Submission No 109

INQUIRY INTO THE CONTINUED PUBLIC OWNERSHIP OF SNOWY HYDRO LIMITED

Organisation:

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Theme:

Summary

Submission to the NSW parliamentary enquiry into the continued public ownership of Snowy Hydro

Submitted by

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1. Introduction:

This submission details some responses to various statements made during the IPO process by various members of the public and media. These claims are related to questions 2 and 3 of the parliamentary inquiry.

It is our opinion that these claims were inaccurate and quite misleading. We aim to identify the inaccuracies with these statements by providing sufficient background facts to dispel these "myths".

It is hoped that this information will be assistance in reviewing future options for Showy Hydro Limited.

The views represented in this document are the personal perspectives of the authors and do not necessarily represent the views of Snowy Hydro Limited.

2. About the Author's

David Mead

For the last 14 years I have been employed by Snowy Hydro, and since 1999 I have been the Manager Asset Planning, prior to this I was in a range of strategic asset and maintenance management roles. More recently I have been working to align Snowy Hydro's physical capabilities with its current and future market position. Due to having been employed by SMHEA during the 90's I also have a good perspective of the "pre" market / SHL business. I believe this gives me a somewhat unique perspective on impacts of the competitive market and what is necessary for SHL to be competitive WRT its physical assets.

Some of my responsibilities pertinent to the issues discussed in this submission are:

- Integrating asset management and routine maintenance into the more market facing aspects of the business.
- Development of the 20yr portfolio asset plan
- Management of annual project assessment, approval and budgeting process
- Business case development for the more significant expenditures
- Development of asset (life extension and modernisation) plans to ensure asset capability will meet medium to long-term market requirements.
- Identification of capability improvement opportunities

Cau Thai

I have been working for Snowy Hydro for five years since 2001. My work involves various market analyses and intensive strategy modelling, particularly in assessing market behaviour of other generators. I have a BE and an ME in electrical engineering and a PhD in management science specialising in economic behaviours in electricity markets. Prior to Snowy Hydro I worked for 3 years (1995-1998) as an electrical engineer with the largest power distribution company in Ho Chi Minh city, Vietnam. I feel that my work and academic experience provide me with sufficient competence to realise the likely impacts of changing market environment on the strategic position of SHL.

Vladimir Stojnic

I have been with Snowy Hydro Limited, as a Water and Market Optimisation Manager, since March 2004. I am mostly involved in developing integrated business approach to optimise short and long term water utilisation in line with value maximisation from electricity and other markets and water release obligations. Having worked previously for public service as well (Department of Land and Water Conservation, NSW and Sydney Catchment Authority) I believe that I have a good understanding of the water resources management related implications of continued public ownership of Snowy Hydro Limited and of possible change in SHL ownership (if sold through IPO or similar process).

3. Background Information - some myths and facts

3.1. SHL's current market position

By virtue of a high generation capacity and low annual energy volume SHL's generation assets are most suited to peaking operation (this includes new open cycle gas turbine stations in Victoria). However, like any other business SHL needs certainty of cash-flow and hence undertakes to contract its capacity. This raises the question of how best to contract, with two basic options available; energy based and capacity based contracts. Unfortunately energy based contracts are not suitable due to both the limited average energy that can be produced an uncertainty as to the timing and quantity available. SHL therefore contracts using "capacity" based products that required high levels of generation capacity but only limited energy.

Additionally due to a declining market share (refer with below for discussion) along with vertical integration between generators and retailers, SHL has acquired a small volume of retail load in Victoria (via Red Energy). This is a hedge strategy to assist in managing the risk of SHL's capacity based contracts loosing their relevance in the market

Myth: ***Several articles in the media stated something along the lines of "SHL creates high spot prices, then sells contracts to hedge participants against these high prices". This is simply not true…. as detailed below.***

Facts:

a) Generally SHL contracts with counterparties (e.g. retailers) who have a variable load that they require hedging against the spot market, i.e. they have a load that varies from day-to-day and also has intra-day shape. Simply hedging this variable load with SWAP contracts is high cost as they will almost always be under or over contracted.

