

Assessment of Undiscovered Shale-Gas Resources in the Grand Erg/Ahnet Basin Province of Algeria, 2026

Using a geology-based assessment methodology, the U.S. Geological Survey estimated undiscovered, technically recoverable mean resources of 80.1 trillion cubic feet of shale gas in the Grand Erg/Ahnet Basin Province of Algeria.

Introduction

The U.S. Geological Survey (USGS) assessed the potential for undiscovered, technically recoverable shale-gas resources in the Grand Erg/Ahnet Basin Province of Algeria (fig. 1). The Grand Erg/Ahnet Basin is one of a series of Paleozoic intercratonic basins occupying much of northern Africa (Boote and others, 1998; Badalini and others, 2002; Coward and Ries, 2003; Dixon and others, 2010). During the early Paleozoic, northern Africa was a north-facing passive margin with Ordovician, Devonian, and Silurian siliciclastic depositional systems prograding to the paleo-Tethys Ocean. The Ordovician was a time of regional glaciation in northern Africa, and the retreat of the ice cap and associated large volumes of meltwater formed a series of north-trending incised valleys as much as 200 meters (m) deep that were subsequently filled with organic-rich shales during a major transgression in the early Silurian (Klett, 2000; Lüning and others, 2000; Le Heron and Craig, 2008). A second major transgression in the Late Devonian led to the deposition of organic-rich shales across much of the passive margin. Regional compressional deformation and uplift during the Carboniferous Hercynian orogeny segmented the passive margin into a series of basins—such as the Timimoun, Sbaa, Ahnet, Benoud-Melrhir, Oued Mya, and Mouydir Basins—and adjacent uplifts (Wendt and others, 2006; Eschard and others, 2010; Perron and others, 2018). Uplift and erosion formed the Hercynian unconformity recognized in all northern Africa basins. The focus of this study is on the possible retention of gas within Devonian and Silurian organic-rich shales after uplift, erosion, and possible migration of gas.

Total Petroleum Systems and Assessment Units

The USGS defined the Devonian Total Petroleum System (TPS) and the Silurian TPS within the Grand Erg/Ahnet Basin Province. The Timimoun Basin Devonian Shale Gas Assessment Unit (AU), Sbaa Basin Devonian Shale Gas AU, and Ahnet Basin Devonian Shale Gas AU were defined within the Devonian TPS. The Benoud-Melrhir Trough Silurian Shale Gas AU, Timimoun Basin Silurian Shale Gas AU, Oued Mya Basin Silurian Shale Gas AU, Sbaa Basin Silurian Shale Gas AU, and Ahnet Basin Silurian Shale Gas AU were defined within the Silurian TPS. Devonian organic-rich shales contain as much

as 14 weight percent (wt. pct.) total organic carbon (TOC), have hydrogen index (HI) values as much as 580 milligrams of hydrocarbon per gram of TOC (mg HC/g TOC), and have shale thickness as much as 200 m (Lüning and others, 2003; Chaouche, 2013). Silurian organic-rich shales contain as much as 10 wt. pct. TOC, have HI values as much as 380 mg HC/g TOC, and have shale thickness as much as 100 m (Logan and Duddy, 1998; Kaced and Arab, 2012; El Diasty and others, 2017). Silurian organic-rich shales in the Ahnet Basin are overpressured (Bouchachi and others, 2022), but the regional distribution of overpressure in Devonian or Silurian shales is not known.

