World Undiscovered Petroleum Resources (excluding U.S.)
Oil

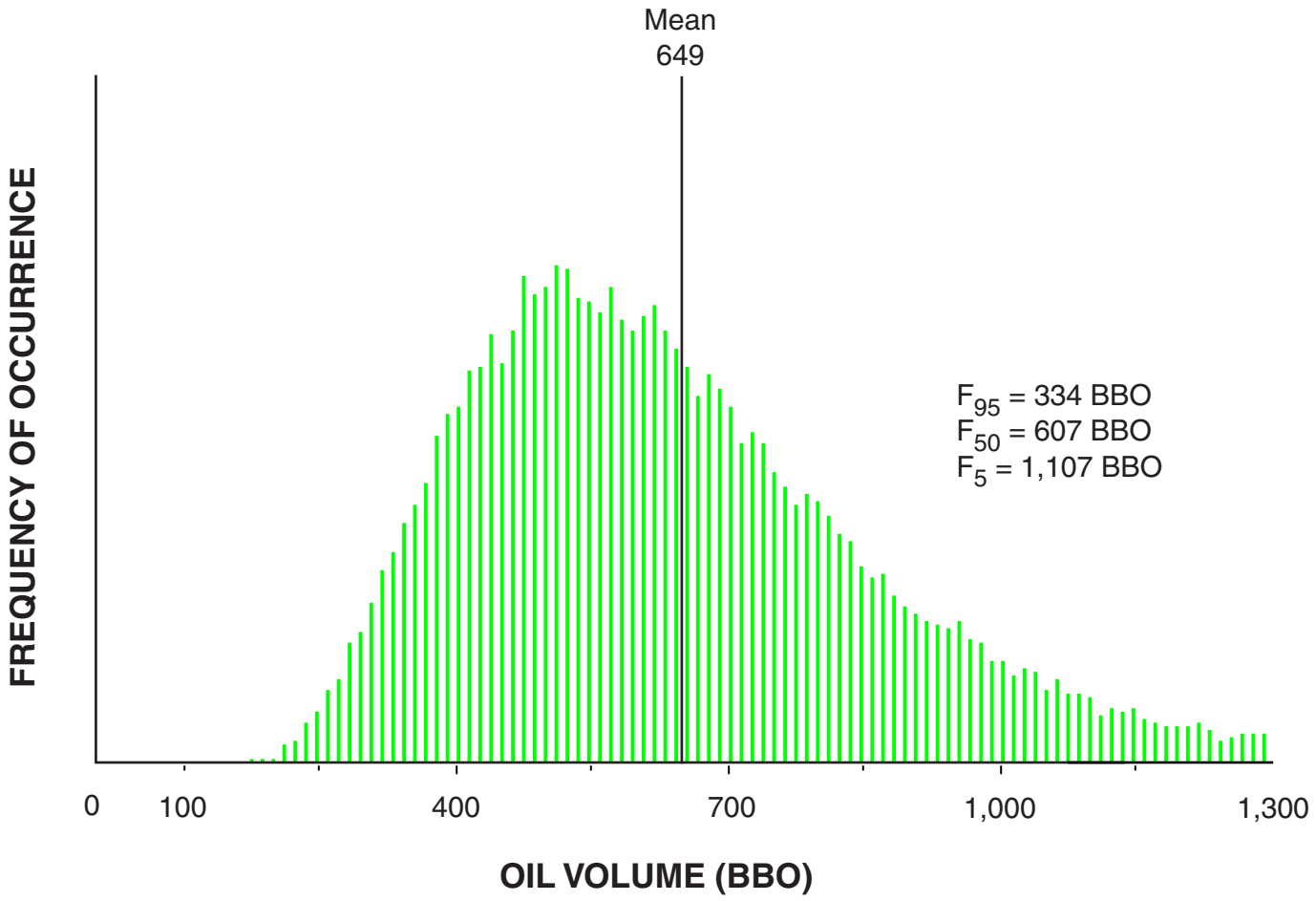

Figure AR-1. Graphical depiction of the forecast for world undiscovered oil resources (exclusive of the U.S.), with uncertainty expressed in the form of a lognormal probability distribution. BBO, billion barrels of oil.

World Undiscovered Petroleum Resources (excluding U.S.)
Gas

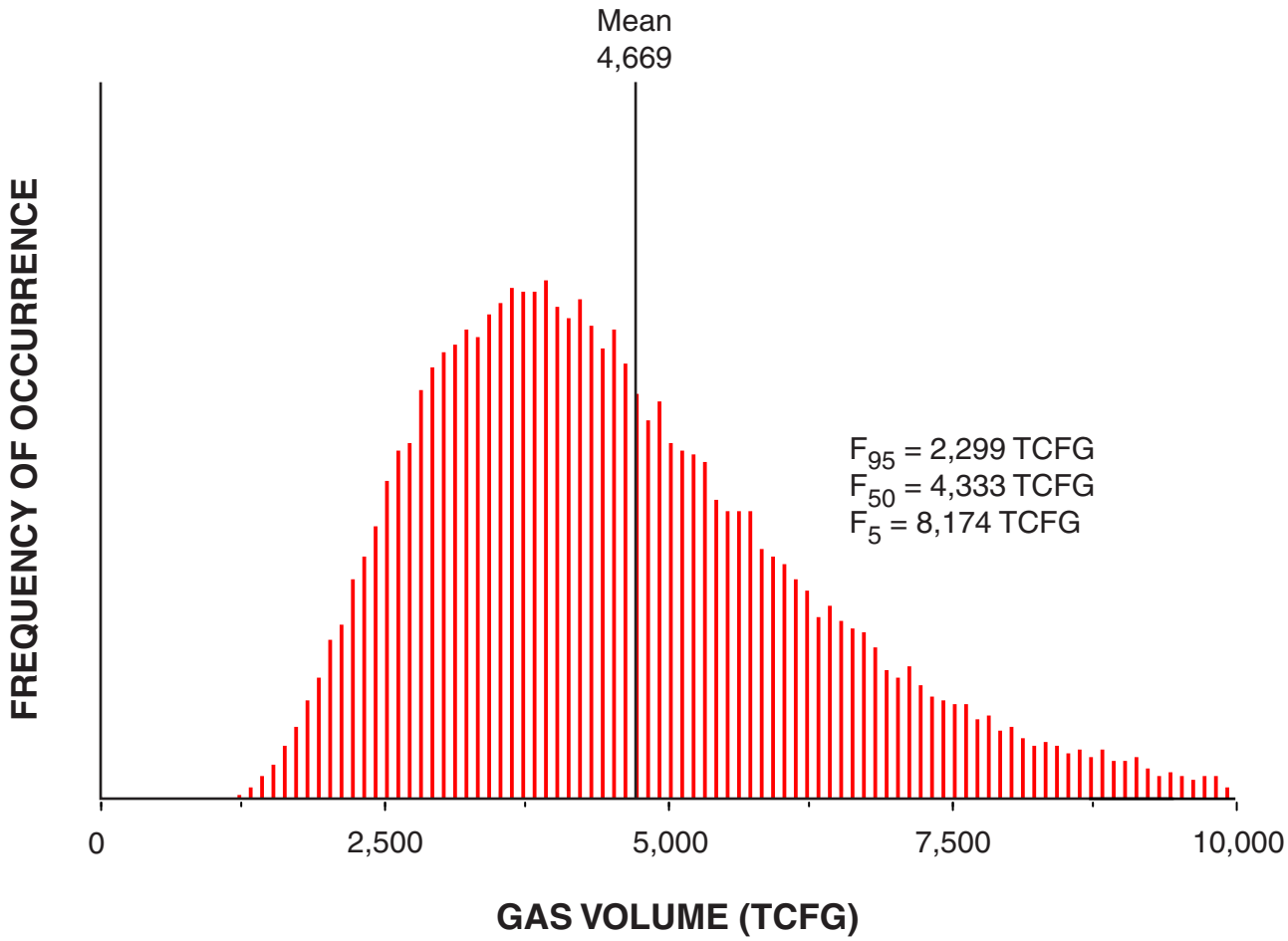

Figure AR-2. Graphical depiction of the forecast for world undiscovered gas resources (exclusive of the U.S.), with uncertainty expressed in the form of a lognormal probability distribution. TCFG, trillion cubic feet of gas.

World Undiscovered Petroleum Resources (excluding U.S.)
NGL

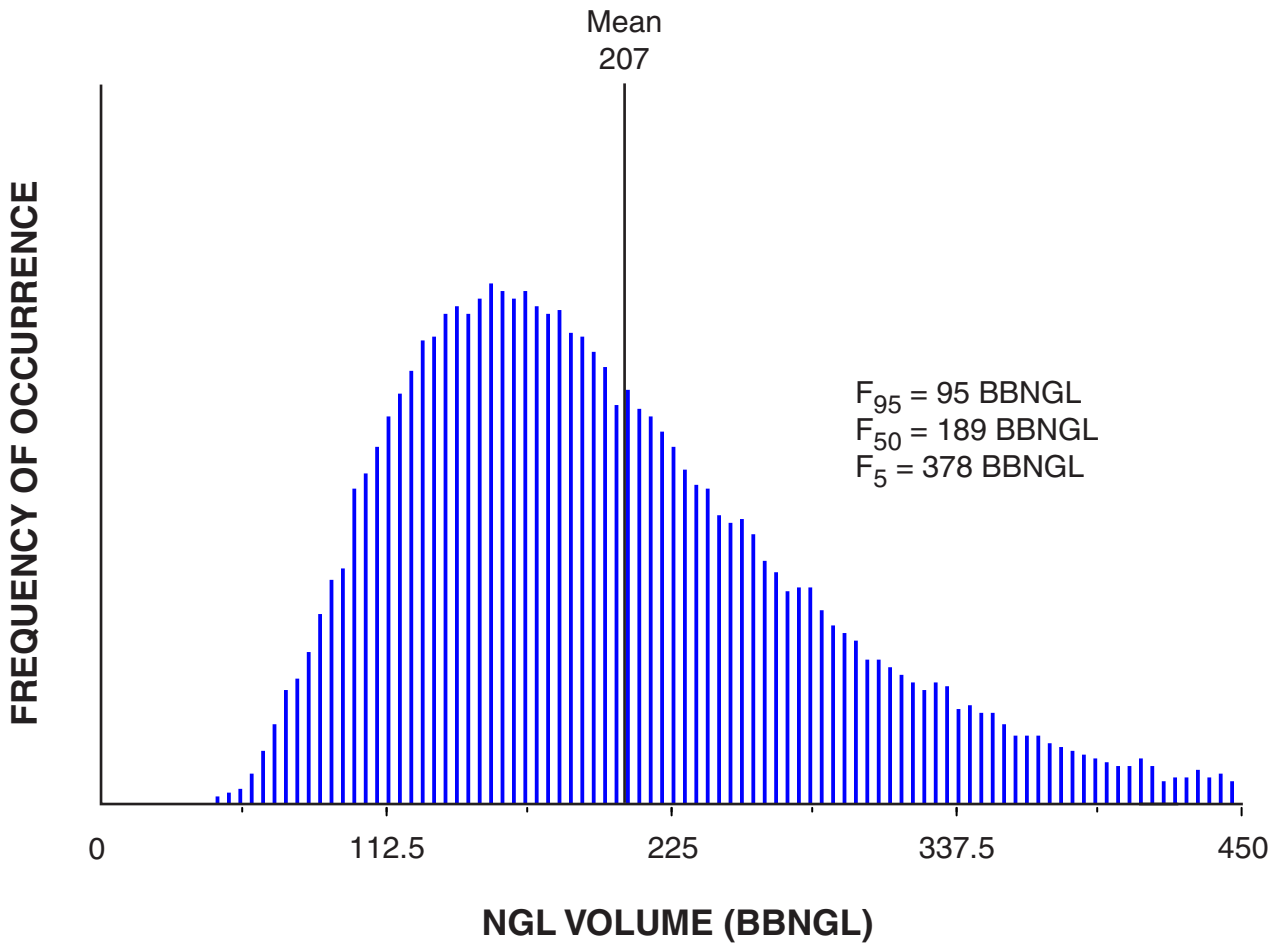

Figure AR-3. Graphical depiction of the forecast for world undiscovered NGL resources (exclusive of the U.S.), with uncertainty expressed in the form of a lognormal probability distribution. BBNGL, billion barrels of NGL.