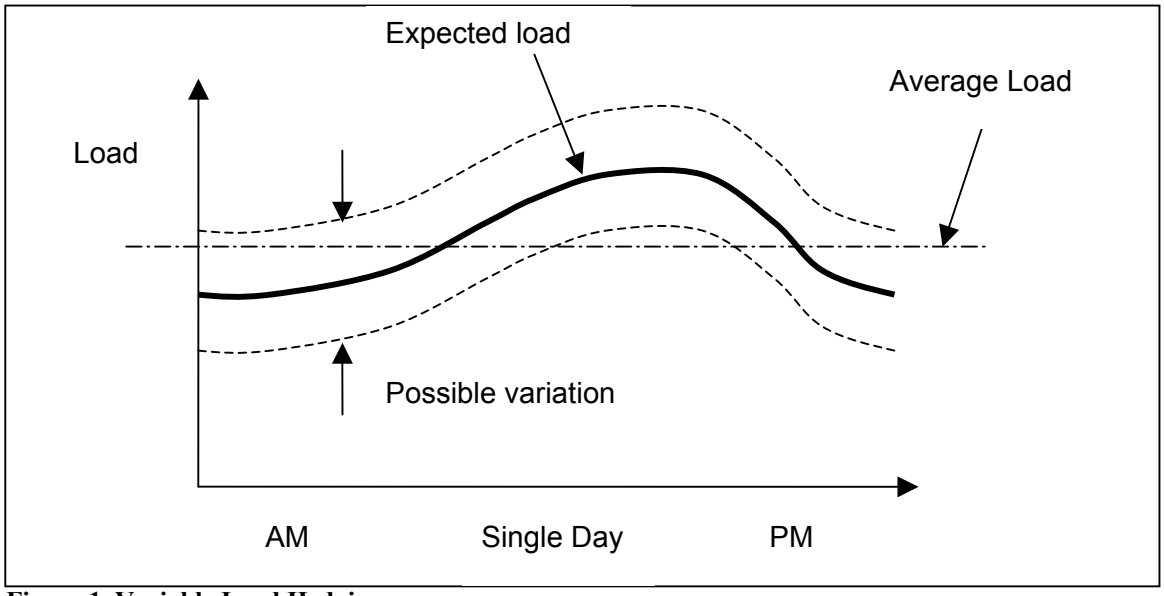


Figure 1. Variable Load Hedging

As can be seen in Figure 1 if the retailer hedges using a SWAP at the average load then there will be times where they are over contracted (and exposed to low spot prices) and periods when they are under contracted (and exposed to high prices). Since price is correlated with demand these periods have a high cost to the retailer. By shaping the swap some of the shape risk can be removed but not the variability risk.

The CAP based contract products SHL wholesales are simply a better (i.e. more cost effective) means for a retailer to manage the variable portion of their load. In this instance the retailer takes some spot risk but this is capped and therefore priced into their retail products with a high degree of

certainty, hence reducing their risk[1]. More recently SHL has been trading a hybrid product that are a cross between a SWAP and a CAP, this further assists the counterparty in managing their risk (by further reducing their spot exposure).

As can be seen **both** SWAPS and CAPS hedge the retailer against variations in the spot price (i.e. high spot prices) and both are required if retailers are to achieve the lost wholesale energy costs. CAP based products are therefore too narrowly described as simply "high price" hedging products. **CAPS are not the result of SHL creating high market prices then exploiting the situation, they are simply a market mechanism to manage variable load. SHL generates during high price periods to hedge its contract position.**

b) If you review historical high price periods in NSW you will see that these occur when the supply vs demand situation is tight – either as a result of high demand or generation outages. Furthermore, during some of these periods NSW base load generators seem to generate at less than their available capability, thereby creating high prices (perhaps to extract value from ETEF). Snowy Hydro generates to defend contract positions when the prices are high, it does not have the market power to "create" the high prices.

c) SHL has never been pointed out by the market regulator as misusing market power and creating high prices.

d) It is widely accepted that trading forward contracts (i.e. SWAPS and CAPS) contributes to lower long-run spot prices.