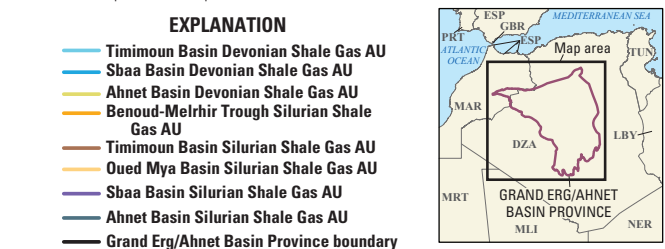
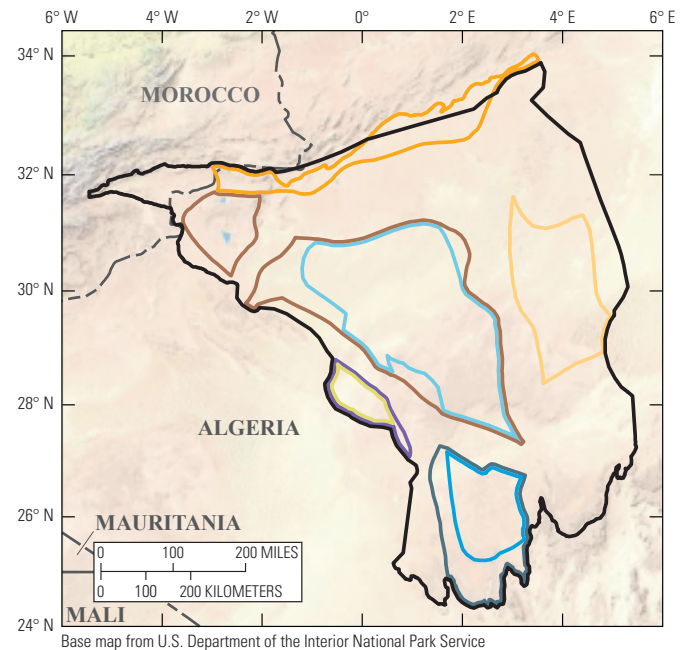


Figure 1. Map showing the location of eight shale-gas assessment units (AUs) in the Grand Erg/Ahnet Basin Province of Algeria.

The geologic model for the assessment of the Devonian and early Silurian organic-rich shales is for oil and gas to have been generated from organic-rich shales, possibly as early as the Carboniferous (Lüning, and others, 2000; Makhous and Galushkin, 2003; Craig and others, 2010). Oil would have thermally cracked to gas during Mesozoic burial. The basis of

the assessment is that some part of the gas was partially retained within the Devonian and Silurian shales after uplift, erosion, and migration to form shale-gas accumulations in the basins. Key assessment input data for the defined AUs are summarized in [table 1](#) and Schenk (2026).

Table 1. Key input data for eight shale-gas assessment units in the Grand Erg/Ahnet Basin Province of Algeria.

[Gray shading indicates not applicable. The average estimated ultimate recovery (EUR) input is the minimum, mode, maximum, and calculated mean. AU, assessment unit; %, percent; BCFG, billion cubic feet of gas]

Assessment input data— Continuous AUs	Timimoun Basin Devonian Shale Gas AU				Sbaa Basin Devonian Shale Gas AU			
	Minimum	Mode	Maximum	Calculated mean	Minimum	Mode	Maximum	Calculated mean
Potential production area (acres)	1,000	10,705,000	21,410,000	10,705,333	1,000	1,047,500	2,095,000	1,047,833
Average drainage area (acres)	80	120	160	120	80	120	160	120
Untested area (%)	100	100	100	100	100	100	100	100
Success ratio (%)	10	50	90	50	10	50	90	50
Average EUR (BCFG)	0.1	0.4	1.3	0.447	0.1	0.4	1.3	0.447
AU probability	1.0				1.0			
Assessment input data— Continuous AUs	Ahnet Basin Devonian Shale Gas AU				Benoud-Melhrir Trough Silurian Shale Gas AU			
	Minimum	Mode	Maximum	Calculated mean	Minimum	Mode	Maximum	Calculated mean
Potential production area (acres)	1,000	2,931,300	5,862,600	2,931,633	1,000	3,100,000	6,200,000	3,100,333
Average drainage area (acres)	80	120	160	120	80	120	160	120
Untested area (%)	100	100	100	100	100	100	100	100
Success ratio (%)	10	50	90	50	10	50	90	50
Average EUR (BCFG)	0.1	0.4	1.3	0.447	0.1	0.4	1.3	0.447
AU probability	1.0				0.9			
Assessment input data— Continuous AUs	Timimoun Basin Silurian Shale Gas AU				Oued Mya Basin Silurian Shale Gas AU			
	Minimum	Mode	Maximum	Calculated mean	Minimum	Mode	Maximum	Calculated mean
Potential production area (acres)	1,000	14,927,000	29,854,000	14,927,333	1,000	5,200,000	10,400,000	5,200,333
Average drainage area (acres)	80	120	160	120	80	120	160	120
Untested area (%)	100	100	100	100	100	100	100	100
Success ratio (%)	10	50	90	50	10	50	90	50
Average EUR (BCFG)	0.1	0.4	1.3	0.447	0.1	0.4	1.3	0.447
AU probability	1.0				0.9			
Assessment input data— Continuous AUs	Sbaa Basin Silurian Shale Gas AU				Ahnet Basin Silurian Shale Gas AU			
	Minimum	Mode	Maximum	Calculated mean	Minimum	Mode	Maximum	Calculated mean
Potential production area (acres)	1,000	1,199,500	2,399,000	1,199,833	10,000	5,221,700	10,443,400	5,225,033
Average drainage area (acres)	80	120	160	120	80	120	160	120
Untested area (%)	100	100	100	100	100	100	100	100
Success ratio (%)	10	50	90	50	10	50	90	50
Average EUR (BCFG)	0.1	0.4	1.3	0.447	0.1	0.4	1.3	0.447
AU probability	1.0				1.0			

