



# H. Reserves

## Oil and Gas Reserves

The oil and gas reserves reported in this section apply to figures as at 1 January 2004. Oil and gas production is for calendar year 2003.

The reserve figures are derived from information provided by the field operators and are estimates of “proven and probable” (P50) reserves.

The gas at the wellhead of a gas or oil field is a mixture of methane (the main component of natural gas), ethane, propane and butane (which together comprise LPG) and larger hydrocarbons molecules (which are components of natural gasoline and condensate). This raw gas must be separated into its components to enable the maximum value to be gained. Figure H.1 illustrates the major steps in the separation of gas and condensate. Note that this is a generalised illustration only. It is similar to the process at Kapuni. At Maui there is no reinjection or natural gasoline extraction.

The oil and gas reserves as at 1 January 2004, compared with the reserves as at 1 January 2003, reflect production for the calendar year 2003 reported in these tables as well as some revisions to the ultimate

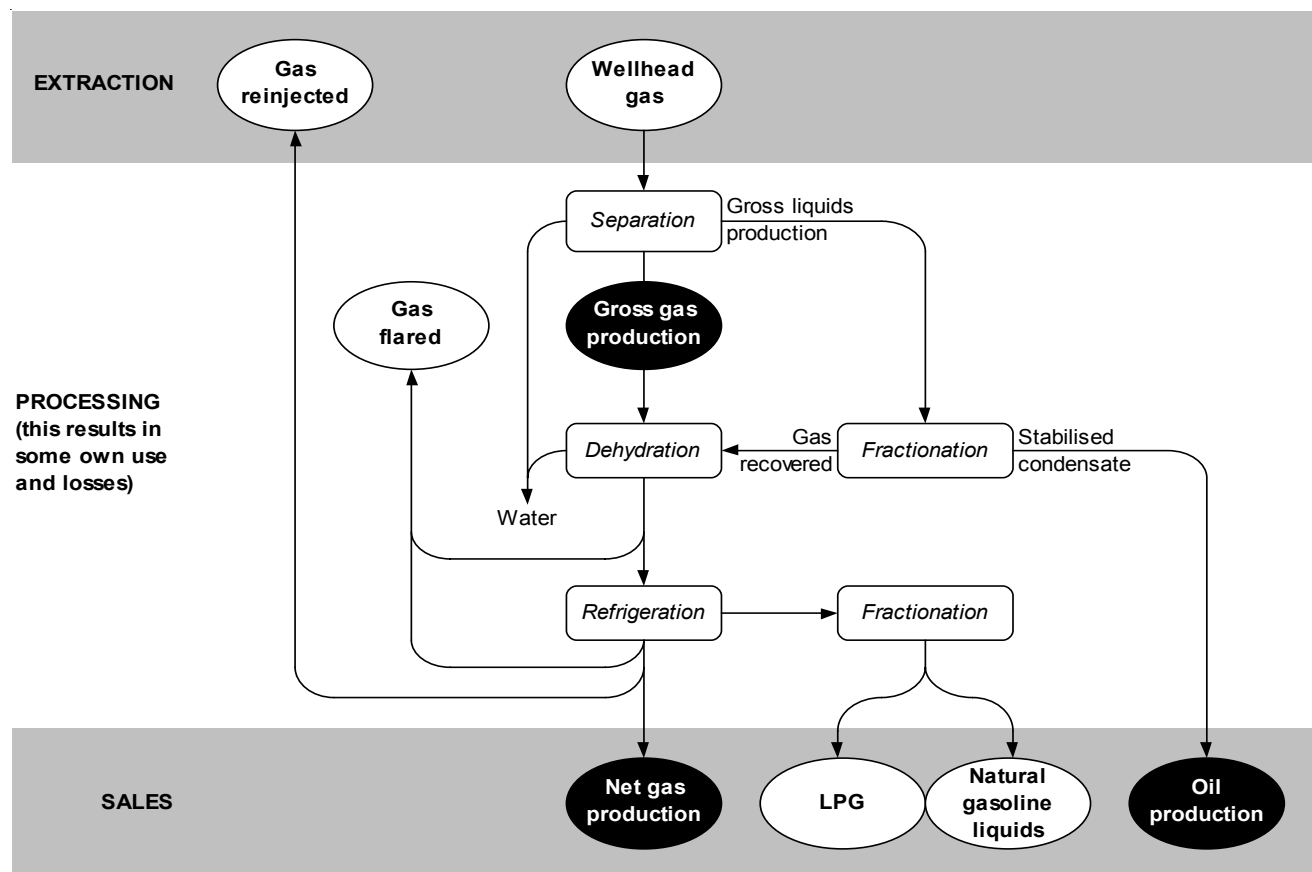
recoverable estimates provided by the operators.

