National and Global Petroleum Assessment

Assessment of Undiscovered Conventional Oil and Gas Resources of South America and the Caribbean, 2025

Using a geology-based assessment methodology, the U.S. Geological Survey estimated undiscovered, technically recoverable mean conventional resources of 37.6 billion barrels of oil and 281.6 trillion cubic feet of gas in 31 geologic provinces of South America and the Caribbean.

Introduction

The U.S. Geological Survey (USGS) assessed the potential for undiscovered, technically recoverable conventional oil and gas resources within geologic provinces of South America and the Caribbean (fig. 1). Thirty-one priority geologic provinces were assessed in this study, representing a reassessment of South America and the Caribbean published in 2012 (Schenk and others, 2012). This report provides the assessment results by geologic province; province numbers and names are listed in table 1 and figure 1. The data and assessment results are also provided by total petroleum system (TPS) and assessment unit in the companion data release (Schenk, 2026).

Geologic Provinces and Total Petroleum Systems

The geologic provinces assessed in this study of South America and the Caribbean represent a spectrum of basin types and TPSs (Urien and others, 1995; Pindell and Kennan, 2009). For this report, the geologic provinces are grouped to illustrate the commonality of source rocks and timing of oil and gas generation by general tectonic setting.

The intracratonic rift-sag Solimões Basin, Amazonas Basin, Parnaíba Basin, and Paraná Basin Provinces contain Paleozoic TPSs defined mainly by Devonian marine organic-rich source rocks (Souza and others, 2021; Mussa and others, 2024). The Paraná Basin Province also contains oil shale source rocks (Martins and others, 2022). Thermal maturation of source rocks and the generation of oil and gas in these geologic provinces are related to the thermal effects of Permian, Triassic, and Early Cretaceous diabase sills and dikes rather than to thermal maturation as a function of burial. This atypical thermal maturation process resulted in spatial heterogeneity of thermal maturation, oil and gas generation, and distribution of oil and gas throughout these four geologic provinces.

The Guyana-Suriname Basin, Foz do Amazonas Basin, Sergipe-Alagoas Basin, Espírito Santo Basin, Campos Basin, Santos Basin, and Pelotas Basin Provinces are rifted, passive-margin basins that formed and evolved as South America separated from Africa in the latest Jurassic and Early Cretaceous, initially opening the South Atlantic Ocean, followed by opening of the central Atlantic Ocean. In these geologic provinces, TPSs are defined mainly by Lower Cretaceous synrift (presalt in the Espírito Santo Basin, Campos Basin, and Santos Basin Provinces) organic-rich lacustrine shales and postrift Cenomanian to Turonian passive-margin marine source rocks (Beglinger and others, 2012; Cedeño, Ohm, and others, 2021; Mello and others, 2021). Thermal maturation of synrift shales necessary to generate oil and gas resulted mainly from Cretaceous burial, and postrift shales were thermally matured by Oligocene to Pliocene burial.

The North Falkland Basin and Malvinas Basin Provinces within the southernmost part of South America reflect regional extension related to the Mesozoic fragmentation of southern Gondwana (Richards and others, 1996; Galeazzi, 1998; Jones and others, 2019). Late Jurassic to Early Cretaceous synrift lacustrine source rocks were thermally matured to generate oil and gas from the Late Cretaceous to Paleogene.

The TPSs of the Magallanes Basin, San Jorge Basin, Neuquén Basin, Cuyo Basin, Santa Cruz-Tarija Basin, Putumayo-Oriente-Marañón Basin, Llanos Basin, and Barinas-Apure Basin Provinces along the western part of South America in general reflect the effects of Andean compressive deformation associated with long-lived subduction of Pacific plates such as the Nazca Plate under cratonic South America. Progressive deformation formed the east-verging Andean fold and thrust belt and the adjacent foreland basins. In these geologic provinces, TPSs range in age from Late Paleozoic to Mesozoic (Fitzgerald and others, 1990; Moretti and others, 1996; Mora and others, 2019; Veiga and others, 2020; Mei and others, 2021). Thermal maturation of major Mesozoic source rocks for oil and gas generation is related to burial of source rocks in the thrust belts and adjacent foreland basins, and maturation ranges from Late Cretaceous to Neogene (Veiga and others, 2020; Spacapan and others, 2023).