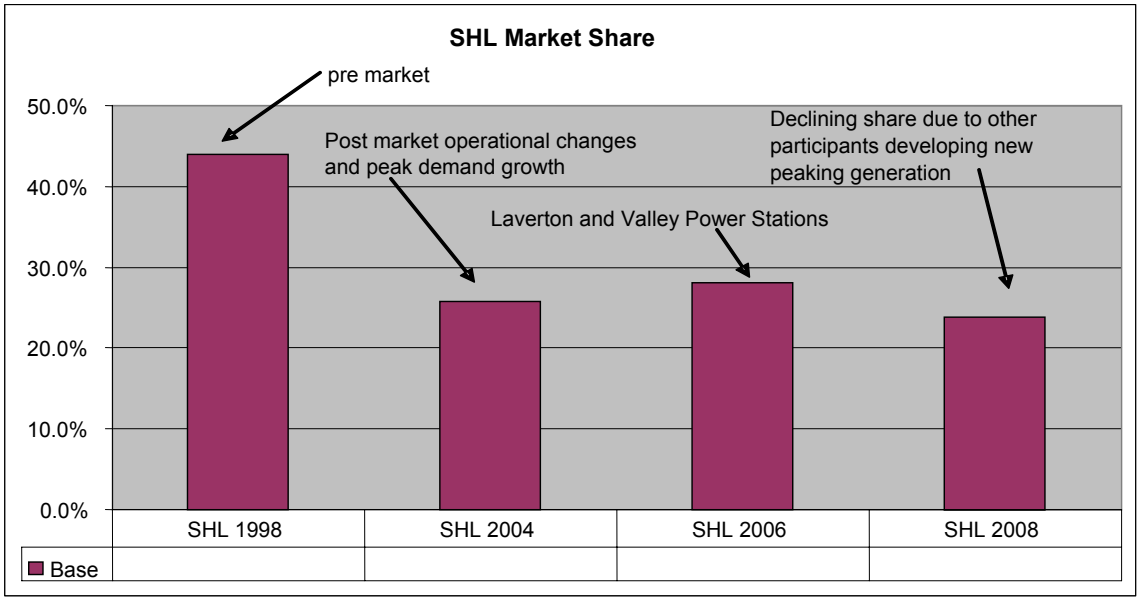
3.2. SHL Market Share

Prior to the formation of the NEM Snowy Mountains Scheme plant represented a high proportion of the peaking capacity (it is not possible to estimate the % of capacity based contracts as these contracts are not public information). Since this time the market share has reduced due to three factors:

1. Market growth and the construction of new peaking capacity
2. Changes in the strategic behaviour of formally base load thermal stations. Since the market started operators of large thermal plant have modified their plant designs so that they can operate units at much lower output levels. This allows them to keep more units operating during low demand periods and therefore more rapidly increase output when market peaks occur.
3. Bass Link

Based on an assessment of how other participants bid and operate their generation plant the following is an approximate summary of how SHL's market share has trended.

[1] Analytical proof that CAP based products are better at managing a variable load can be supplied if required



Peak demand is forecast to grow at approximately 3% per year. This equates to approximately 1000 to 1100MW per year across the whole NEM. This will be split between new base-load and peaking plant, the offshoot being a reduction in the SHL market share by approximately 1% to 2% per year if SHL does not invest in new generation.

3.3. Alternatives to manage reducing market share

Two basic alternatives exist to mange issues associated with declining market share and gradual vertical integration of other market participants:

1. Maintain market share – needs develop at least 150MW per year to capture 25% of the new peaking plant growth.

2. Vertically integrate by purchasing or developing a retail business along with acquiring (build, purchase or contract) base load energy.

3.4. Asset Management Drivers

In order to meet water licence requirements approximately 1000MW of generation strategically located to act as energy dissipaters and enable water to be discharged down Murray and Tumut rivers is required. The remaining capacity simply enables flexibility as to when generation occurs. This flexibility enables:

- targeting of high spot price periods
- when combined with high reliability enables it to be utilised as a hedge for capacity based contracts

3.4.1. Historical Expenditure Drivers:

Early SMHEA (60's to 80's) – characterised by;

- government utility
- no revenue stream (i.e. operated under a net cost of production NCOP basis)
- capital expenditure based on managing generation system security requirements
- generation reliability valued due to impact of system security
- low reliability (high failure rates) of early 80"s unacceptable from a system security basis and upgrade programs started, noting that only the absolute minimum was undertaken and the stations had to be revisited within 5 years!

