Hydro Tasmania Water Price for water takes for the 2010/11 season

Reservoir or River	Generation forgone MWh/ML	Annual Price per ML (Jul10-Jun11)	Summer Price per ML (Dec10-Apr11)	Winter Price per ML (May10-Nov10)
Arthurs Lake	1.8878	$ 123.50	$ 129.48	$ 117.51
Great Lake	2.2394	$ 146.50	$ 153.60	$ 139.41
Ex Poatina or S.Esk	0.2844	$ 18.61	$ 19.51	$ 17.71
Parangana (ex mini)	0.7308	$ 47.81	$ 50.13	$ 45.49
Cluny Lagoon	0.1119	*$ 7.32*	$ 7.68	*$ 7.00*
Lake Meadowbank	0.0722	*$ 7.00*	*$ 7.00*	*$ 7.00*
Lake Paloona	0.0742	*$ 7.00*	*$ 7.00*	*$ 7.00*

Hydro Tasmania

Updated 14th May 2010

Minimum Fee	
$ 7.00	per ML

Water Price = Value of Generation x Generation Foregone

Value of Generation = Flat Swap Contract price + 1/2 REC price + Water Scarcity Premium^1 (if dry)

Generation Foregone = MW hours per Mega Litre^2

Note.
This methodology will be reviewed and may change if the underlying character of the electricity market changes. For example, when the final shape and impact of the proposed carbon pricing mechanism is known the pricing method may need to be modified.

^1 - The Water Scarcity Premium is a percentage of the Peak Swap Contract Price

^2 - Generation foregone depends on the 'head' of the water and on which power stations the water runs through

Explanation of Value of Generation:
Calculations

	Value of Generation $/MWh					
	Component	Annual		Summer		Winter
1	Flat Swap	$	41.55	$	44.35	$ 38.75
2	RECs @50%	$	23.87	$	24.24	$ 23.50
3	Scarcity Premium #1	$	-	$	-	$ -
	Total	**$**	**65.42**	**$**	**68.59**	**$ 62.25**

See next page for more detailed explanation on the three components

#1 Scarcity premium is charged at the same rate over all irrigation takes because it is triggered on previous hydro system yields and doesn't depend on when the water is taken.

The value of water that Hydro Tasmania transfers to other water users is based on the revenues that could have been earned had the water been used to generate electricity (i.e. the value of generation). Electricity can effectively be sold in advance via the contract market and can also earn income through Renewable Energy Credits (RECs). This means the potential earnings from that water for the year ahead is public knowledge.

Hydro Tasmania calculates a new water value in April each year based upon the contract market and the REC market prices. The prices used in the calculation are those as published on publicly available web sites on the second business Friday in April.

- Because there is not yet a publicly traded Tasmanian forward contract market the Victorian contract electricity prices are used.
- Because on average the stations pass their baselines only about half the time, and for simplicity, only half a REC is claimed as the value lost.

  Note that **all** the generation above a defined station baseline earns RECs, so if the station had been going to pass its baseline, **any** water taken for irrigation reduces the potential number of RECs that could have been produced.

The value of generation is converted to a water value based on the station efficiency. Water is more valuable from high head reservoirs.

Water values are published for the following periods (the periods will correspond with the periods on water licences):

- Dam filling (winter)
- Direct takes (summer)
- All year (upcoming financial year)

After a prolonged period of low inflows a premium is added to the water value to reflect the higher costs (hence value foregone) to Hydro Tasmania.

1: FLAT SWAP CONTRACT PRICE

Victorian Swap Contract Market Prices #2

Period	Peak	Flat	
Q210	$ 75.50	$ 45.00	
Q310	$ 45.00	$ 32.50	
Q410	$ 45.25	$ 32.10	
Q111	$ 102.00	$ 56.60	Difference
Annual	**$ 66.94**	**$ 41.55**	**$ 25.39**
Summer	not used	**$ 44.35**	
Winter	not used	**$ 38.75**	

#2 Based on Sydney Futures Exchange on……30th April 2010

The electricity forward contract market uses a naming convention where for example, Q212 means the second quarter (April, May, June) of 2012. Contract prices vary over the year depending on the expected demand and availability of generation plant across the entire network.

