirements for power, flood mitigation, irrigation and industry the largest users.

Stakeholders such as fishing and tourism also need representation.

There appears to be nothing in Hydro Tasmania's legislative structure brief and operational guidelines to ensure consideration is given to these water uses. Current arrangements rely on goodwill and WSAC.

Whereas once these were mainly mutually exclusive this is no longer the case especially with recent initiatives in irrigation throughout the eastern half of the state.

There is an inbuilt dichotomy in these arrangements whereby:

> Power requires storages where possible be maintained at high levels to ensure security and provide the highest heads for Pelton type turbines
>
> Flood mitigation requires storages to be kept low to provide buffer surge storage.
>
> Irrigators have no alternative to water use whereas power has partial alternatives at present in gas turbines and Bass Link imports.

There should be some formalising of considering these competing needs and regular reviews of operational priorities.

.

9 & 10 Second Basslink & Gas Generation

To date leading up to the Bass Link outage this single cable served Tasmania well in providing security, buffering insufficient water inputs to storages and reducing overall power costs with relatively low cost brown coal power imported from the Latrobe Valley.

There are reasons that an increased use of an interconnector capacity should be analysed critically mainly:

There are rapidly increasing costs of all power supplied in Australia driven by subsidies for alternate sources especially domestic solar and the reducing availability of coal sourced power e.g. the recent closure of South Australia's only large coal fired base power station at Port Augusta. This was followed shortly after by spot pricing increases in that state purchasing power at $14000/MWH.

The rush by all state governments to chase higher renewable power targets and achievements and the discouraging of base load coal stations to supply interconnectors such as Bass link.

The recent announcements by AGL to run down and not replace its base load coal stations especially in NSW & Vic is an example of this trend. They plan to shut down Loy Yang in 2050.

This may seem the distant future but in reality lead times for design, layers of approvals required and subsequent construction & commissioning of any new assets could use 50% of this lead time.

Most states in closing coal fired stations will increasingly rely of gas fired stations to supply base load especially at night. With the increasing gas exports from the NW shelf and Gladstone Australia is now effectively running on domestic gas supplied at near international spot prices for any gas generation. This is rapidly eroding our national natural advantage of lower cost energy which was an offset for our manufacturing industries with high labour costs and small domestic market.

With Basslink effectively powered by Loy Yang its closure will mean the nearest available power source will be the ageing Jeeralang gas powered station. This station installed in 1978-79 has seven turbines none of which are combined cycle so are far less efficient than the largest Tamar Valley gas & downstream steam turbines.

Basslink input at Loy Yang substation could end up marooned with all Latrobe Valley coal stations closed and the nearest source aged gas turbines with low efficiencies.

Tasmania would be better served with maintaining the current or expanding the Tamar Valley station and have the following advantages

Increased self-sufficiency.

Reduced dependence on a rapidly cost increasing mainland power costs with attendant volatility and reduced stable base load supply.

Use existing infrastructure of the gas pipeline and power station.

Increase onshore gas use to underpin the underutilized gas pipeline and thus reduce user costs.

Use its more recent higher combined cycle efficiency to burn gas on shore in Tasmania.

With reducing Bass strait gas reserves Vic will increasingly depend on interstate export parity pricing and have no inherent advantage over Tasmania.

11 Gas Utilisation

As stated above increased gas fired power generation at Tamar can be the trigger for increased gas utilisation in Tasmania.

Currently gas penetration into the Tasmanian market especially retail is low compared with mainland states.

The relatively high gas price with resultant low demand and lack of returns from and reticulation expansion has stalled gas usage.

These factors combined with the previous use of lower cost heating power prices has unlike other states pushed Tasmanians to the use of "Heat Pumps "which are reverse cycle compressor units. The capital cost of these is relatively high as they also have the rarely used air conditioning facility built in.

The use of these units together with underfloor, radiant and other electrical systems used for heating over long winter periods reduce for Tasmania the opportunity to export high valued peak electricity interstate. Direct gas home and commercial building heating are a more efficient use of this energy source and should be encouraged.

12 13 & 14 Renewable Energy

These questions can be best addressed by considering some facts and observations of the current Tasmanian market.

Tasmania total energy relevant to renewables are electricity and wood with energy consumption of 39 % & 6% respectively in 2013-14. The 39% electricity was 66% electricity (2014-15) such that 39 X 0.6 + 6 = 29.4 % by far Australia's highest. This assumes none of the 14% Basslink imports are renewables.

Tasmanian per capita CO2 per capita emissions in 2014-15 was approx. 8,000kg compared with a national average17,500kg. This low Tasmanian figure for renewable energy already exceeds national targets.

If electricity only is considered 66% of Tasmania's was hydro again far in excess of any national targets.

Despite the above Tasmanians are charged at approx. 4.5 % of retails bills for Renewable Energy Certificates to subsidize renewable generation here and interstate.

There is no published justification for this inequity.