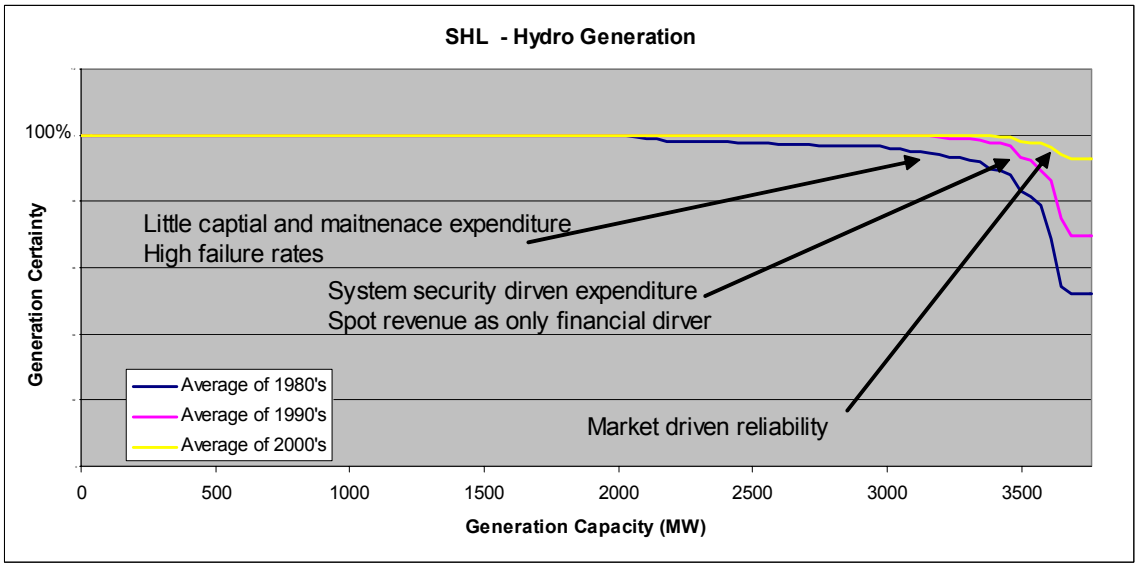
Late SMHEA (90's) – characterised by;

- government utility
- still operating under NCOP but pseudo revenue stream created using spot revenue (from separate trading company – Snowy Trading Ltd) for expenditure business cases
- reliability not important as there was an excess of reliability with only spot revenue as the income stream.
- Maintenance re-engineering program in 90's resulted in major maintenance cuts as risk vs cost models showed that expenditure was not justified to improve or maintain reliability.
- Limited capital expenditure approved, mostly based on minimum life cycle costs, environmental and safety drivers.

SHL to now – characterised by;

- competitive spot market
- market for capacity based spot price hedging products (eg CAPS)
- highly reliable plant required to underwrite contracts
- value in maintaining/improving reliability
- Value in expanding capacity

The impact changing drivers have had on asset management is graphically highlighted by the changes that have occurred in plant reliability. The following is a graph of generation capacity and the certainty at which it can be provided for various historical periods. As can be seen there has been quite distinct improvement in reliability as a result of changing business drivers and the creation of a real value stream.



3.4.2. Future Expenditure Requirements

Future expenditure requirements are a function of two aspects

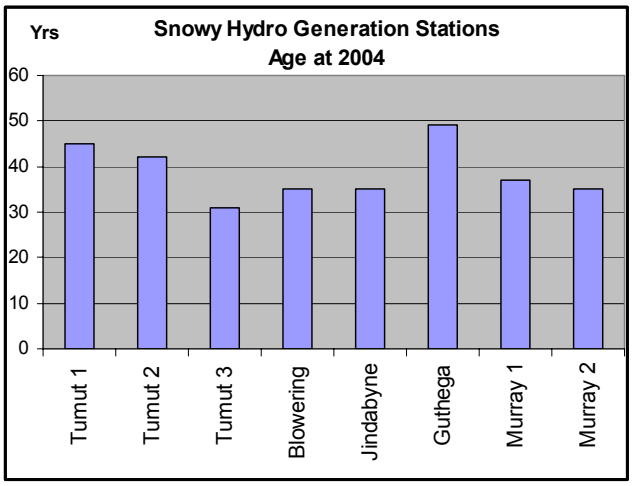
1. Asset life cycles
2. Business environment and the financial drivers this places on the assets

1. Asset life cycles

The following is a summary of typical asset lives and the age of SHL plant

Typical Asset Lives

Civil Structures	100's years
Pipes, Spiral Casings (fatigue)	50+ years
Turbines	
Runners (cavitation/fatigue)	50 – 100 yrs
Guide Vanes	50 – 100 yrs
Guide Vane Bushings	20 – 50 yrs
Generators	
Stator Core	50 – 100 yrs
Windings	25 – 60 yrs
Wedging and packing systems	10 – 20 yrs
Coolers	30 – 60 yrs
Transformers	30 – 80 yrs
Circuit Breakers	30 - 50 yrs
Relays, Control Field Devices	20 – 50yrs
Controls	10 – 20 yrs
Auxiliary Assets	5 – 30 yrs