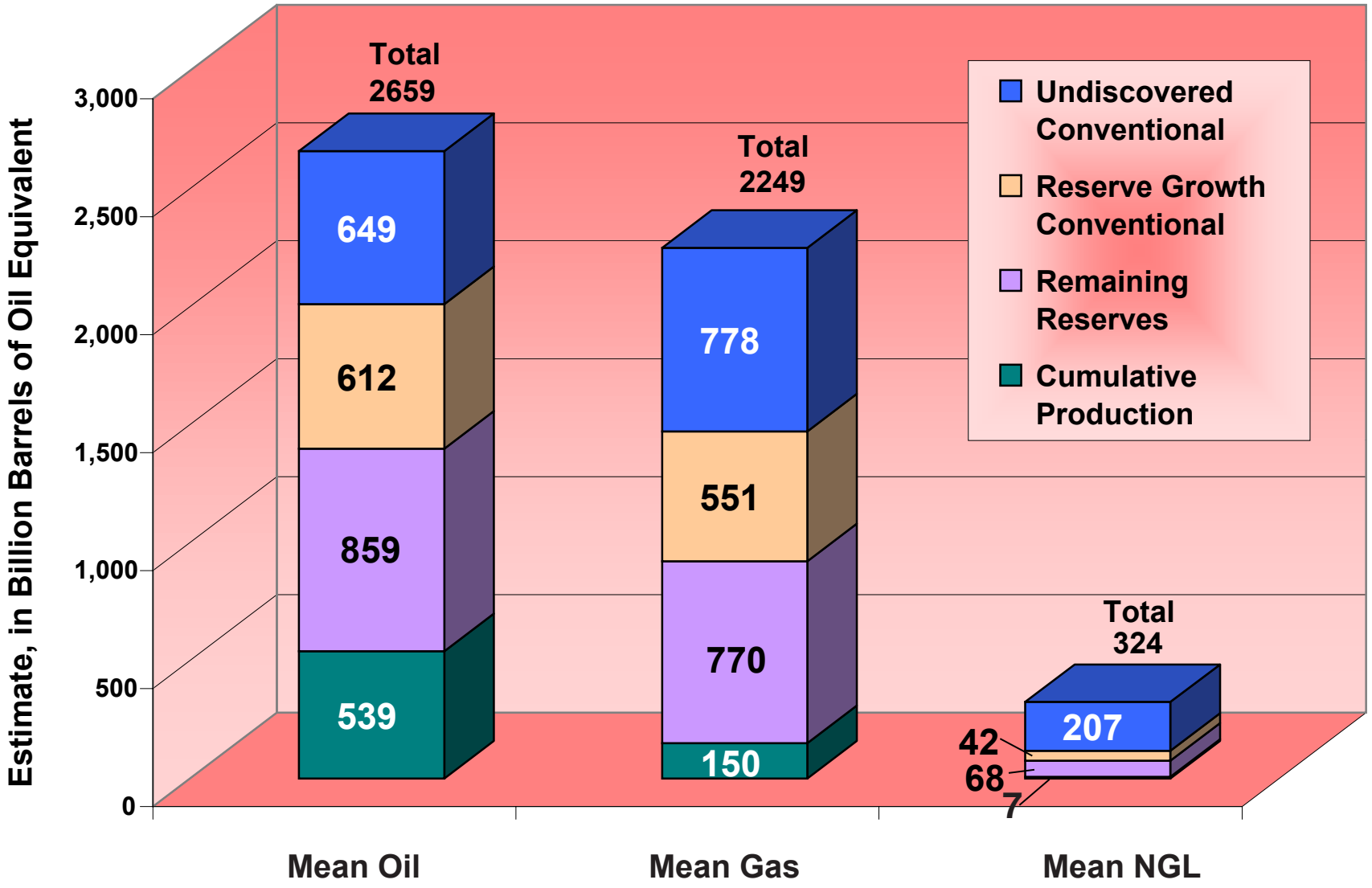

Figure AR-4. Graph showing the mean estimate of the world grown conventional endowment (excluding the U.S.) of oil, gas and NGL, in billion barrels of oil equivalent, from World Petroleum Assessment 2000. Includes cumulative production, remaining reserves, and reserve growth and undiscovered resources in conventional accumulations. Production and reserve data as of January 1, 1996. Data from Petroconsultants (1996) and NRG Associates (1995).

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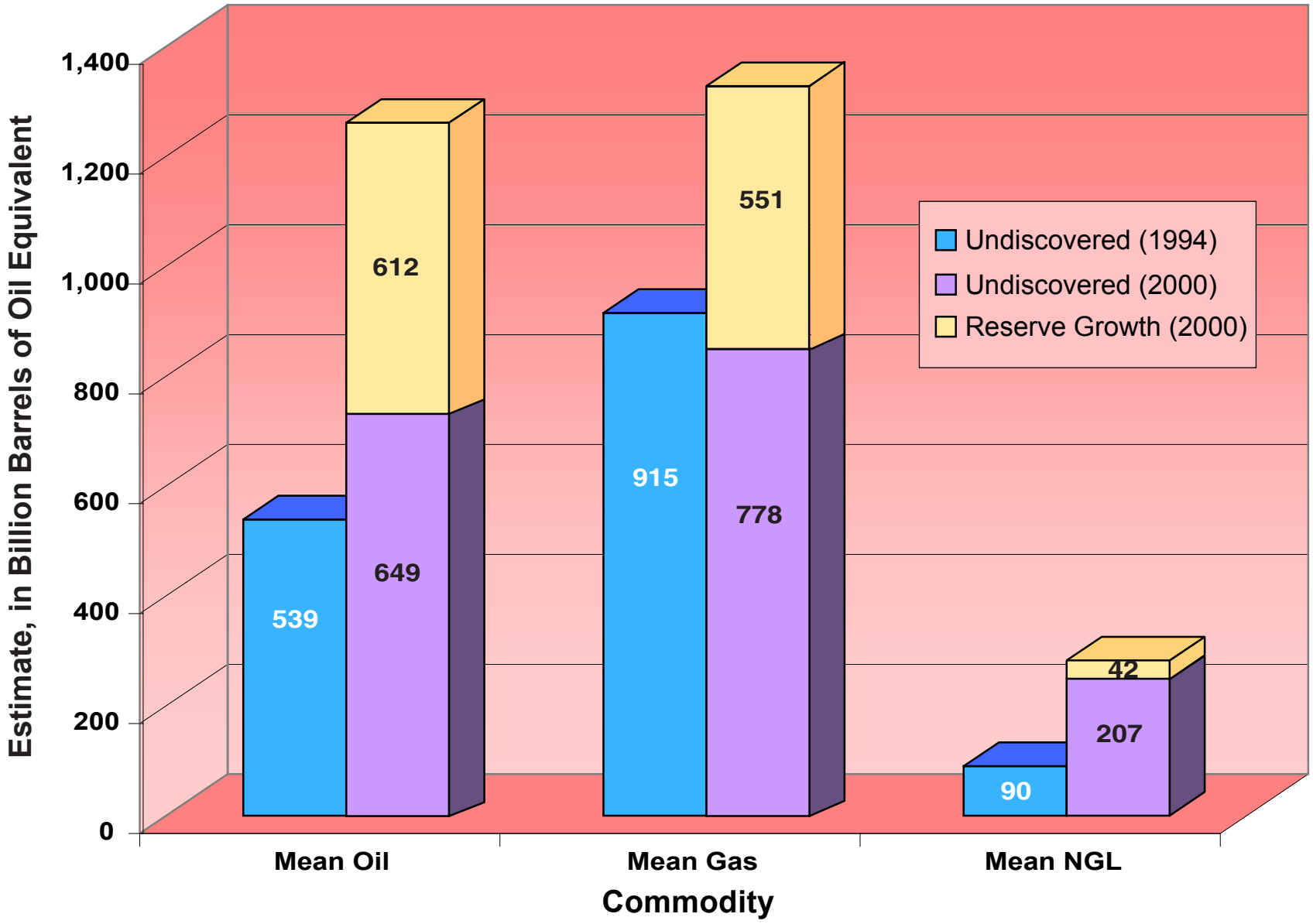

Figure AR-5. Graph comparing the 1994 and 2000 USGS world estimates exclusive of the U.S. for undiscovered conventional oil, gas and NGL in billion barrels of oil equivalent. For each commodity, the estimated reserve growth from World Petroleum Assessment 2000 is also shown. Data from Masters and others (1994, 1997) and this study.

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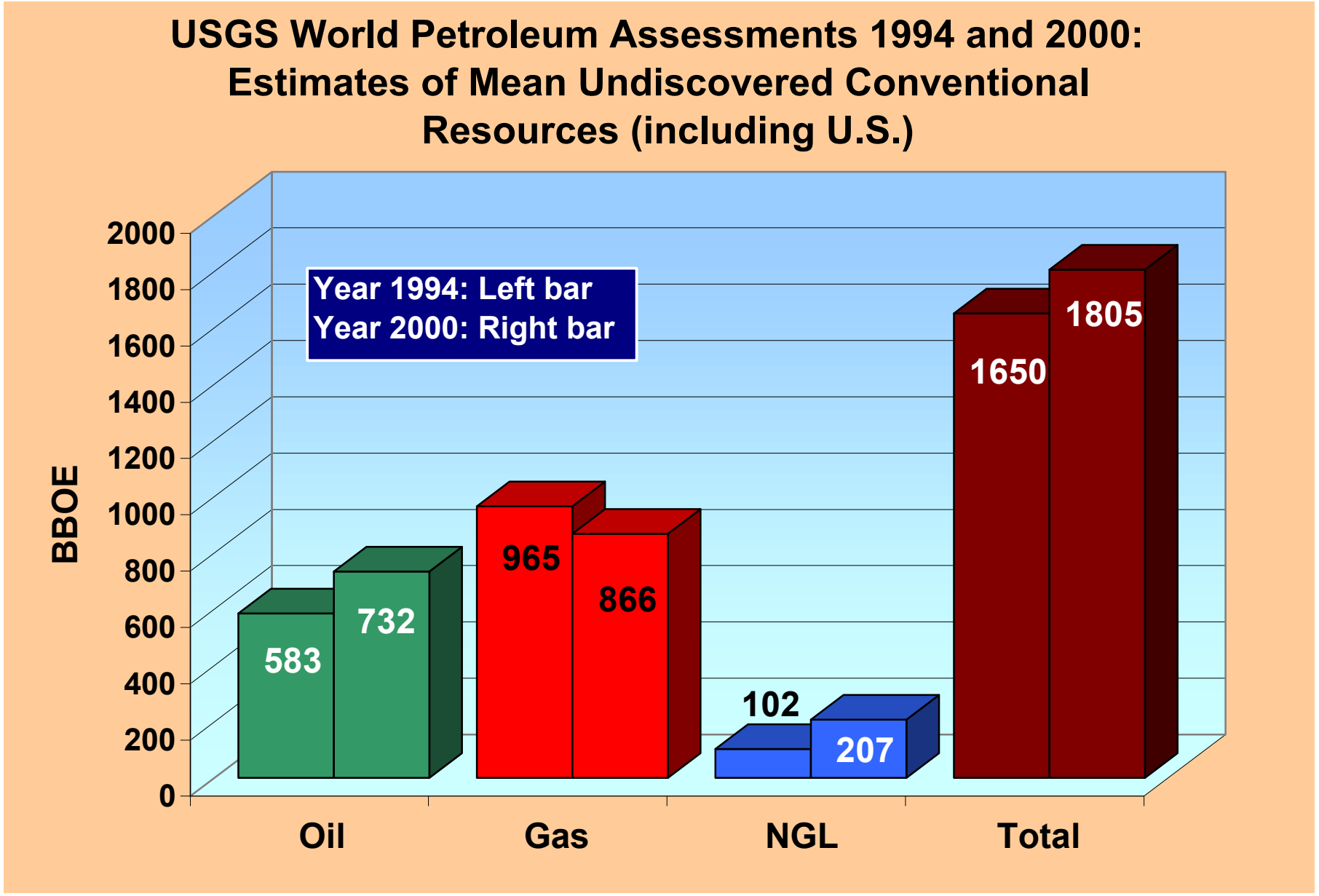

Figure AR-6. Estimates of mean undiscovered conventional resources including the U.S. from 1994 USGS assessment (Masters and others, 1994, 1997) compared to the current assessment of the world. BBOE, billion barrels of oil equivalent.

