

World Petroleum Resources Project

Assessment of Undiscovered Oil and Gas Resources of Papua New Guinea, Eastern Indonesia, and East Timor, 2011

Using a geology-based assessment methodology, the U.S. Geological Survey estimated means of 5.8 billion barrels of oil and 115 trillion cubic feet of undiscovered natural gas in five geologic provinces in the areas of Papua New Guinea, eastern Indonesia, and East Timor.

Introduction

The U.S. Geological Survey (USGS) assessed the potential for undiscovered conventional oil and gas fields within five geologic provinces of eastern Asia as part of the USGS World Petroleum Resources Assessment Project. This study follows the USGS assessment of 23 provinces in Southeast Asia (Schenk and others, 2010). The five geologic provinces assessed in this study are the Banda Arc, Bintuni–Sulawati, Arafura Basin–Irian Jaya, New Guinea Foreland Basin–Fold Belt, and the Papuan Basin–Shelf Platform (fig. 1). Assessment units (AU) defined within these provinces are (1) Banda Arc Province—Timor Thrust Structures AU and Seram Thrust Structures AU; (2) Bintuni–Sulawati Province—Sulawati Basin AU, Bintuni Basin AU, and Lengguru Fold Belt AU; (3) Arafura Basin–Irian Jaya Province—Arafura

Platform AU and Irian Jaya Fold Belt AU; (4) New Guinea Foreland Basin–Fold Belt Province—Papua New Guinea Fold Belt AU; and (5) Papuan Basin–Shelf Platform Province—Papua Platform AU (table 1).

The methodology for the assessment included a complete geologic framework description for each AU based mainly on published literature. Exploration and discovery history was a critical part of the methodology used to estimate sizes and numbers of undiscovered accumulations. Where the discovery history of an AU was immature, geologic analogs were used in the assessment as a guide to sizes and numbers of undiscovered oil and gas accumulations. Each AU was assessed for undiscovered oil and nonassociated gas accumulations, and co-product ratios were used to calculate the volumes of associated gas (gas in oil fields) and volumes of natural gas liquids.

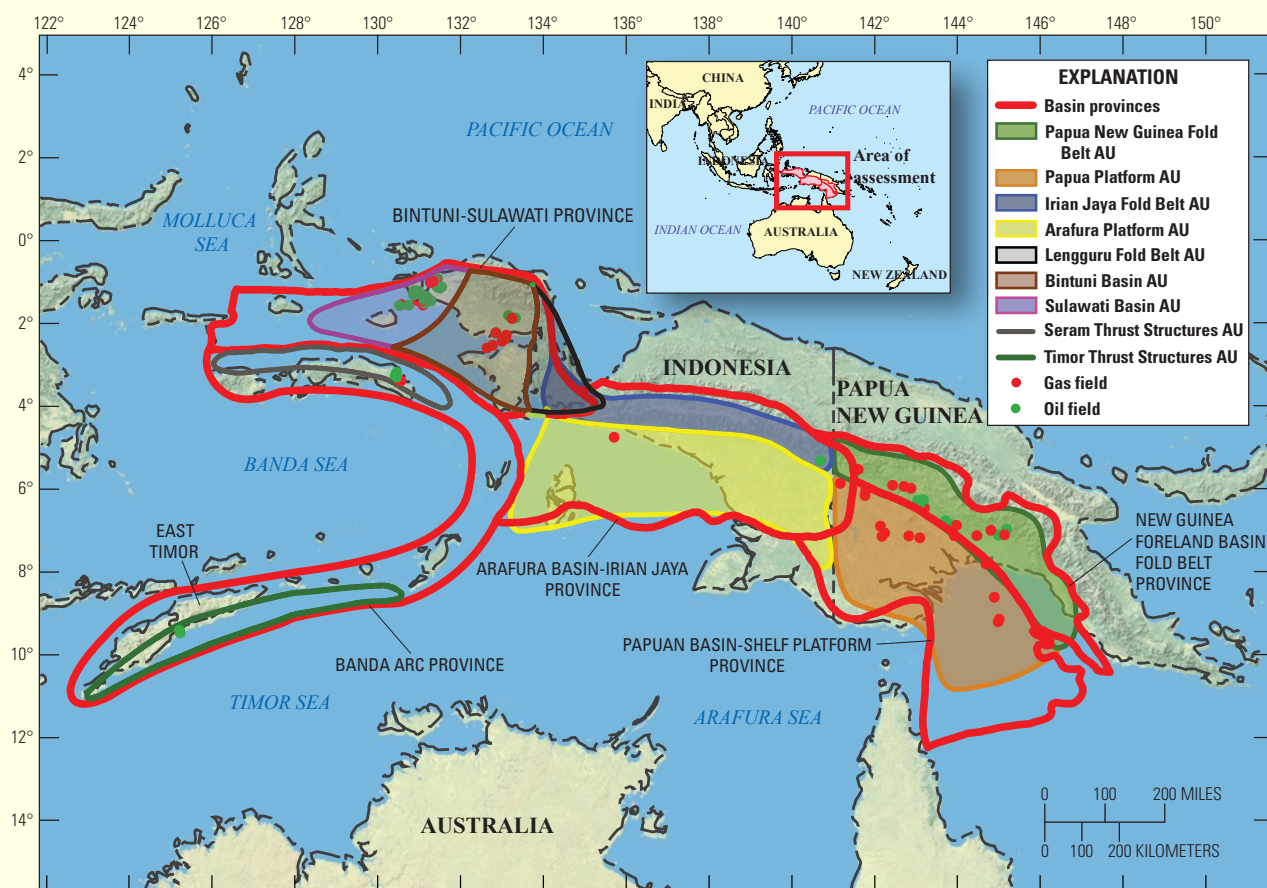


Figure 1. Locations of five geologic provinces within the Papua New Guinea, eastern Indonesia, and East Timor areas of eastern Asia assessed in this study (AU, assessment unit).