Tasmanians currently have the following Aurora variable pricing (Excludes Fixed Charges)

Tariff 31 25.2 c/unit (May 2016)

Tariff 42 15.19c/unit " "

Legacy feed in 28.28 c/unit

Current feed in 6.67 c/unit

My current power bill shows generation costs at 22.7 % of the total charge. There is no insight available into the variable cost of electricity of the last incremental KW generated from hydro

which would include some maintenance costs plus the opportunity lost to export the via Basslink.

I suggest the price offered to feed in suppliers in Tasmania should be calculated from

Average price received for Basslink export (Opportunity cost).

Less Allowance for volatile input from solar with little in winter when Tas demand is highest.

Less Loading for depreciation & maintenance of distribution network to PV solar equipped homes who rely on public grid security.

Less allowance for poor quality including square wave form of input lack of frequency control and no contribution to expensive VARS (Volt Amp Reactance) which are supplied free by the generators.

The above indicates there was no financial justification for the Legacy feed In Tariff level and no published justification for the current rate. The author suggests its likely to be below the current feed in tariff which shows that Tasmanians who invest in PV panels and feed into the grid are being subsidized by those who cannot afford the initial capital outlay.

In summary my answers to the posed questions are

13 Best Opportunity Technologies

In order of value to Tasmania the best renewable opportunities are

1 Hydro
2 Wind
3 Wood
4 Solar
5 Wave
6 Hot Rock
7 Nuclear (This is effectively renewable given the size of the resource)

14 Is there a limit to Intermittent renewable

The limit is not a fixed artificial target but rather the incremental cost of power from the next expansion when compared with an existing source or alternate option.

It's imperative that the likely future trend to future costs of these sources of energy as new assets have long lead times and operating lives.

Tasmania should not strive to reach some unexplored feel good targets as recent costs and trends in Australia show the results of such initiatives.

15 Material Barriers

There are obvious barriers and opportunities in taking up current and emerging products such as location, small dispersed population, lack of sunlight, demand pattern, wood availability, rainfall patterns, water demand for other uses and a resistance to change culture.

The riskiest barrier to investment in non-optimum options such that a once advantageous energy cost state loses its competitiveness that partly offsets the already considerable disadvantages the above factors affecting Tasmanian industries and their employees.

16 Timing for Developments

Tasmania is well placed not needing to rush into policy commitments with its already leading renewable energy performance. There will be multiple technology and policy outcomes in the next decade and early adoption will prove in some cases to have unfortunate outcomes.

17 National Commitment

National commitments to decrease carbon emissions will likely see significant cost increase accompanied with less reliable supplies of electricity across the national grid.

This combined with multiple private and government ownerships of the system all with different objectives will present some export opportunities for Tasmania whilst the security of Basslink imports will diminish significantly.

Renewable and other initiatives taken within Tasmania are likely to improve costs and supply reliability.

18 Climate Change

If Tasmania experiences increased temperatures, they will be small and gradual allowing adjustment for most human activities.

Rainfall and temperature are interwoven in Tasmanian weather patterns.

Traditionally maximum water input to storages for all uses has occurred in the winter months whilst hydro power needs have coincided with this peak.

Warmer temperatures and higher irrigation needs will likely reduce the spread of max to min water demands. This could be partly offset by larger rain events with surges into storages.

Individual agricultural and aquaculture activities will be affected both positively and negatively but the overall demand for energy with its concentration on five or so large industrials will show little demand variation due to climate.

19 Scenario Planning for Energy Security

Most scenario planning for energy and electricity supply is on options for interruptions to supply. This occurs because sources are concentrated and consumption dispersed and diffuse with supplies of finished products in the distribution networks.

Electricity unlike other energy cannot be stockpiled in commercial quantities once produced except in small systems such as pumped storage.

Tasmania is again unique in that the most significant risk is the permanent loss of a large industrial customer. Ironically the loss of a large customer would enhance security in the immediate short term with an abundance of supply.

In the longer term however the loss would be catastrophic as unless there was meaningful cost cutting by the supply authorities this would have an adverse effect on all customers big and small. The recent demise of the car manufacturing industry in Australia is an example of this where suppliers become unviable almost overnight due to the volume drop from GMH and Ford.

The best insurance scenario planning for this must include

> An intimate relationship between Hydro and these large customers whereby each understand the others issues and mutually beneficial decisions can be made. If the relationship is reduced to a zero sum game on pricing, there will be unpleasant surprises for all parties.
>
> Supply authorities must be non-compromising in their efforts to contain costs to assist customer competitiveness.
>
> The state government must be aware of industry viability and ensure its actions have no adverse or unexpected consequences.
>
> The population of Tasmania must be kept informed as to the key elements of the economy, energy strategy and costs. This does not mean glossy brochures and motherhood statements but rather transparent and meaningful communication and not just react to events such as the recent power shortage.
>
> Australian governments are traditionally not good at this but some countries are good as the author has experienced in the forest industries in Scandinavia whereby children from a young age are aware of the tradition and importance of the timber and associated industries and similarly the part manufacturing and engineering play in Germany.

Thankyou

Ian Howard