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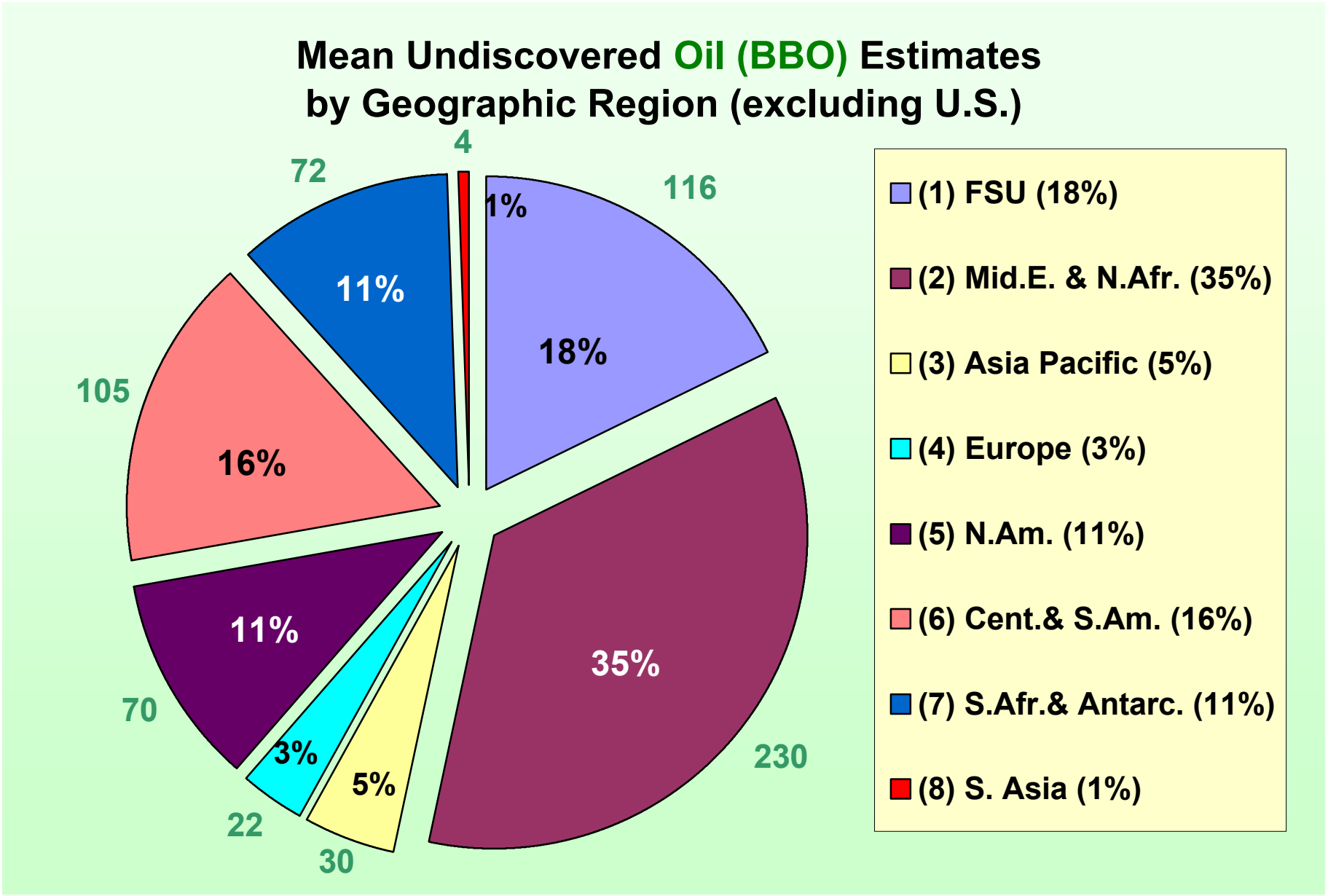

Figure AR-7. Estimates of mean undiscovered conventional oil (excluding the U.S.) for the eight USGS regions of the world. BBO, billion barrels of oil.

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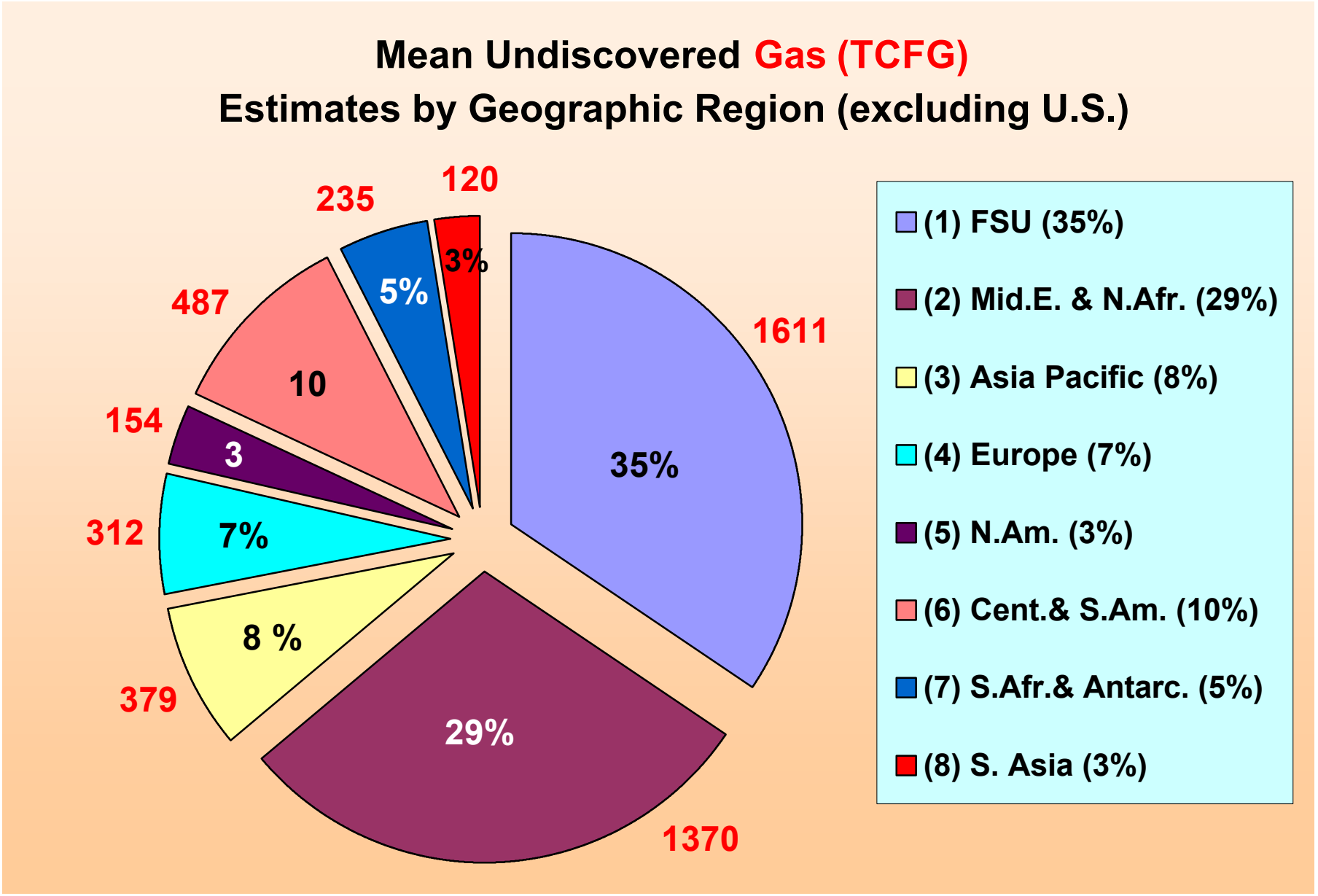

Figure AR-8. Estimates of mean undiscovered conventional gas (excluding the U.S.) for the eight USGS regions of the world. TCFG, trillion cubic feet of gas.

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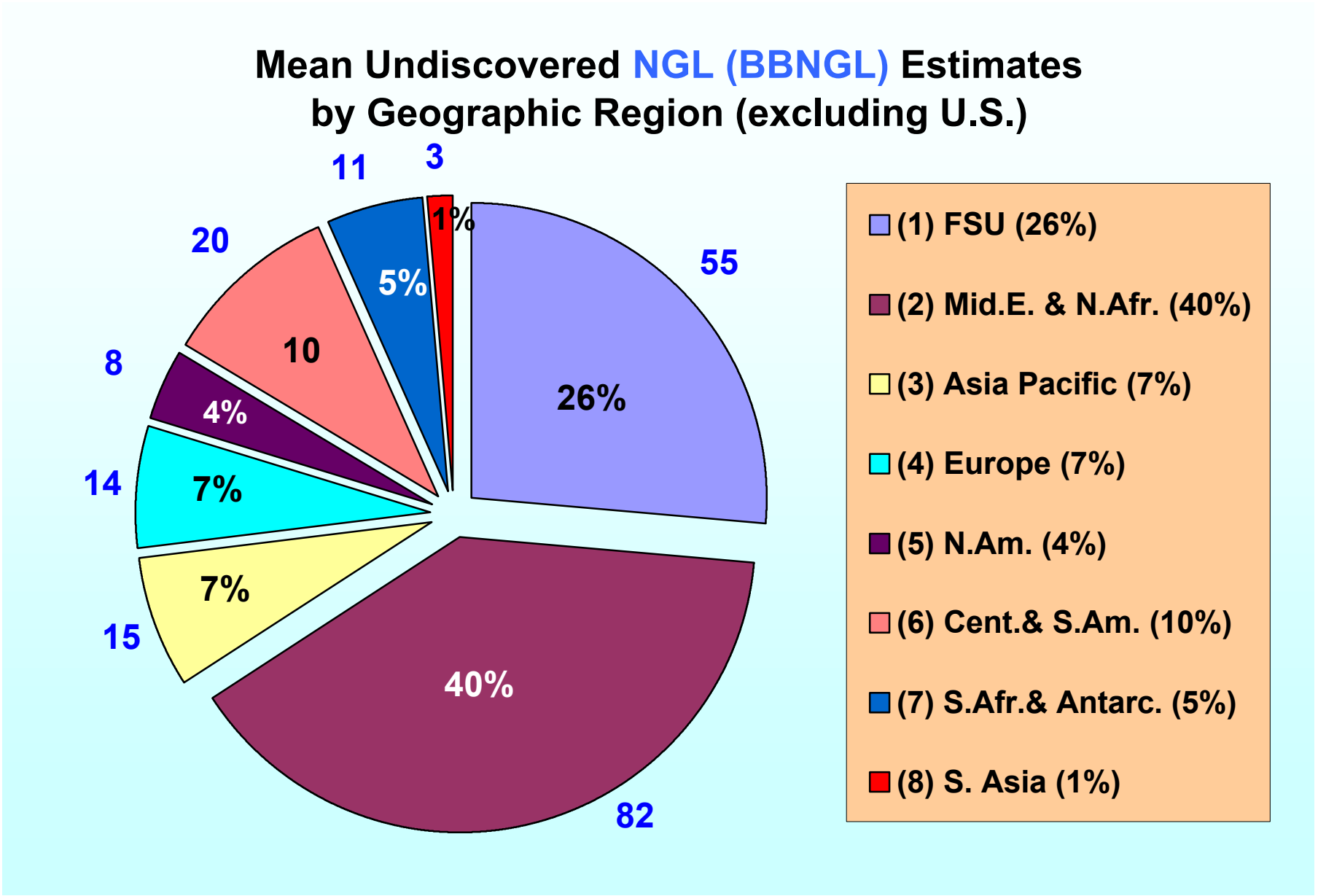