The Upper Magdalena Basin, Middle Magdalena Basin, Lower Magdalena Basin, Guajira Basin, Maracaibo Basin, East Venezuela Basin, Tobago Trough, and Lesser Antilles Deformed Belt Provinces along the northern margin of South America reflect the complex eastward movement of the Caribbean Plate between North and South America (Pindell and Kennan, 2009). Oblique eastward collision of the Caribbean Plate with northern South America caused transpression and transtension beginning in the Eocene, and deformation continues at present to the east in offshore Trinidad. The major source rock in these geologic provinces is the Upper Cretaceous La Luna Formation and its stratigraphic equivalents, which were deposited as passive-margin

organic-rich shales throughout northern South America (Gallango and Pamaud, 1995; Summa and others, 2003; Sarmiento and Rangel, 2004; Escalona and Mann, 2006; Osorno and Rangel, 2015; Ramirez and others, 2015; Carvajal-Arenas and others, 2020). Thermal maturation of shales in the La Luna began in the Eocene in the west and is younger to the east, and shales in Trinidad achieved thermal maturation by burial in the Pliocene to Pleistocene (Erlich and Barrett, 1992).

The Barbados Accretionary Complex of the Lesser Antilles Deformed Belt Province contains Upper Cretaceous La Luna-equivalent organic-rich source rocks (Hill and Schenk, 2005). The Upper Cretaceous source rocks are incorporated within the accretionary complex as the Atlantic Plate continues to subduct beneath the Caribbean Plate (Cedeño, Ahmed, and others, 2021). Thermal maturation most likely began in the Eocene and continues at present. The North Cuba Basin of the Greater Antilles Deformed Belt Province contains Upper Jurassic Oxfordian and Tithonian organic-rich source rocks that reflect proximity to the Gulf of America. The Upper Jurassic source rocks reached thermal maturity for oil generation by burial and foreland basin formation in the Late Cretaceous to Paleogene (Sá and others, 2024). The Bahama Platform Province, like the North Cuba Basin of the Greater Antilles Deformed Belt Province, is interpreted to contain Oxfordian and possibly Tithonian source rocks. Thermal maturation of oil and gas in the Bahama Platform Province is interpreted to have been in the Late Cretaceous to Paleogene (Schenk and others, 2025).

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EXPLANATION

13 **Geologic province number and boundary**

Geologic province number and name

1	Solimões Basin
2	Amazonas Basin
3	Parnaíba Basin
4	Paraná Basin
5	Guyana-Suriname Basin
6	Foz do Amazonas Basin
7	Sergipe-Alagoas Basin
8	Espírito Santo Basin
9	Campos Basin Basin
10	Santos Basin
11	Pelotas Basin
12	North Falkland Basin
13	Malvinas Basin
14	Magallanes Basin
15	San Jorge Basin
16	Neuquén Basin
17	Cuyo Basin
18	Santa Cruz-Tarija Basin
19	Putumayo-Oriente-Marañón Basin
20	Llanos Basin
21	Barinas-Apure Basin
22	Upper Magdalena Basin
23	Middle Magdalena Basin
24	Lower Magdalena Basin
25	Guajira Basin
26	Maracaibo Basin
27	East Venezuela Basin
28	Tobago Trough
29	Lesser Antilles Deformed Belt
30	Greater Antilles Deformed Belt
31	Bahama Platform

Figure 1. Map showing the locations of 31 geologic provinces in South America and the Caribbean.

The assessment results for the 31 geologic provinces are summarized in table 1 and Schenk (2026).

Undiscovered Resources Summary

The USGS quantitatively assessed undiscovered conventional oil and gas resources in 31 geologic provinces of South America and the Caribbean (table 1). The estimated mean resources are 37,584 million barrels of oil (MMBO), or 37.6 billion barrels of oil, with an F95 to F5 range from 10,160 to 88,819 MMBO; 281,610 billion cubic feet of gas (BCFG), or 281.6 trillion cubic feet of gas, with an F95 to F5 range from 77,604 to 656,338 BCFG; and 7,014 million barrels of natural gas liquids (MMBNGL), or 7.0 billion barrels of natural gas liquids, with an F95 to F5 range from 1,857 to 16,795 MMBNGL.

Table 1. Results for conventional oil and gas resources in 31 geologic provinces of South America and the Caribbean.