The following table gives a representation of capital value versus the types of assets (based on replacement values for Snowy Mountains Scheme)

Description	% of Capital Value
Major Civil Works	70
Electrical & Mechanical Equipment	24
Electronic Equipment	1
Miscellaneous	5

The simple conclusion that can be drawn from the above is that irrespective of the business environment higher levels of capital replacement will be required going forward in order to simply maintain the status quo. Over the next 10 to 20 years a range of assets that have longer lives will require replacement along with the ongoing replacement of shorter life assets. Specifically this includes circuit breaker, generator winding and transformer replacement programs along with major turbine work.

2. Business environment and the financial drivers

The current business environment for SNOWY Hydro dictates that it requires to contract its capacity in order to both improve revenue and secure its future revenue stream (simply operating as a peaking spot generator would reduce average revenues and create very large annual variation…..)

For the above to occur high reliability plant is required as these contracts are written without any force majeure clauses for equipment failure. Contracts with force majeure clauses are effectively worthless in the market. This requires that expenditure occur over and above that which will be required to address asset aging using a minimum life cycle cost methodology.

Myth: ***We can revert to the old way of operating the Snowy Mountains Scheme and undertaking capital investment decisions***

Facts:

a) Generators no longer have any "system security" obligations (i.e. they can simply re-bid less generation if a generator fails), therefore this driver no longer exists for investment decisions. The mechanisms that existed in the 80's and 90's no longer exist.
b) Spot revenue by itself is insufficient to justify the current levels of SHL asset performance, hence future expenditure programs designed to maintain this performance would be reduced
c) The contracts market effectively operates as the pseudo "system operator" from the pre-market days. When a generator contracts they need reliable plant to hedge their position and this is the driver for capital expenditure. However, unless there is forward security of this contracts market then this expenditure cannot be justified (since by itself the spot market is insufficient to justify the expenditure)

Furthermore it is worth noting that in the 80's and 90's SMHEA was fast heading down the infrastructure death spiral. This did not occur in the Snowy Mountains Scheme only because SHL created a sufficiently viable business to justify the extensive capital requirements need to maintain the aging asset base.