Figure AR-9. Estimates of mean undiscovered conventional natural gas liquids (NGL) (excluding the U.S.) for the eight USGS regions of the world. BBNGL, billion barrels of NGL.

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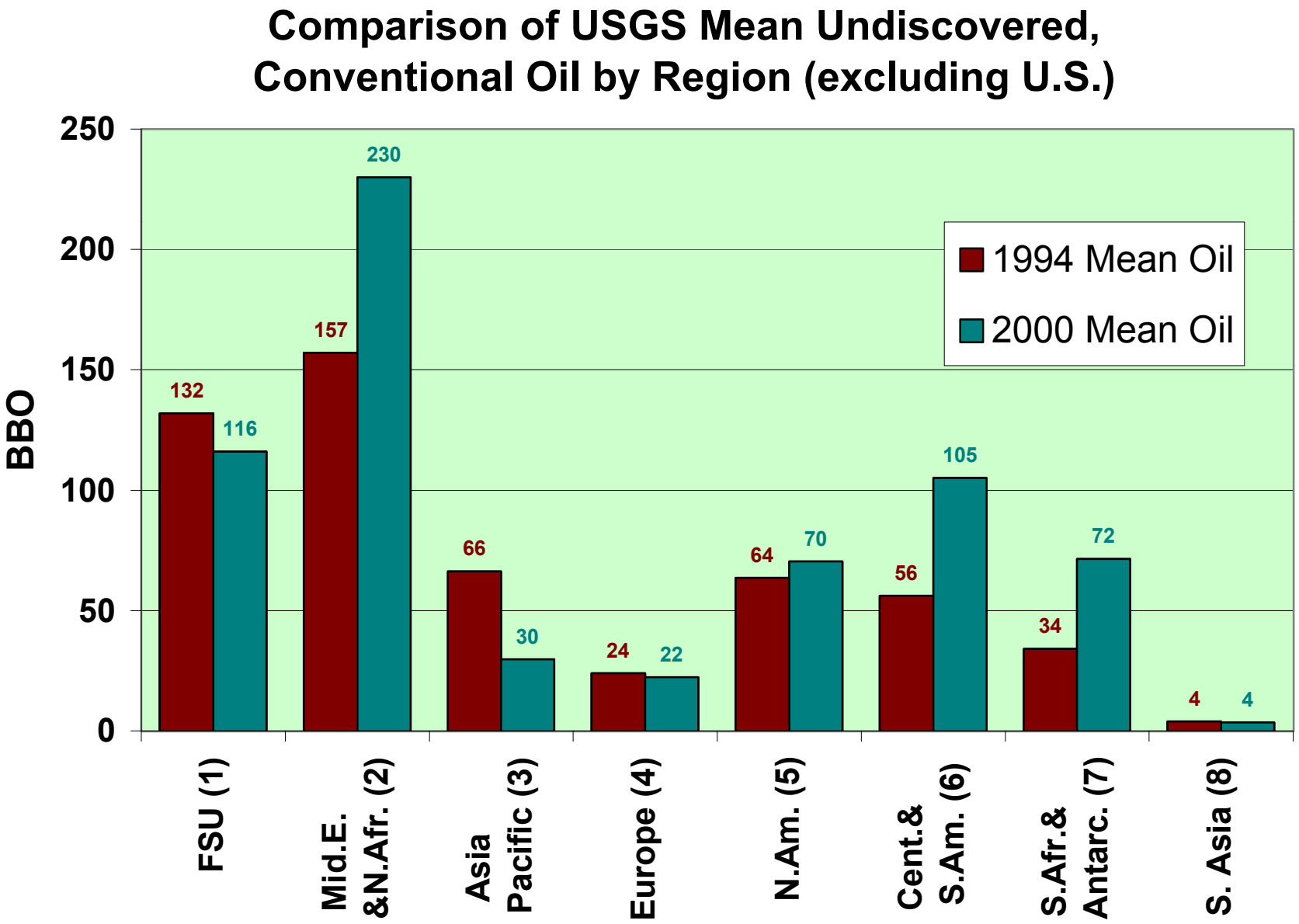

Figure AR-10. Comparison of the 1994 and 2000 USGS world petroleum assessments (excluding the U.S.) of undiscovered, conventional oil resources for the eight USGS regions of the world. Data from Masters and others (1994, 1997) and this study. BBO, billion barrels of oil.

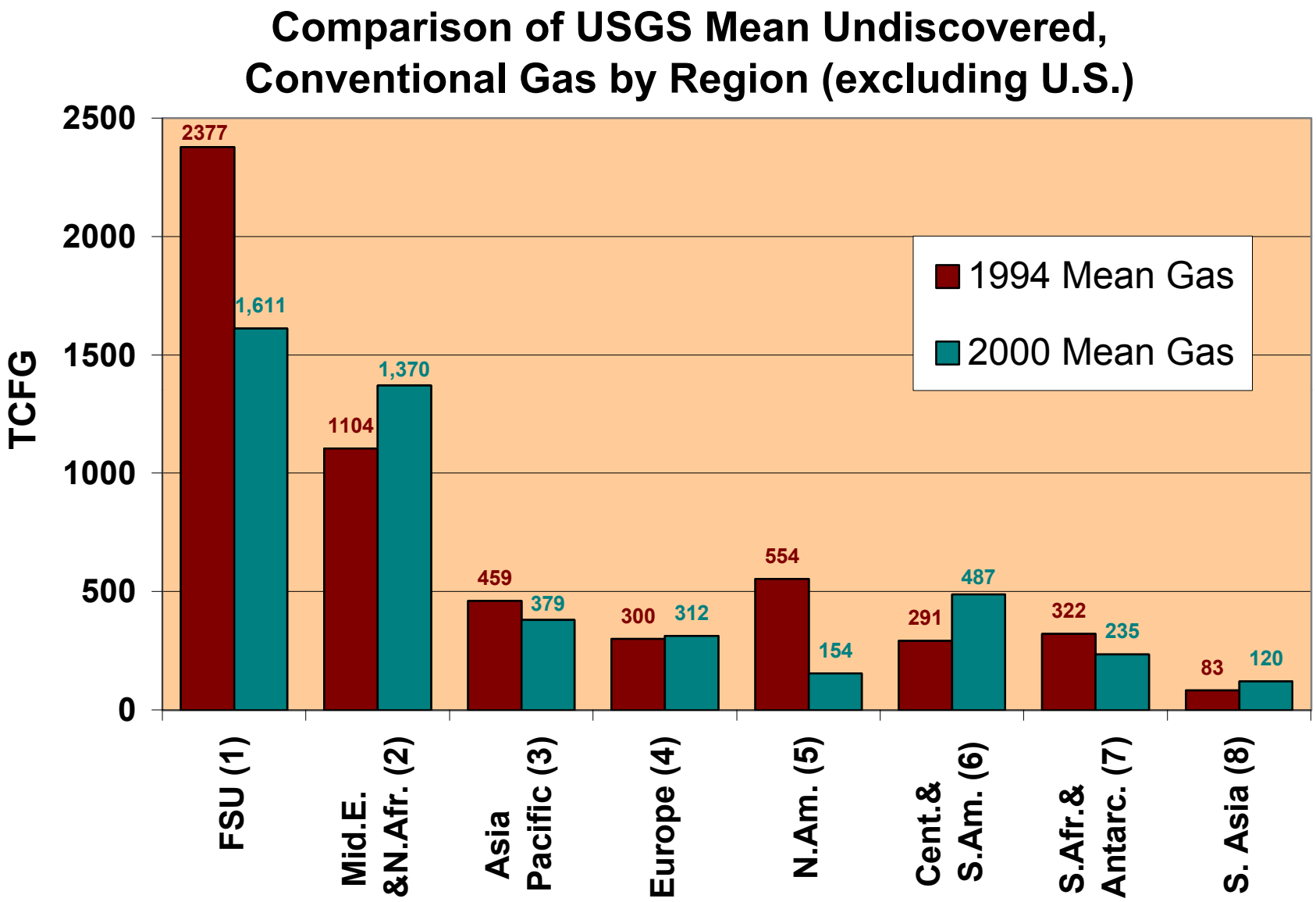

Figure AR-11. Comparison of the 1994 and 2000 USGS world petroleum assessments (excluding the U.S.) of undiscovered, conventional gas resources for the eight USGS regions of the world. Data from Masters and others (1994, 1997) and this study. TCFG, trillion cubic feet of gas.