Total oil and gas reserves as at January 2004 were only about 2.2% less than as at January 2003 due to some major revisions to the ultimate recoverable oil and gas reserves provided by the oil and gas field operators in the recent reserve estimates. The ultimate recoverable oil and gas reserves for Kapuni, Maui, McKee, Mangahewa, Waihapa/Ngaere and Rimu/Kauri fields were revised upwards by the operators while oil and gas reserves for the Tariki/Ahuroa field were revised downwards. The reserve figures for the Kaimiro and Ngatoro fields, both operated by Greymouth Petroleum Acquisition Co. Ltd, have been reported as a combined total and have also been revised upwards.

Table H.1 and Chart H.1 provide oil and condensate information, while Table H.2 and Chart H.2 provide the counterpart information for gas.

The Maui oil reserves in Table H.1 and Maui gas reserves in Table H.2 are as at 1 January 2004 and were provided by Shell Todd Oil Services (STOS) Ltd in late June 2004. The upward revision in the Maui reserves is reportedly due to improved reservoir modelling and monitoring, while the McKee and Mangahewa upward revision is due to operational improvements implemented by Todd Taranaki Ltd.

**Figure H.1: Gas/Condensate Separation Process (Generalised)**



**Table H.1: Oil and Condensate Reserves and Production**

Field	Reserves <sup>1</sup>						Production <sup>3</sup>			
	Ultimate Recoverable			As at 1 January 2004			2003			Gross Calorific Value <sup>3</sup>
	Mm <sup>3</sup>	mmbbls	PJ	Mm <sup>3</sup>	mmbbls	PJ	Mm <sup>3</sup>	mmbbls	PJ	PJ/Mm <sup>3</sup>
Kaimiro/Ngatoro <sup>4</sup>	1.58	9.9	58.2	0.47	2.96	17.4	0.058	0.366	2.02	34.55
Kapuni <sup>2</sup>	10.27	64.6	363.7	0.68	4.28	24.1	0.200	1.259	5.18	25.88
Kupe	2.59	16.3	95.4	2.59	16.30	95.4	0.000	0.000	0.00	
Maui <sup>2</sup>	35.78	225.2	1,163.6	4.86	30.59	158.1	1.175	7.390	42.43	36.11
McKee	7.50	47.2	285.7	0.36	2.27	13.7	0.091	0.574	3.48	38.13
Mangahewa	0.11	0.7	3.8	0.05	0.32	1.8	0.017	0.108	0.69	40.16
Tariki/Ahuroa <sup>2</sup>	0.49	3.1	20.2	0.09	0.57	3.8	0.066	0.415	2.43	36.82
Waihapa/Ngaere	3.85	24.2	154.1	0.04	0.25	1.7	0.011	0.072	0.46	39.70
Rimu/Kauri <sup>2</sup>	1.71	10.7	73.2	1.63	10.26	69.8	0.045	0.281	1.64	36.82
<b>TOTAL</b>	<b>63.88</b>	<b>401.9</b>	<b>2,217.8</b>	<b>10.77</b>	<b>67.80</b>	<b>385.7</b>	<b>1.664</b>	<b>10.465</b>	<b>58.33</b>	

Notes:

<sup>1</sup> Reserves are estimated as "proven and probable" or P50 by the field operators.<sup>2</sup> Includes LPG.<sup>3</sup> Gross calorific values are for the given production figures.<sup>4</sup> Includes information for Goldie well.**Table H.2: Gas Reserves and Production**