Undiscovered Resources Summary

The USGS quantitatively assessed undiscovered, technically recoverable shale-gas resources in the Grand Erg/Ahnet Basin Province of Algeria (table 2). The estimated mean resources are 80,109 billion cubic feet of gas (BCFG),

or 80.1 trillion cubic feet of gas, with an F95 to F5 range from 13,745 to 191,175 BCFG; and 275 million barrels of natural gas liquids (MMBNGL), with an F95 to F5 range from 39 to 706 MMBNGL.

Table 2. Results for eight shale-gas assessment units in the Grand Erg/Ahnet Basin Province of Algeria.

[Gray shading indicates not applicable. Results shown are fully risked estimates. F95 represents a 95-percent chance of at least the amount tabulated; other fractiles are defined similarly. BCFG, billion cubic feet of gas; NGL, natural gas liquids; MMBNGL, million barrels of natural gas liquids]

Total petroleum systems and assessment units (AUs)	AU probability	Accumulation type	Total undiscovered resources							
			Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean
Devonian Total Petroleum System										
Timimoun Basin Devonian Shale Gas AU	1.0	Gas	4,095	16,535	46,330	19,784	12	57	186	73
Sbaa Basin Devonian Shale Gas AU	1.0	Gas	396	1,617	4,558	1,936	1	6	18	7
Ahnet Basin Devonian Shale Gas AU	1.0	Gas	1,117	4,501	12,690	5,391	3	14	46	18
Silurian Total Petroleum System										
Benoud-Melrhir Trough Silurian Shale Gas AU	0.9	Gas	0	4,317	13,053	5,123	0	14	47	17
Timimoun Basin Silurian Shale Gas AU	1.0	Gas	5,696	23,011	64,840	27,438	16	72	230	92
Oued Mya Basin Silurian Shale Gas AU	0.9	Gas	0	7,237	21,736	8,599	0	23	78	29
Sbaa Basin Silurian Shale Gas AU	1.0	Gas	459	1,848	5,242	2,220	1	6	19	7
Ahnet Basin Silurian Shale Gas AU	1.0	Gas	1,982	8,066	22,726	9,618	6	25	82	32
Total undiscovered shale-gas resources			13,745	67,132	191,175	80,109	39	217	706	275

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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>.

Grand Erg/Ahnet Basin Province Assessment Team

Michael E. Brownfield, Christopher J. Schenk, Tracey J. Mercier, Marilyn E. Tennyson, Cheryl A. Woodall, Thomas M. Finn, Phuong A. Le, Heidi M. Leathers-Miller, Janet K. Pitman, Ronald M. Drake II, and Stephanie B. Gaswirth