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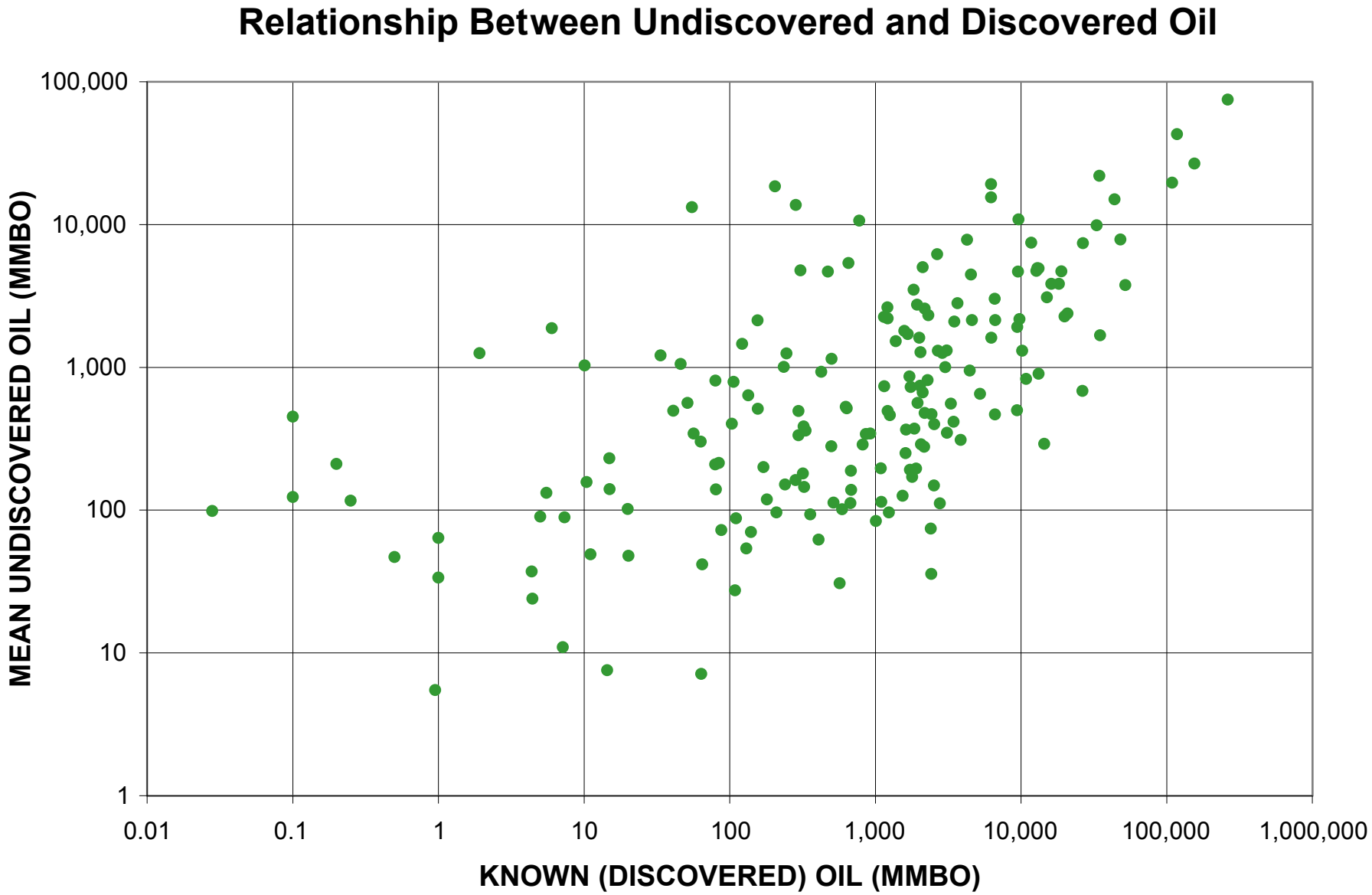

Figure AR-12. Relationship between volumes of undiscovered and discovered oil in assessment units. Assessment units identified as hypothetical are not shown. MMBO, million barrels of oil.

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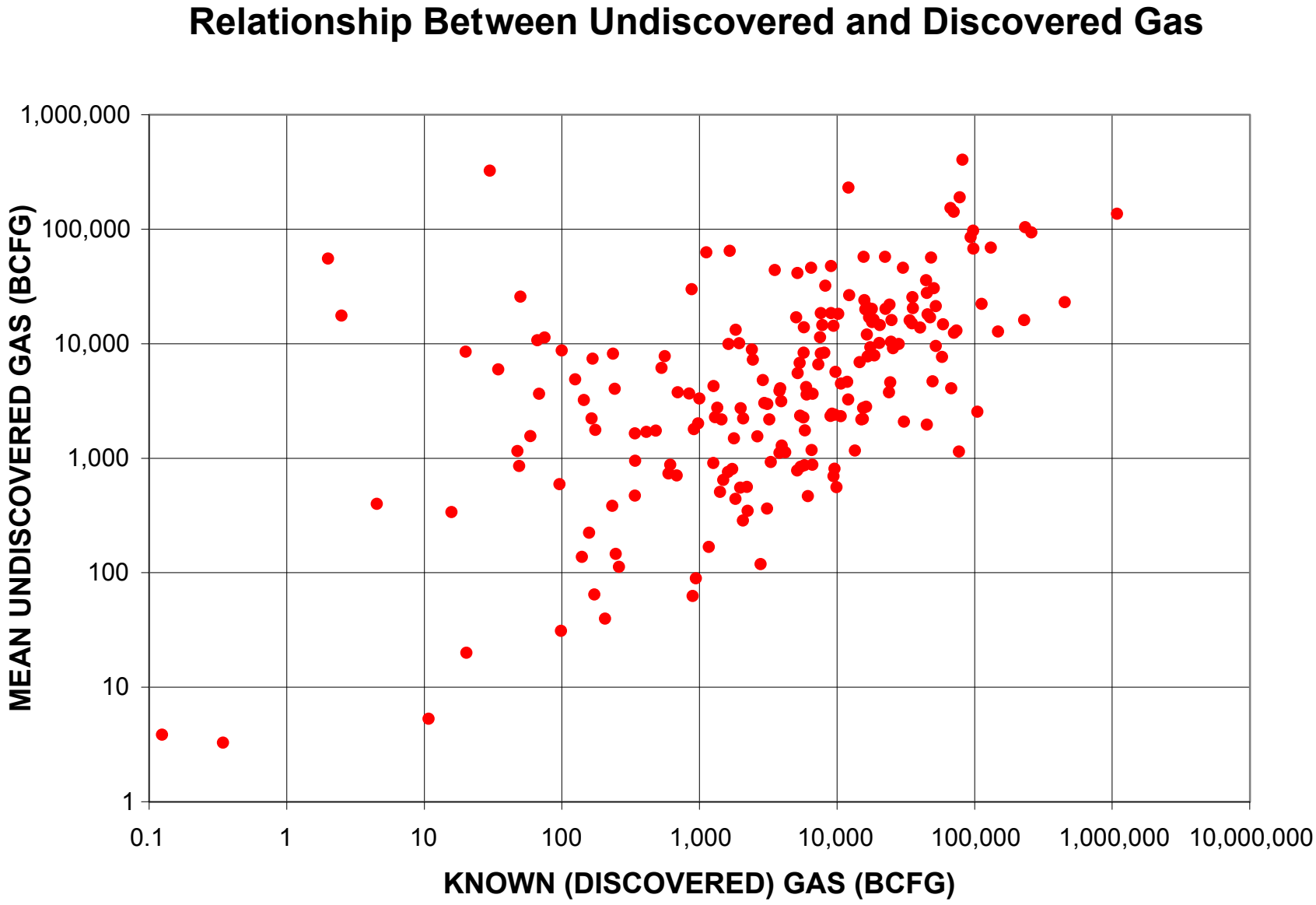

Figure AR-13. Relationship between volumes of undiscovered and discovered gas in assessment units. Assessment units identified as hypothetical are not shown. BCFG, billion cubic feet of gas.

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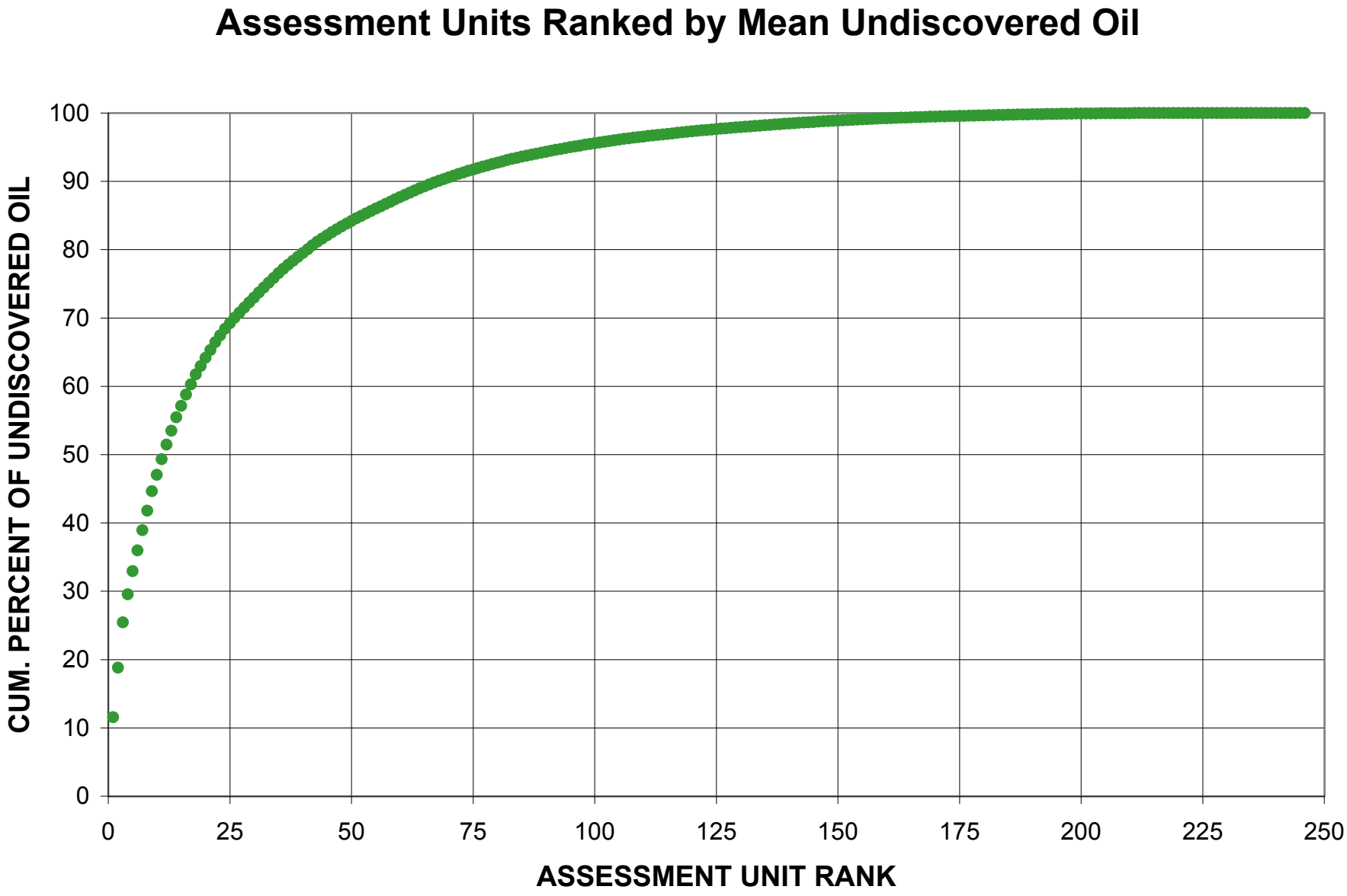

Figure AR-14. Cumulative percent of estimated undiscovered oil volume, with assessment units ranked by decreasing volume.