Field	Reserves <sup>1</sup>						Production <sup>3</sup>			
	Ultimate Recoverable			As at 1 January 2004			2003			Gross Calorific Value <sup>3</sup>
	Mm <sup>3</sup>	Bcf	PJ	Mm <sup>3</sup>	Bcf	PJ	Mm <sup>3</sup>	Bcf	PJ	PJ/Mm <sup>3</sup>
Kaimiro/Ngatoro <sup>4</sup>	614	21.70	23	151	5.33	6	28.8	1.02	1.29	0.045
Kapuni <sup>2</sup>	40,714	1,437.60	1,100	12,683	447.83	343	916.0	32.35	24.18	0.026
Kupe	7,476	264.00	309	7,476	264.00	309	0.0	0.00	0.00	
Maui <sup>2</sup>	99,742	3,521.90	3,825	14,047	495.99	539	2,952.8	104.28	121.99	0.041
McKee	5,117	180.70	210	1,821	64.31	75	165.8	5.86	6.83	0.041
Mangahewa	2,328	82.20	91	1,693	59.79	66	217.4	7.68	8.41	0.039
Tariki/Ahuroa <sup>2</sup>	3,230	114.10	132	1,171	41.35	48	338.4	11.95	15.29	0.045
Waihapa/Ngaere	822	29.10	36	11	0.39	0	5.2	0.18	0.23	0.044
Rimu/Kauri <sup>2</sup>	1,864	65.80	81	1,793	63.31	78	44.1	1.56	1.85	0.042
<b>TOTAL</b>	<b>161,906</b>	<b>5,717.10</b>	<b>5,805</b>	<b>40,846</b>	<b>1,442.30</b>	<b>1,462</b>	<b>4,668.5</b>	<b>164.9</b>	<b>180.07</b>	

Notes:

<sup>1</sup> Reserves are estimated as "proven and probable" or P50 by the field operators.<sup>2</sup> Excludes LPG for Kapuni, Maui, Tariki/Ahuroa and Rimu/Kauri and also reinjection for Kapuni. The figures here differ from

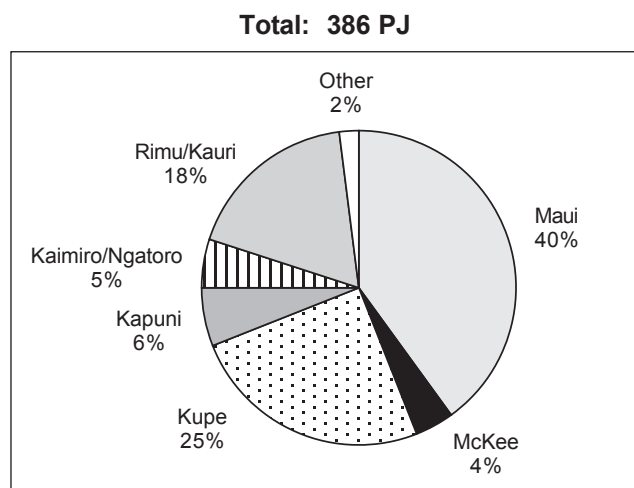
those in Table E.2a in that own use, losses and flared are included here.

<sup>3</sup> Gross calorific values are for the given production figures.<sup>4</sup> Includes information for Goldie well.

An independent expert (IE), Netherland Sewell of Texas, carried out a re-determination of the Maui gas reserves with a final report released in early February 2003. The IE estimated total economically recoverable gas under the Maui contract terms was 3,562 PJ, implying that there was 367 PJ of Maui contract gas remaining as at 1 January 2003. The IE's estimate is not on a comparable basis with other reserve figures

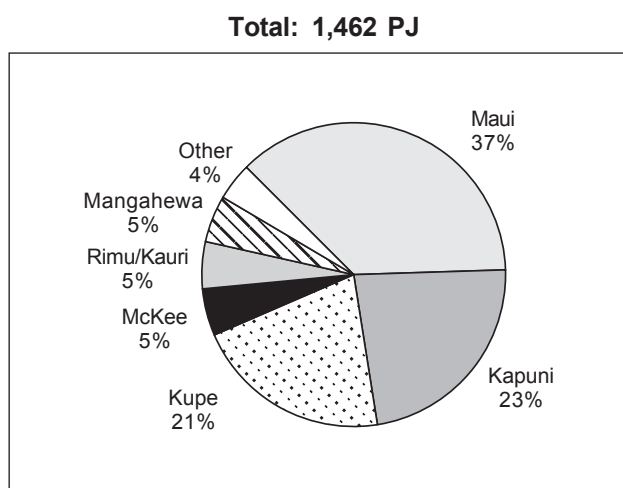
quoted in this section, including for other STOS-operated fields.