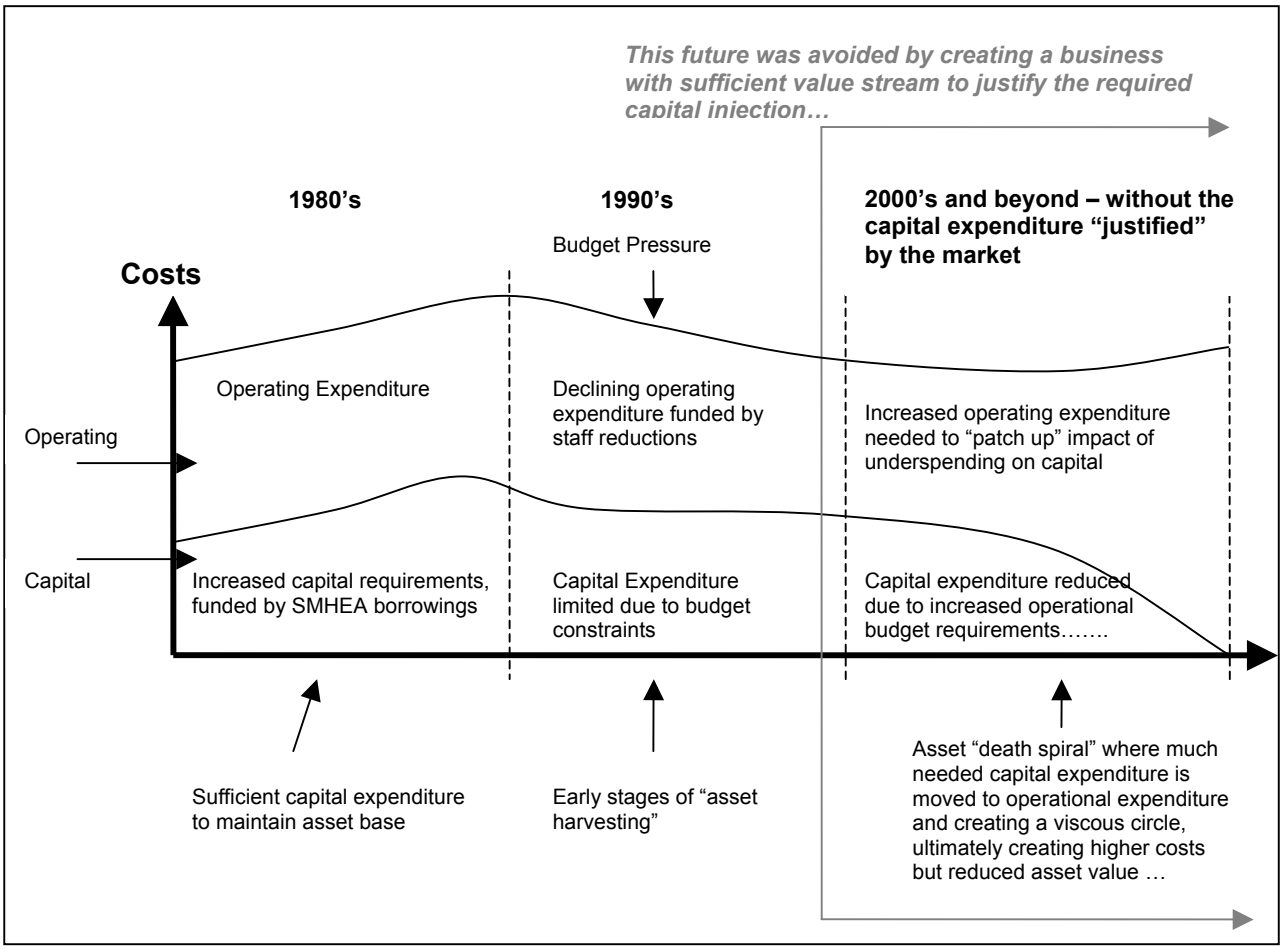


Figure 2. Infrastructure Asset Death Spiral

Snowy Hydro needs to be positioned such that the gains made in creating a value stream over the last 5 years can be sustained into the future.

Myth: ***Historical capital expenditure levels are all that is required going forward.***

Facts:

a) The scheme's asset base is aging resulting in progressively higher levels of capital expenditure to maintain the status quo.
b) SHL creates its value via hedging contracts, as these contracts are firm (i.e. no force majeure clauses) then highly reliable plant is required. If reliability is not maintained contracting carries high levels of risk and associated lower or negative returns. To continue achieving the current high reliability performance expenditure over and above "lowest life cycle cost" is required.

4. Responses to Parliamentary Questions

4.1. Question 2: Future Capital Requirements

Future capital requirements of Snowy Hydro in order to remain competitive in National Electricity Market

The answer to the above questions revolves around the definition of "remaining competitive". Our perspective is that this must include the concept of long-term competitive sustainability. SHL therefore needs to have the ability to:

1. Maintain market share in capacity based risk hedging products
2. Manage the vertical integration and participant aggregation occurring in the market – and the resulting reduction in need for capacity based hedging products with traditional customers
3. Agility to respond to market changes

1. Maintain market share in capacity based risk hedging products

For this to occur SHL requires to:

a) Maintain existing reliability of hydro plant
b) Increase the capabilities of hydro plant
c) Develop approximately 150MW of peaking capacity every year

Current estimates for a) and b) are approximately $500m over the next ten years[2], while developing/purchasing new gas fired peaking capacity would require an investment of approximately $100m per year (assuming $650k/MW development costs)

2. Manage the vertical integration and participant aggregation occurring in the market

While SHL is gaining retail exposure though organic growth by develop RED Energy, this will not provide sufficient market penetration to enable offset vertical integration / aggregation. Purchasing an existing energy retailer is the most viable option.

3. Agility to respond to market changes

Flexibility and the ability to quickly respond to market changes are crucial to any business remaining competitive. SHL therefore requires the ability to access equity in a flexible and timely manner.

Irrespective of future ownership structures unless the above three attributes are part of the solution then Snowy Hydro will not remain competitive ion the National Electricity market.

[2] This is based on SHL's 20yr asset management program.