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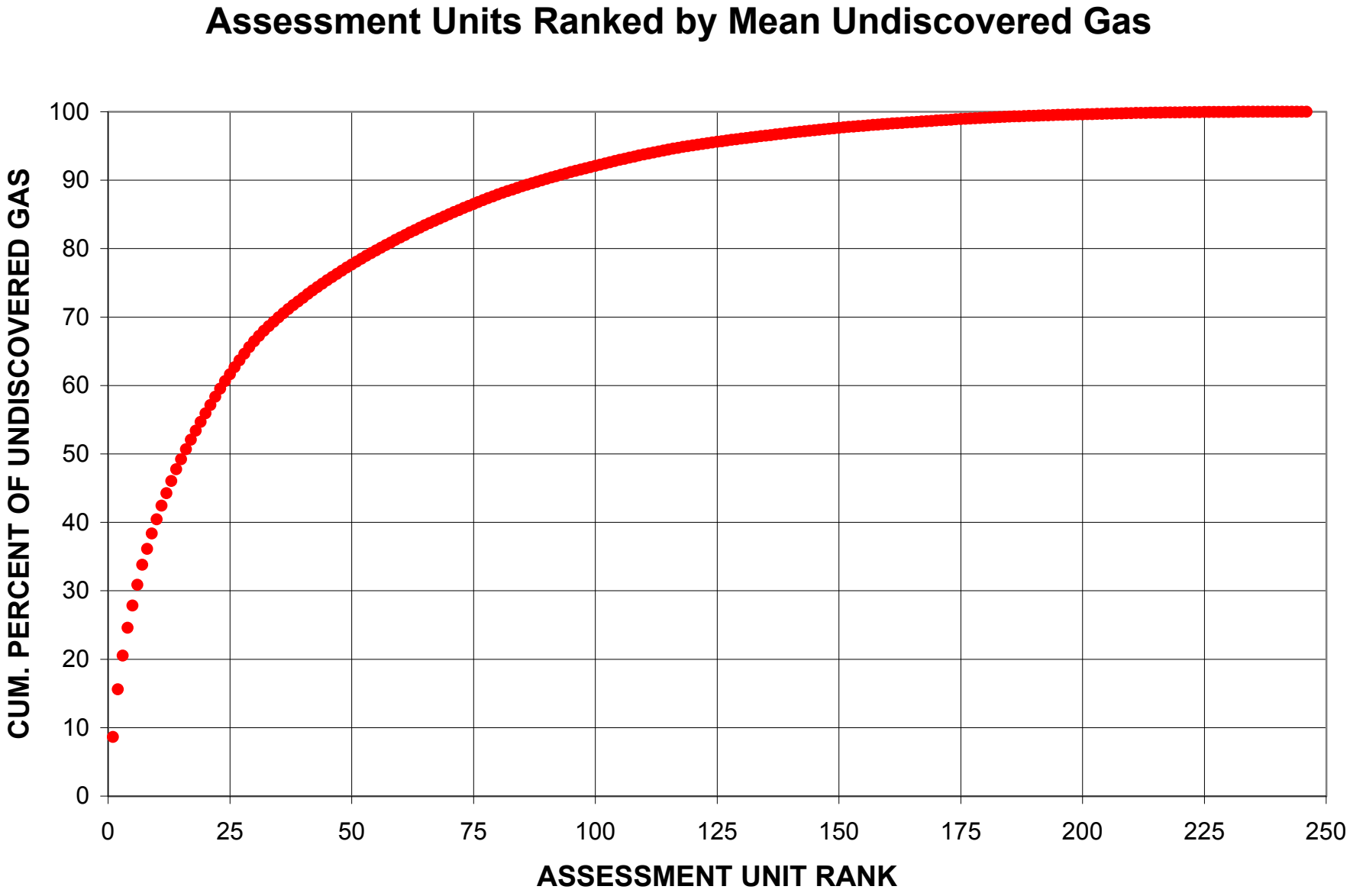

Figure AR-15. Cumulative percent of estimated undiscovered gas volume, with assessment units ranked by decreasing volume.

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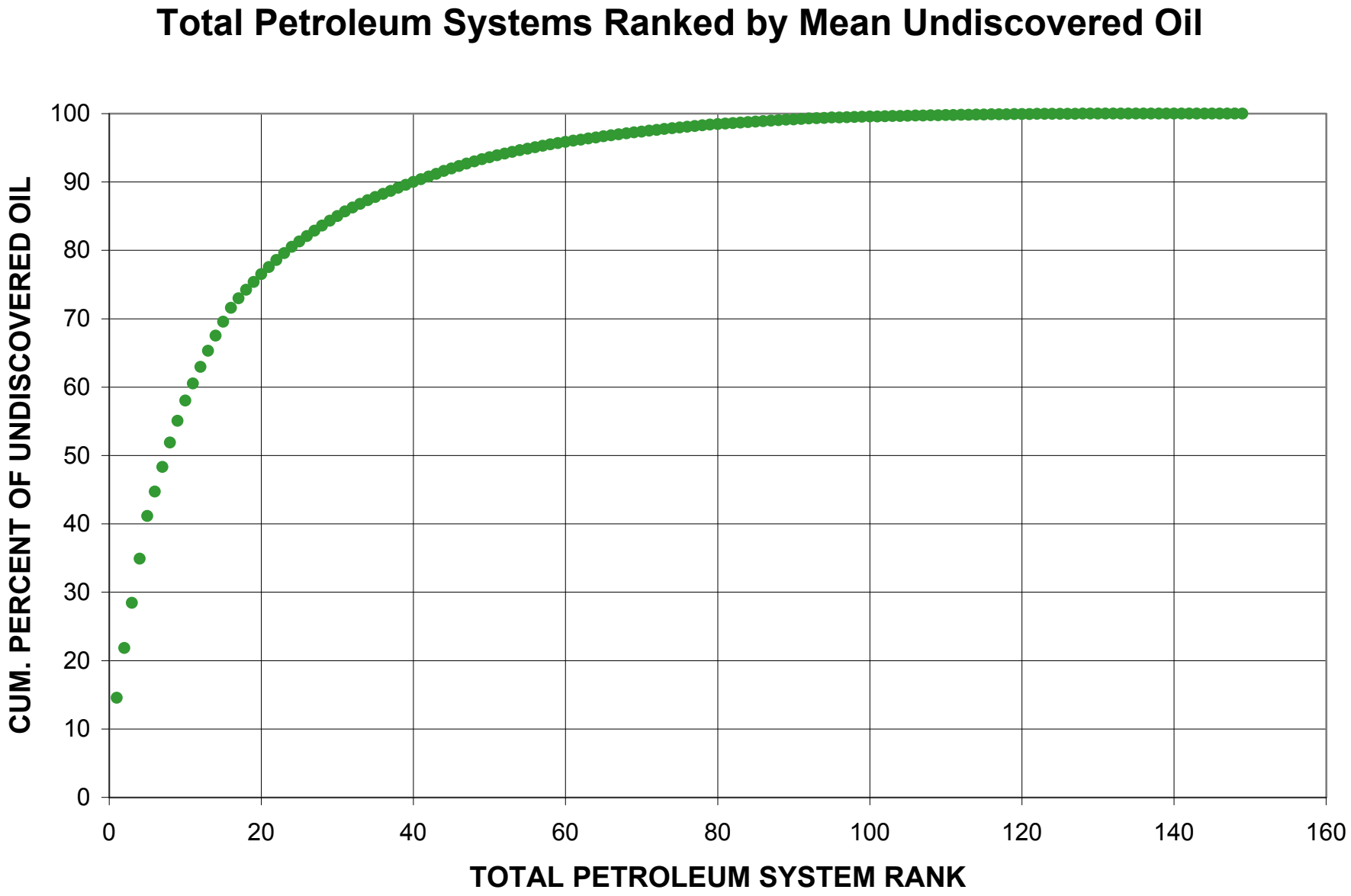

Figure AR-16. Cumulative percent of estimated undiscovered oil volume, with total petroleum systems ranked by decreasing volume.

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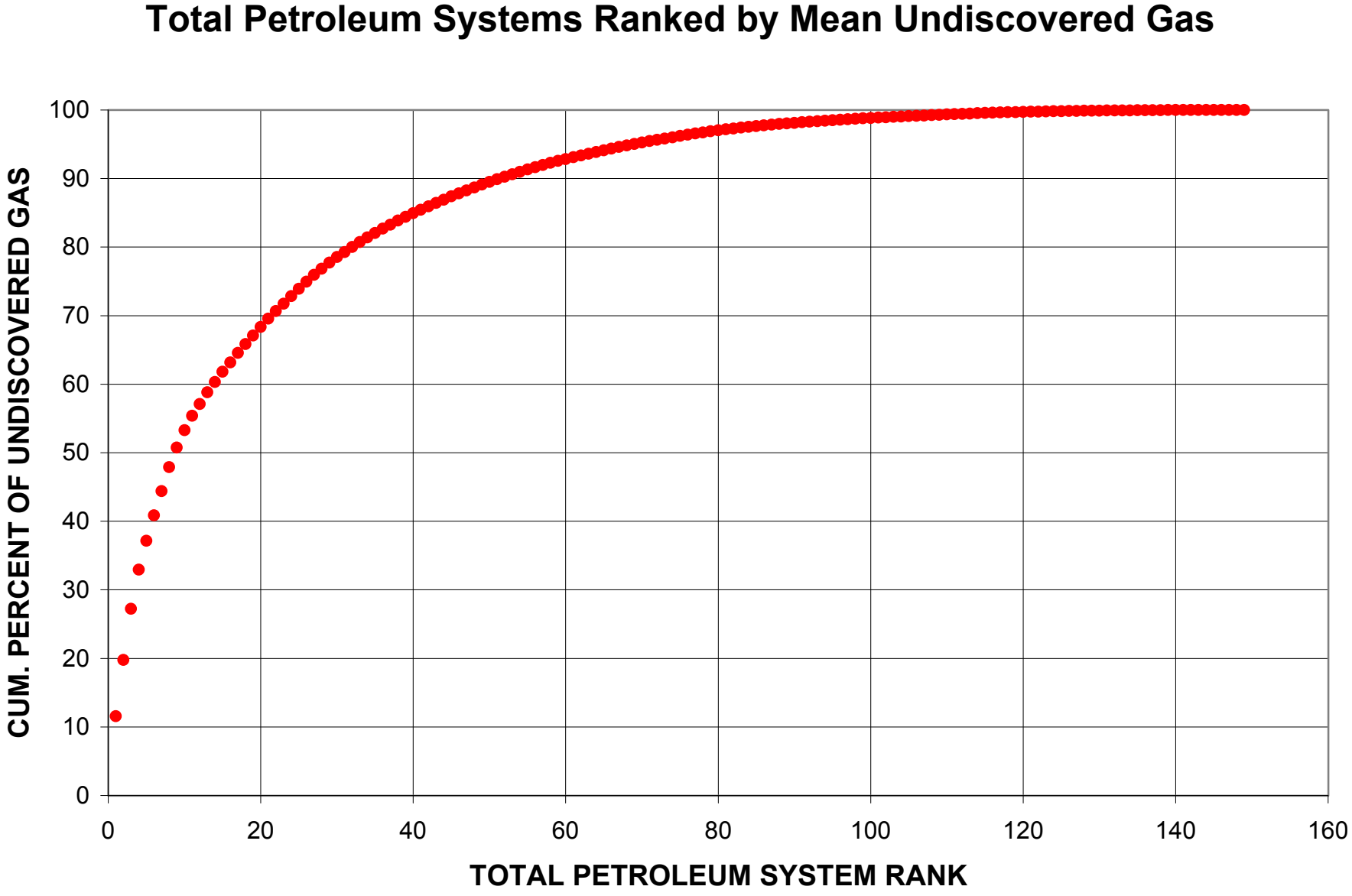

Figure AR-17. Cumulative percent of estimated undiscovered gas volume, with total petroleum systems ranked by decreasing volume.