During 2004 two new petroleum mining permits were granted by Crown Minerals. The offshore Pohokura field, discovered in early 2000 and successfully appraised by subsequent wells and seismic data acquisition, was granted a petroleum mining permit covering 155.8 sq-km on 8 October 2004. The field

**Chart H.1: Oil and Condensate Reserves by Energy Content as at 1 January 2004**

operator, STOS, has indicated June 2004 mean hydrocarbon reserves of 700 Bcf gas and 42.8 mmbbls of condensate. The Pohokura field is the third largest ever to be discovered in New Zealand, and will be New Zealand's second offshore gas and liquids production operation. The drilling of production wells is scheduled to commence in mid-2005, with initial production expected to be 50 PJ and 3 mmbbls of condensate per annum. The other petroleum mining permit granted in 2004 was for the Kahili field, onshore Taranaki, which was discovered in 2002. A 5.99 sq-km permit was granted on 1 September 2004. The operator of the Kahili field, Austral Pacific, initially indicated reserves of 4.57 Bcf gas and 0.141 mmbbls of condensate, but considerable difficulties have been experienced in maintaining production. It should be noted that reserve figures for Pohokura and Kahili fields have not been included in the Tables H.1 and H.2, which are dated 1 January 2004.

Exploration for oil and gas has intensified over recent years. This has been reflected by the number of exploration permits granted by Crown Minerals (29 in 2004, 18 in 2003, 30 in 2002, 14 in 2001 and only 4 in 2000) and by the recent increase in activity in the key areas of drilling and seismic data acquisition. Crown Minerals has 99 exploration permits currently issued and 14 petroleum mining permits/licences for producing fields. Prominent amongst recent exploration activities is the offshore oil discovery Tui-1, drilled in early 2003 some 20 km north of Maui B and targeting the same Kapuni F Sands reservoir. The joint venture operating the permit elected to shoot 350 km of 3D seismic over the Tui discovery (and adjacent prospects) which led to a four-well exploration campaign. This was completed in the third quarter of 2004 and the Tui discovery has been augmented by discoveries on Amokura-1 and Pateke-2. Further appraisal activities are scheduled to be conducted during 2005.

**Chart H.2: Gas Reserves by Energy Content as at 1 January 2004**

During 2004, plans for the Kupe oil and gas field moved through the development process, following various equity sales, and appointment of Origin Energy (NZ) Ltd as operator of the project. The joint venture also commissioned work on design of facilities, with final investment decision targeted for October 2005.

Development plans for the production of oil from the Maari field continued during 2004, one of the permit joint venture partners indicating that the field may contain recoverable oil reserves as high as 50 mmbbls.

Substantial seismic data acquisition campaigns in the offshore Taranaki Basin commenced at the end of 2004, with considerable funds being invested by permit operators acquiring superior quality 3D seismic data.

Greatly increased levels of activity have been registered in the onshore Taranaki Basin where at least two rigs have been drilling continually since early 2004. Swift Energy, Austral Pacific, Tap New Zealand and Bridge Petroleum operated the vast majority of onshore drilling in the Taranaki Basin during 2004. Petroleum exploration activity has also increased in the East Coast of the North Island, with only the third offshore well to explore in this basin being drilled in September of 2004. In February 2005 a 4,200 km Crown-funded offshore 2D seismic data acquisition campaign commenced over the central and northern parts of the East Coast Basin. The data acquired, and the results of subsequent geotechnical studies, will be released to industry free of charge to encourage further exploration in those areas. In the South Island, a substantial seismic data acquisition campaign was conducted over the Great South Basin (to the east of Stewart Island) early in 2004. In total, 4,000 km of 2D seismic data was acquired over two exploration permits.