- The Summer direct take price is based on the average of electricity contract prices for Q4 of the current year and Q1 of the next year.
- The Winter dam fill price is based on the average of electricity contract prices for the two winter quarters, Q2 and Q3.
- The Annual price is the average of the last three quarters of the current year and the first quarter of the next year.

The "Flat" price for electricity is the average of all prices. The "Peak" price for electricity is the average of prices during the hours from 7am to 10pm on business days. The "Peak" price for electricity is used in determining the scarcity price if the previous two years have been very dry (see below for detailed explanation).

2: REC PRICE

Price of Renewable Energy Credits (RECs) #3

Period	RECs	Contribution
Cal 10	$ 47.00	
Cal 11	$ 49.95	
Annual #4	$ 47.74	**$ 23.87**
Summer (Q4&Q1)	$ 48.48	**$ 24.24**
Winter (Q2&Q3)	$ 47.00	**$ 23.50**

#3 Based on prices from Australian Financial Markets Association on…… 30th April 2010
#4 3/4 of year one plus 1/4 of year two

RECs are calculated after the calendar year has finished and so prices are quoted in calendar years. The value of the contribution is weighted according to the year the RECs are created.

Each MWh above a station's baseline creates one REC. However, because stations on average cross their baselines only half the time, and for simplicity, only half a REC is considered to be lost value.

3: WATER SCARCITY PREMIUM

	Yield (GWh)	Penalty #5
Expected Yield	8700	$ 0.00
Trigger (95% of exp)	8265	$ 0.00
Moving Avg	**8684**	**$ 0.00**
Maximum (80% of exp)	6960	**$ 25.39**

#5 Premium is derived by linear interpolation between trigger and maximum .
Maximum premium is Annual Peak minus Annual Flat

Historical Yields in GWh

	Actual	Moving Avg #6
May-08	499	6739
Jun-08	839	6895
Jul-08	1198	6987
Aug-08	907	6964
Sep-08	1711	7286
Oct-08	632	7256
Nov-08	475	7378
Dec-08	516	7580
Jan-09	331	7609
Feb-09	68	7620
Mar-09	349	7732
Apr-09	513	7939
May-09	911	7687
Jun-09	806	7788
Jul-09	1898	8392
Aug-09	2363	8656
Sep-09	1550	8999
Oct-09	512	8500
Nov-09	200	8546
Dec-09	287	8568
Jan-10	-59	8578
Feb-10	58	8571
Mar-10	254	8647
Apr-10	549	**8684**

#6 24 month moving average yield in GWh expressed as an annual figure

Explanation

After an extended period of low inflows, Hydro Tasmania increases the price that it offers electricity into the market to reflect the lower water levels in its storages and to ensure that the storages are not emptied. If water levels are very low then the water must generally be valued higher than Victorian electricity prices and will remain high until storages are able to recover and the risk of supply shortfall is very small. Storage recovery may take a year or more.

In such a situation Tasmanian generation cannot sustainably supply all the Tasmanian electricity demand. The extra electricity needed has to be imported from Victoria via Basslink including during periods of peak electricity prices. As such, during periods of low water availability a water scarcity premium is added onto the water price to reflect the increased cost of meeting Tasmania's electricity demand. In these circumstances all the avialable low prices are fully used up for importing and so any extra importing (or reduced exporting) must be done at the very high prices found during peak hours.

The water scarcity premium is related to the value of peak energy contracts. Because there is not yet a publicly traded Tasmanian forward contract market the Victorian "Peak" energy price is used as a surrogate.

The premium only applies if system wide inflows over the previous two years have been less than 95% of the expected (this is not common). The premium is calculated using the formula below where EAY = expected annual yield.

Premium = [(95% of EAY minus Moving Average Yield) /
(95% of EAY minus 80% of EAY)] x Vic Peak Swap Price

The graph below shows how the premium is interpolated as the moving average yield becomes drier. If the moving average yield is > 8265 GWh no premium is paid.