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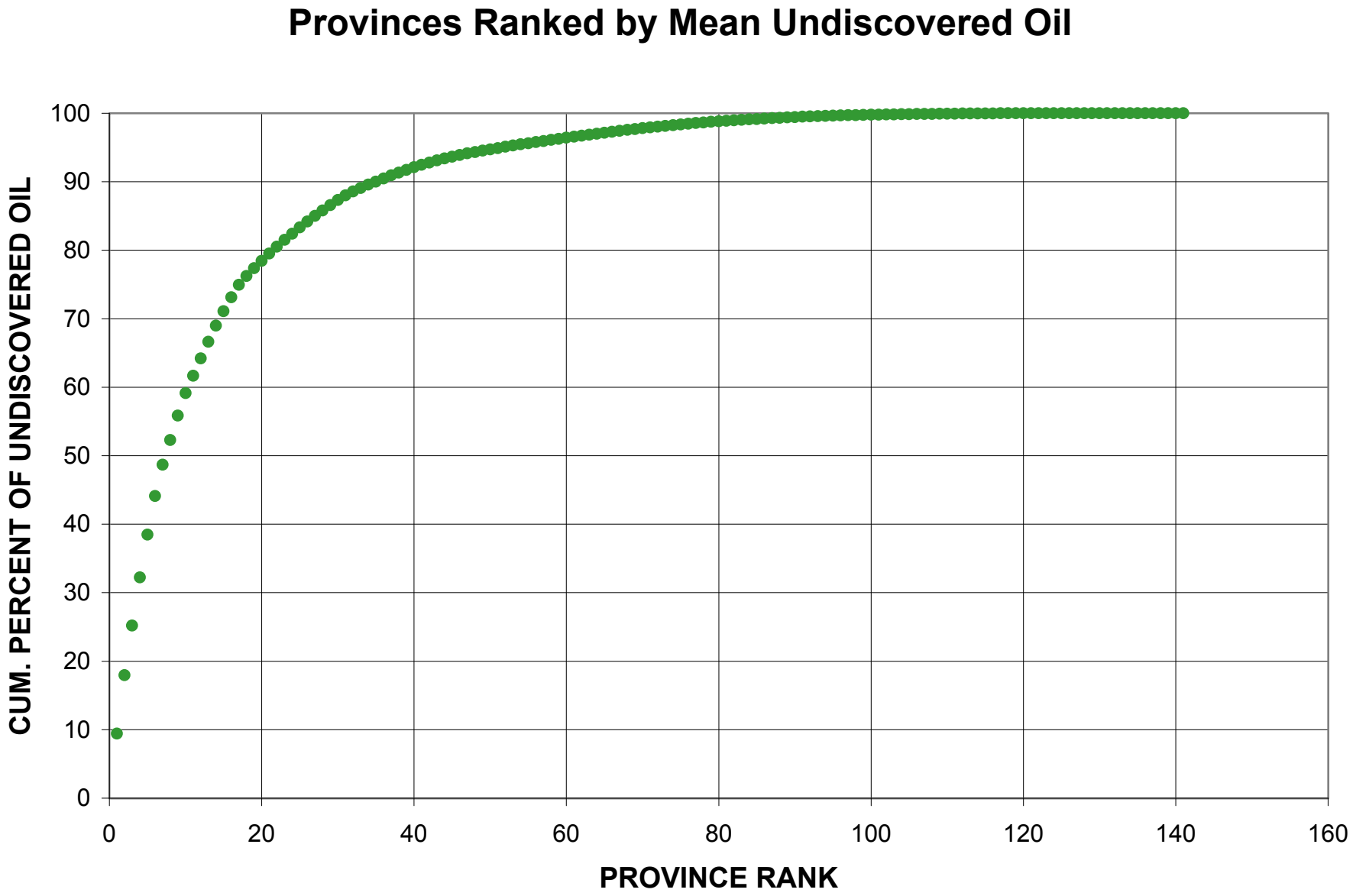

Figure AR-18. Cumulative percent of estimated undiscovered oil volume, with provinces ranked by decreasing volume.

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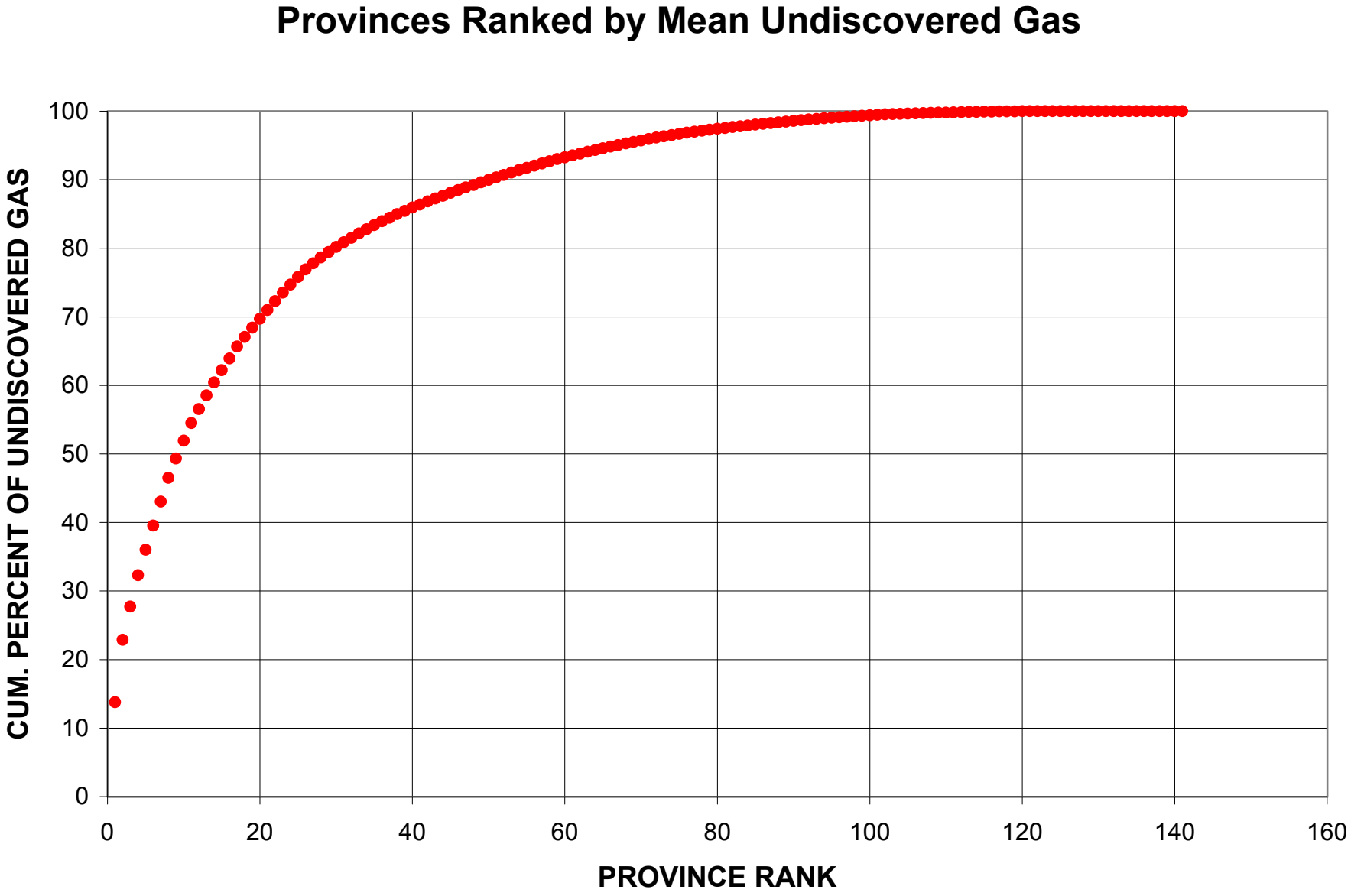

Figure AR-19. Cumulative percent of estimated undiscovered gas volume, with provinces ranked by decreasing volume.

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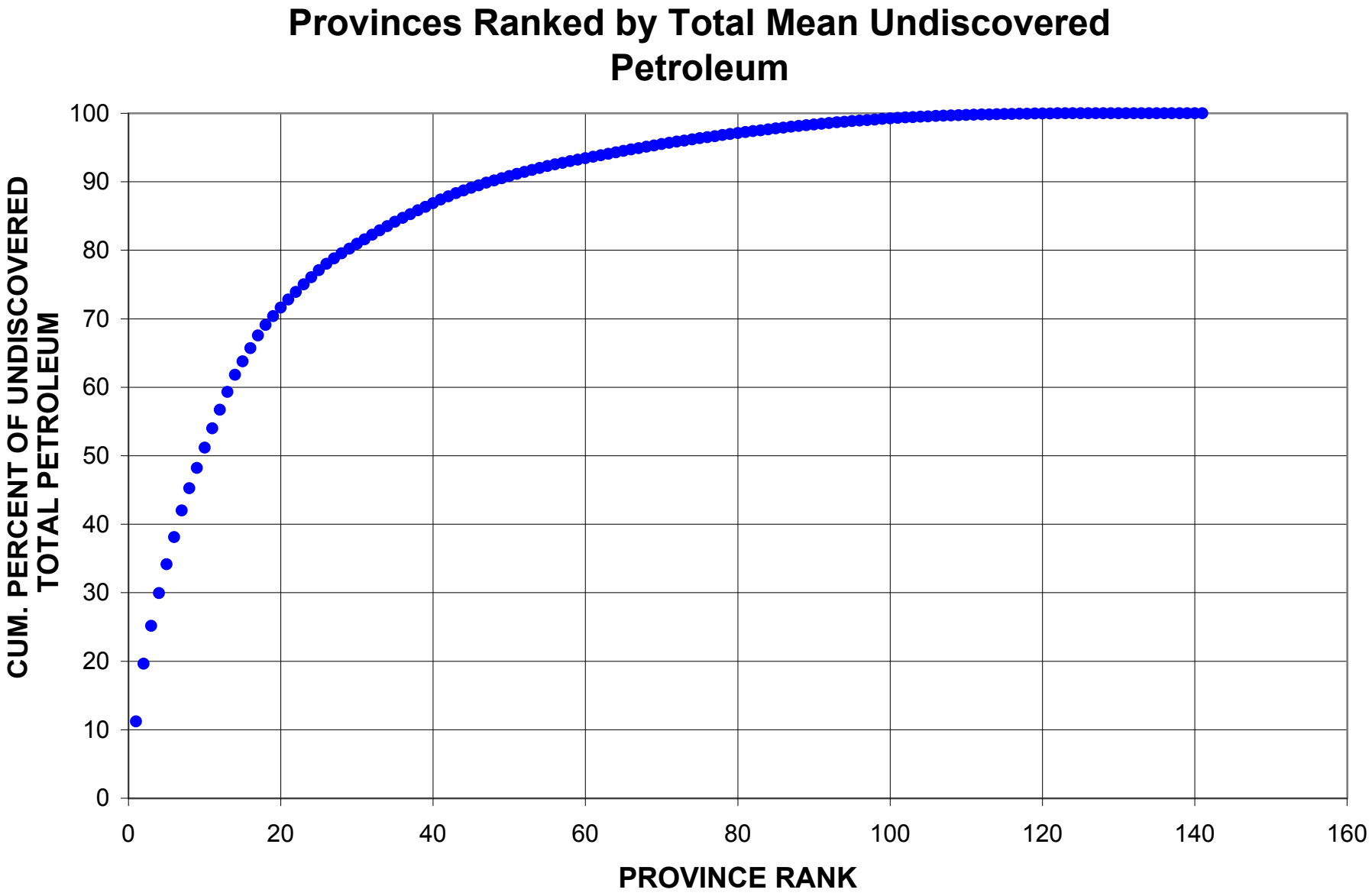

Figure AR-20. Cumulative percent of estimated total undiscovered petroleum volume, with provinces ranked by decreasing volume.