[Results shown are fully risked estimates. F95 represents a 95-percent chance of at least the amount tabulated; other fractiles are defined similarly. MMBO, million barrels of oil; BCFG, billion cubic feet of gas; NGL, natural gas liquids; MMBNGL, million barrels of natural gas liquids]

Geologic province number and name		Total undiscovered resources											
		Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
		F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
1	Solimões Basin	191	400	783	432	2,405	4,574	8,459	4,889	108	205	378	219
2	Amazonas Basin	379	728	1,339	776	1,428	2,876	5,491	3,087	16	31	59	34
3	Parnaíba Basin	24	70	183	82	2,596	5,412	10,338	5,801	2	6	12	7
4	Paraná Basin	66	162	357	180	1,095	3,299	8,252	3,814	2	6	13	7
5	Guyana-Suriname Basin	3,039	7,259	15,068	7,912	6,050	16,283	44,438	19,480	143	421	1,336	534
6	Foz do Amazonas Basin	238	1,185	6,342	1,914	10,992	29,564	69,624	33,496	123	337	830	388
7	Sergipe-Alagoas Basin	155	495	1,753	660	2,183	6,757	18,960	8,160	116	365	1,015	440
8	Espírito Santo Basin	115	811	2,813	1,027	2,617	11,315	35,840	14,021	58	262	839	324
9	Campos Basin	1,624	4,386	12,751	5,390	4,378	11,732	32,531	14,175	171	466	1,316	567
10	Santos Basin	1,075	3,232	9,371	3,964	5,142	19,932	64,684	25,093	225	821	2,625	1,035
11	Pelotas Basin	0	2,338	8,519	3,052	0	8,082	28,629	10,380	0	155	563	202
12	North Falkland Basin	408	1,240	4,033	1,586	3,328	11,313	35,637	14,129	69	230	713	285
13	Malvinas Basin	50	213	672	265	4,324	15,262	41,085	17,974	132	459	1,232	541
14	Magallanes Basin	24	43	76	46	2,563	5,237	11,022	5,801	79	161	340	178
15	San Jorge Basin	29	51	89	54	25	43	74	46	0	0	0	0
16	Neuquén Basin	34	71	176	84	144	361	908	422	2	8	17	8
17	Cuyo Basin	10	19	39	21	336	574	970	602	5	8	13	8
18	Santa Cruz-Tarija Basin	7	16	54	21	1,104	1,906	3,199	1,996	45	78	132	82
19	Putumayo-Oriente-Marañón Basin	186	274	400	281	178	660	2,869	971	3	15	69	22
20	Llanos Basin	75	116	175	119	391	1,158	3,184	1,387	37	113	314	136
21	Barinas-Apure Basin	17	59	250	85	62	206	646	259	1	3	10	4
22	Upper Magdalena Basin	14	24	40	25	66	130	245	139	1	2	3	2
23	Middle Magdalena Basin	22	36	58	37	54	92	158	97	1	1	2	1
24	Lower Magdalena Basin	58	864	2,088	956	7,751	24,528	69,239	29,772	53	172	475	206
25	Guajira Basin	22	117	871	232	1,628	5,045	14,223	6,088	30	93	248	110
26	Maracaibo Basin	444	757	1,237	787	1,026	2,278	5,010	2,546	45	98	212	109
27	East Venezuela Basin	745	2,167	6,537	2,691	9,803	25,132	68,089	30,130	239	696	2,162	878
28	Tobago Trough	31	72	195	87	1,522	4,141	11,191	4,950	23	62	168	74
29	Lesser Antilles Deformed Belt	13	32	97	40	1,322	4,184	12,118	5,111	66	209	605	255
30	Greater Antilles Deformed Belt	900	3,124	10,701	4,098	2,308	9,050	39,404	13,268	43	177	854	273
31	Bahama Platform	165	519	1,752	680	783	2,545	9,821	3,526	19	60	240	85
	Total undiscovered conventional oil and gas resources	**10,160**	**30,880**	**88,819**	**37,584**	**77,604**	**233,671**	**656,338**	**281,610**	**1,857**	**5,720**	**16,795**	**7,014**

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For More Information

Assessment results are also available at the USGS Energy Resources Program website, https://www.usgs.gov/programs/energy-resources-program.

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