

Draft- all estimates are based on best currently available conservative figures.

Calculation of Source Potential Index (SPI)

See Hunt J.M., 1996 *Petroleum Geochemistry and Geology*, Freeman New York and Magoon L., & Dow, W., 1994 *The Petroleum system- from source to trap*, AAPG *Memoir* 60 1-655.

This is calculated using rock eval and thickness data.

SPI = thickness(S1 +S2) x density divided by 1000.

Maturity data also have to be considered in the final calculations.

Dr Reid calculates:

Tasmanite Oil Shale and *Tasmanites*-rich horizons =3.78 barrels per square metre.
(Woody Island/Quamby Fms = 6.05 barrels per square metre)
Woody Island /Quamby Fms after maturity corrections= 4.114 bbls per sq metre.

Top Bundella Mudstone etc =0.189 bbls per sq metre
Liffey Gp coals and carbonaceous shales (basinwide av.) =1.136 bbls per sq metre

For comparison Tasmania Mines Department calculations (see Bacon et al 2000 p.48 and p.51) are:

Woody Island Fm = 7 bbls per sq metre
Tasmanite = 2.5 bbls per sq metre

Thus Dr Reid's figures are very similar to those calculated by Bacon et al (2000). The exact subsurface extent of these source units is unknown but if we assume the following areas, based on the best available information, then a possible generative potential is obtained.

Tasmanites-rich horizons 10,000 square km
Woody Island /Quamby Fms 15,000 sq km
Liffey Gp carbonaceous sediments 15,000 sq km
Top Bundella 15,000

Tasmanite, 10,000 x million x 3.78 = 37,800,000,000 bbls
Woody Is 15,000 x million x 4.114 =61,710,000,000 bbls
Liffey Gp = 15,000 x million x 1.136 = 17,040,000,000 bbls
Top Bundella = 15,000 x million x 0.189 = 2835,000,000 bbls

Total = 119,385,000,000 bbls

In most petroliferous basins somewhere between 90-98% of the generative potential has been lost (Hunt 1996). Therefore a mid-case scenario is that 5% may be retained. For the Tasmania Basin this would mean an undiscovered potential resource of

5,969,000,000 bbls or close to **6 billion BOE**. However, a more accurate assessment may be obtained if we use the method of Magoon and Valin (1994).

If we take one barrel of heavy crude as weighing 153kg HC (hydrocarbons) this gives us 119,385,000,000 x 153 =

18,265,905 million kg HC Generative Potential or Total Petroleum

Generation Accumulation Efficiencies (GAE) range 0.3% to 36% - average 7%.
Assuming an average GAE of 7% we can calculate the

In-place HC =1278,613,350,000 kg HC

The percentage of **Recoverable HC** from **In-place HC** ranges from 23% to 83% and averages 31.58%.

Recoverable HC = 403,786,095,930 kg HC or 2,639,124,810 barrels of oil equivalent (BOE).

COMPARISON WITH PRODUCING BASINS

System Recoverable HC (bkg) In-place HC (bkg) Generated HC (bkg) GAE

Giant (5000-10000 bkg)

La Luna Misoa (V)	8160	35220	250000	14
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Large (500-5000 bkg)

Ellesmerian (Al)	2682	10124	1086720	0.9
Mandal-Ekofisk (NS)	1119	3780	666000	0.6

Significant (50-500 bkg)

Bampo-Peutu (Su)	439	531	14800	3.6
Tasmania Basin	403 (est)	12789 (est)	18265 (est)	7
Akata-Agbada (Ni)	224	570	71850	0.8
Tuxedni-Hemlock(Al)	215	532	13400	4
LSB- Jurassic (Ge)	127	295	6850	4.3
Simpson-Ellenb. (Tex)	105	418	4020	10.4
LSB Cretaceous(Ge)	101	267	2614	10.3
Cambay-Hazad(India)	-	395	7610	5.2

Small (<50 bkg)

Soda Lake-Painted Rock (California)	47	145	1596	9
Villeta-Monserrate (Colombia)	39	125	2640	4.7
Villeta-Caballos (Colombia)	33	127	2197	5.8
Pt Pleasant=Brassfield (Ohio)	14	56	20700	0.3
Heath-Tyler (Montana)	13	53	147	36.3

The best estimate of recoverable petroleum in the Tasmania Basin (from Permian source rocks) places it near to the top of the *Significant* category (Magoon and Valin in Magoon and Dow 1994 pages 329-338).

Summary

- Estimated ***Generative Potential*** of Gondwanan petroleum system Tasmania = 18,625 billion kg HC
- ***Generative Accumulation Efficiency*** (GAE) is taken as 7%
- ***In-place HC*** = 12789 billion kg HC
- ***Recoverable HC*** = 403 billion kg HC (2.7 billion barrels of oil equivalent BOE)
- Tasmania Basin is near the upper part of the ***Significant*** category for petroleum systems