Table 1. Papua New Guinea, eastern Indonesia, and East Timor assessment results.

[MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MMBNGL, million barrels of natural gas liquids. Results shown are fully risked estimates. For gas accumulations, all liquids are included as NGL (natural gas liquids). Undiscovered gas resources are the sum of nonassociated and associated gas. F95 represents a 95-percent chance of at least the amount tabulated; other fractiles are defined similarly. Largest expected oil field in MMBO; largest expected gas field in BCFG. TPS, total petroleum system; AU, assessment unit. Gray shading indicates not applicable]

Total petroleum systems (TPS) and assessment units (AU)	Field type	Largest expected mean field size	Total undiscovered resources											
			Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
Mesozoic-Cenozoic Composite TPS														
Papua New Guinea Fold Belt AU	Oil	266	486	1,111	2,297	1,215	3,411	7,850	16,592	8,637	53	123	265	136
	Gas	3,304					7,489	16,796	33,515	18,138	123	277	561	301
Papua Platform AU	Oil	78	118	291	647	325	724	1,818	4,108	2,040	11	29	66	32
	Gas	805					4,068	8,194	15,788	8,835	71	145	279	156
Irian Jaya Fold Belt AU	Oil	235	330	836	1,863	932	2,305	5,916	13,400	6,629	35	93	214	104
	Gas	1,411					1,955	4,995	11,288	5,601	32	83	190	93
Arafura Platform AU	Oil	95	241	496	957	534	1,478	3,103	6,054	3,352	23	49	97	53
	Gas	1,545					7,671	14,928	27,524	15,910	135	263	489	281
Lengguru Fold Belt AU	Oil	81	29	95	385	136	196	664	2,753	963	3	10	44	15
	Gas	1,750					1,532	4,307	11,131	5,037	25	71	186	84
Bintuni Basin AU	Oil	49	78	168	343	184	86	243	634	287	2	6	18	8
	Gas	5,328					7,320	18,672	41,602	20,787	191	492	1,135	554
Sulawati Basin AU	Oil	25	197	335	551	349	523	917	1,540	959	17	30	50	31
	Gas	116					485	859	1,449	898	41	75	131	79
Mesozoic Composite TPS														
Seram Thrust Structures AU	Oil	223	293	742	1,689	831	605	1,563	3,675	1,769	19	49	118	56
	Gas	1,334					1,737	4,440	10,135	4,982	54	138	322	156
Timor Thrust Structures AU	Oil	273	472	1,153	2,486	1,275	984	2,438	5,396	2,713	31	77	174	86
	Gas	1,624					2,817	6,909	14,861	7,621	87	216	472	239
Total conventional resources			2,244	5,227	11,218	5,781	45,386	104,612	221,445	115,158	953	2,226	4,811	2,464

Resource Summary

The USGS assessed undiscovered conventional oil and gas resources in the nine assessment units that are defined within the five geologic provinces of the Papua New Guinea, eastern Indonesia, and East Timor areas, with the following results: (1) for conventional oil resources, the mean total for all AUs is 5,781 million barrels of oil (MMBO), with a range from 2,244 to 11,218 MMBO; (2) for undiscovered conventional gas, the mean total is 115,158 billion cubic feet of gas (BCFG), with a range from 45,386 to 221,445 BCFG; and (3) for natural gas liquids (NGL), the mean total is 2,464 MMBNGL, with a range from 953 to 4,811 MMBNGL (table 1).

Of the mean undiscovered oil total of 5,781 MMBO, about 36 percent (2,106 MMBO) is estimated to be in two AUs within the Banda Arc Province: Timor Thrust Structures AU (mean of 1,275 MMBO) and Seram Thrust Structures AU (mean of 831 MMBO). Another 37 percent of undiscovered oil is estimated to be in the fold and thrust belts of Papua New Guinea and Irian Jaya (Papua New Guinea Fold Belt AU, 1,215 MMBO, and the Irian Jaya Fold Belt AU, 932 MMBO).

For the mean undiscovered gas total of 115,158 BCFG, there is significant potential for undiscovered nonassociated gas resources (gas in gas fields) in all AUs (table 1). Of note are the mean estimates for undiscovered gas resources for the Papua New Guinea Fold Belt AU

(18,138 BCFG), the Arafura Platform AU (15,910 BCFG), and the Bintuni Basin AU (20,787 BCFG).

For Further Information

Supporting studies of the geologic models and the methodology used in the assessment of these five provinces in eastern Asia are in progress. Assessment results are available at the USGS Energy Program website, <http://energy.cr.usgs.gov/oilgas/>.

Reference Cited

Schenk, C.J., Brownfield, M.E., Charpentier, R.R., Cook, T.A., Klett, T.R., Kirschbaum, M.A., Pitman, J.K., and Pollastro, R.M., 2010, Assessment of undiscovered oil and gas resources of Southeast Asia; 2010: U.S. Geological Survey Fact Sheet 2010-3015, 2 p.

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