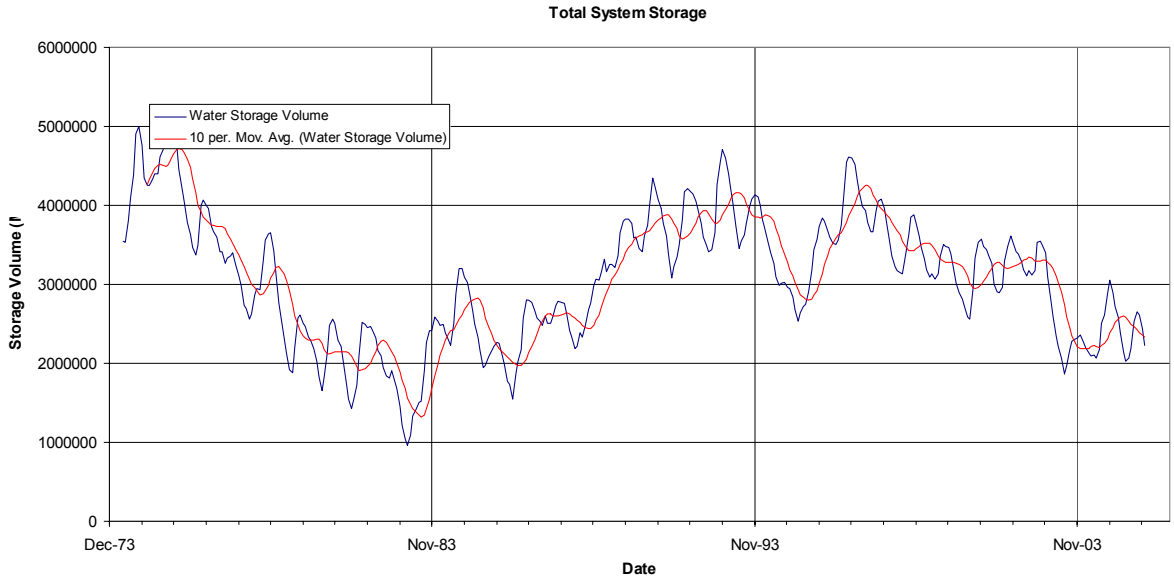
4.2. Question 3 - Control of Water Regulation

Control of water is governed by the Snowy Water Licence SWL issued to SHL by Department of Natural Resources, NSW, with specific rules regarding releases, notifications, above target water collection, modifications and compensation. These are well documented and we have not comments. There were however various "claims" made during the course of the IPO process that should be clarified.

Myth: ***SHL is restricting water releases to irrigators***

Facts:

a) Annual releases are set by SWL and are based on inflows and managing drought sequences
b) Any variation to required annual releases are agreed by state governments' representatives, Murray Darling Basin Commission and SHL through the Water Consultation and Liaison Committee (WCLC) that approves SHL's Annual Water Operating Plan
c) SHL keeps above target water as it requires guaranteed energy to hedge its contract positions, without this water its participation in the NEM would be severely limited.
d) SHL has released more water than was collected over the last few years. This can be seen in the following graph which indicates that SHL now has less water in storage, a direct response to the drought conditions.
e) Some irrigators are very sort sighted if left to their own devise would deplete water reserves without respect to future years.



Myth: ***SHL creates downstream issues by not explicitly forecasting exact release volumes for each month***

Facts:

a) Minimum release profiles, as set in Annual Water Operating Plan, are agreed by state governments' representatives, Murray Darling Basin Commission and SHL through the Water Consultation and Liaison Committee (WCLC),
b) Extent of variations to month by month releases are strictly defined by SWL,
c) Large downstream storages (Talbingo and Hume) exist to manage non-linear annual releases (part of the original design). These are not operated by SHL and were designed to allow monthly variations in discharges from the Snowy Mountains Scheme and enable it to operate as a peaking generator. These large storages along with the minimum release profile allow the regulator to manage storage levels that irrigation releases can align with irrigation requirements.
d) If operated as a peaking generator then it is not possible to forecast exact releases, as this implies forecasting market peaks!

Myth: ***A larger more diversified SHL will require higher levels of compensation for changes to the water licence, costing the taxpayers of Australia.***

An alternative theory:

As SHL grows and diversifies then the value of Snowy Mountains Scheme water value to the business will reduce. By investing in alternative generation sources, diversity will reduce the reliance on scheme water, and hence business value. As any compensation is based on the business impact, the value could well be less than would currently occur.