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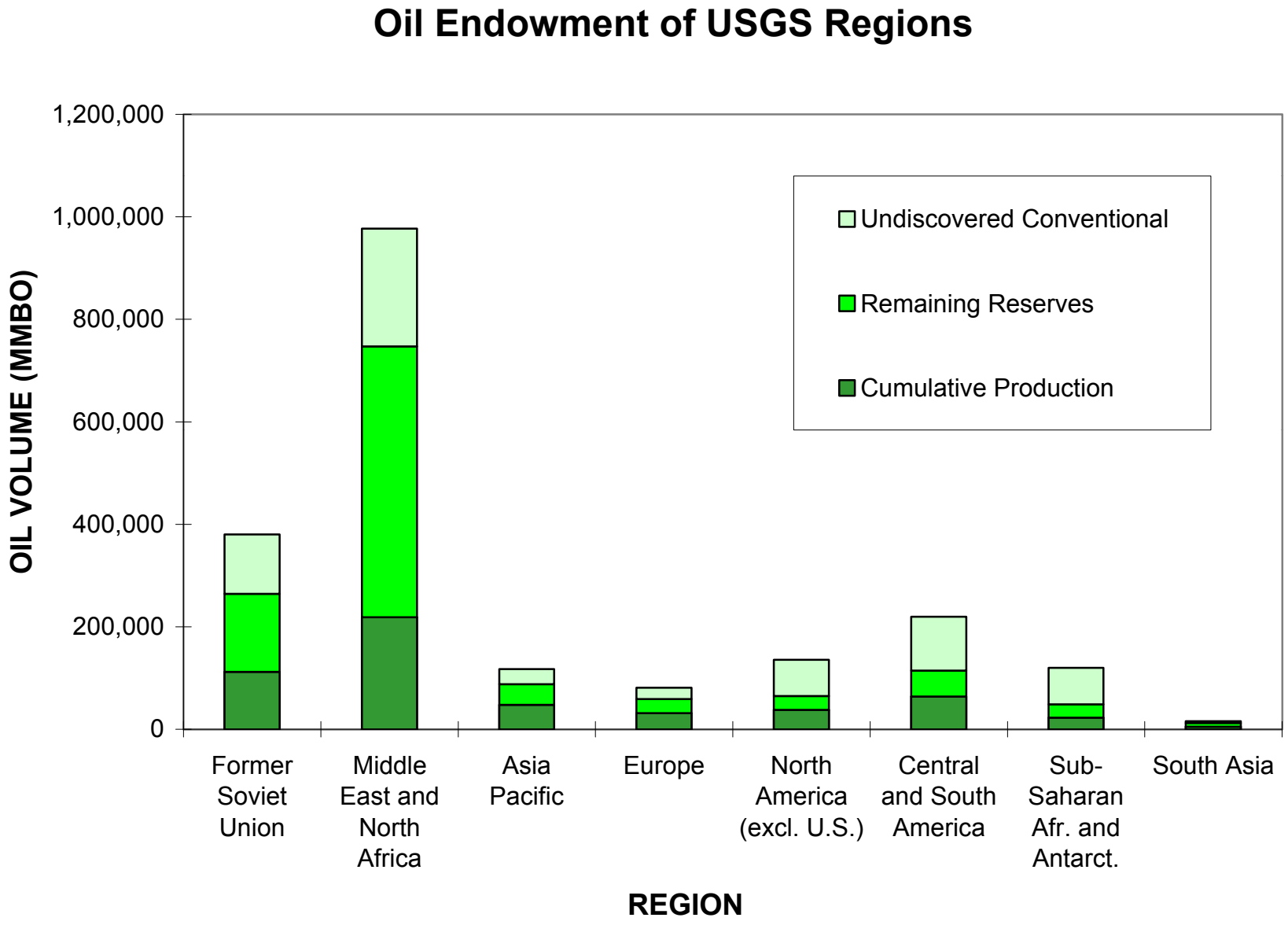

Figure AR-21. Oil endowment of the eight USGS regions of the world. MMBO, million barrels of oil.

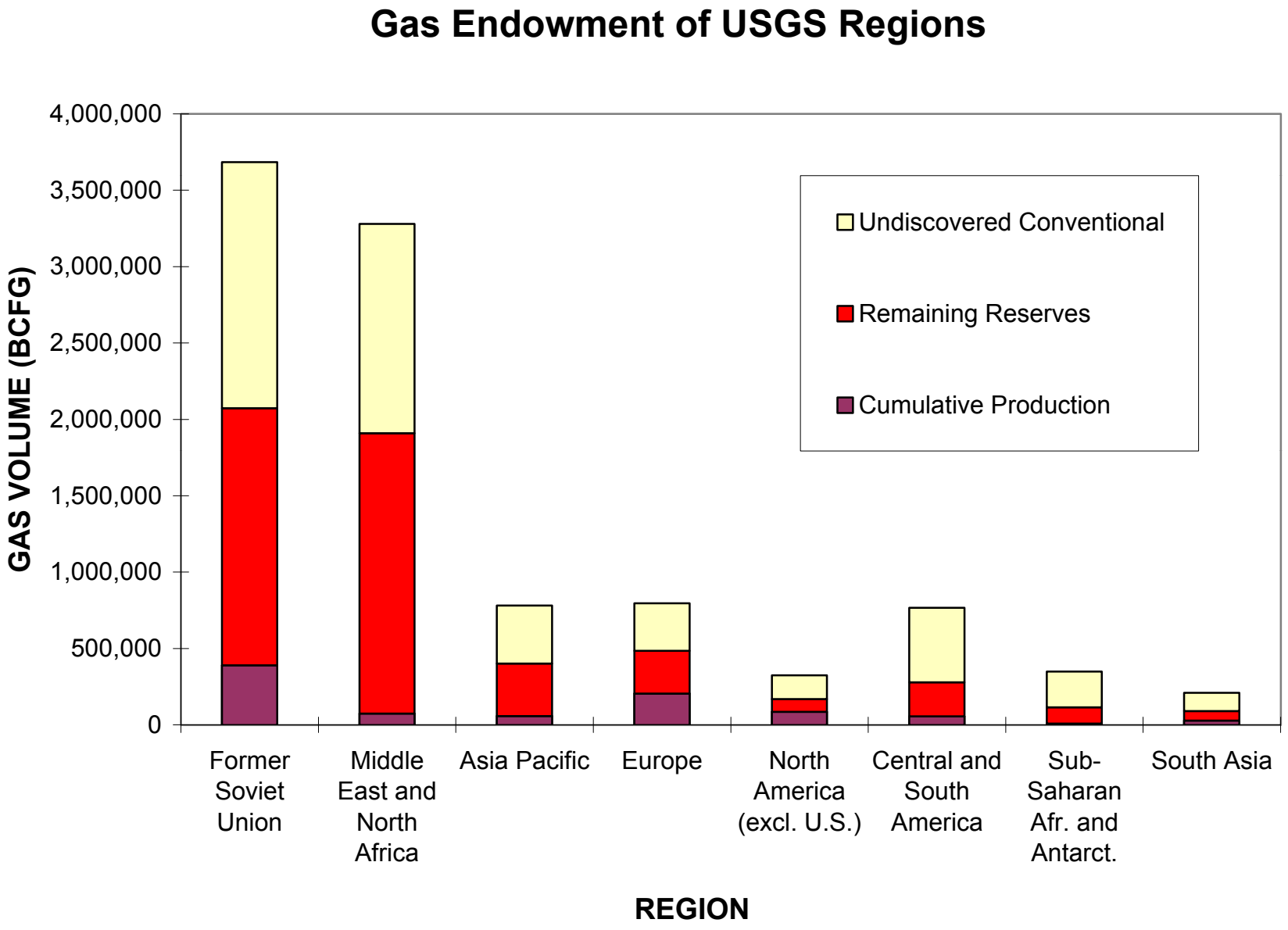

Figure AR-24. Gas endowment of the eight USGS regions of the world. BCFG, billion cubic feet of gas.

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World Potential Reserve Growth (excluding U.S.) Oil

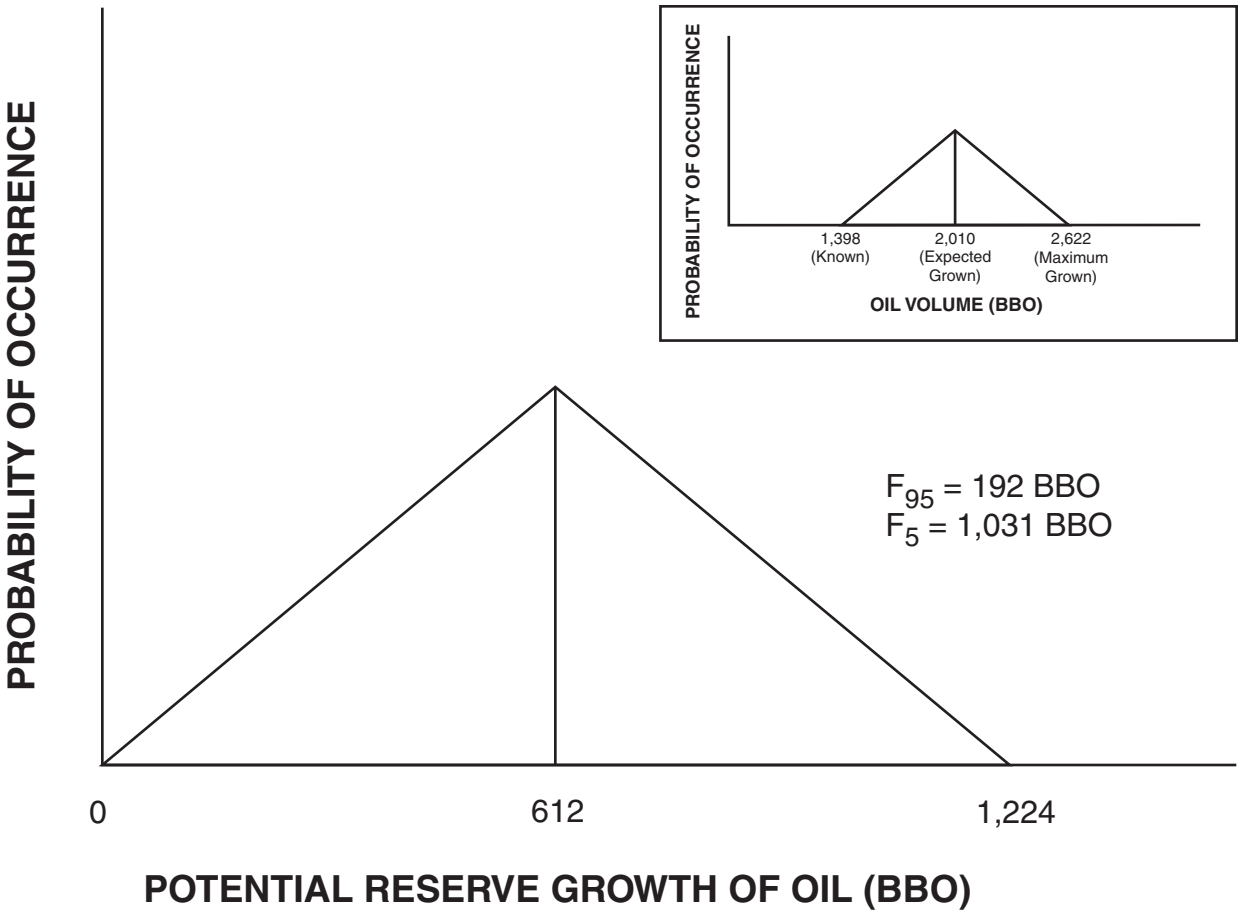

Figure AR-27. Forecast for world potential reserve growth of oil (exclusive of the U.S.), with uncertainty expressed in the form of a triangular probability distribution. Inset shows the potential increase in known oil volume predicted by the reserve-growth forecast. Fractiles other than F_{100}, F_{50}, and F_0 were calculated using Monte Carlo simulation with 50,000 trials and do not precisely match those calculated using probability theory. BBO, billion barrels of oil.

World Potential Reserve Growth (excluding U.S.) Gas

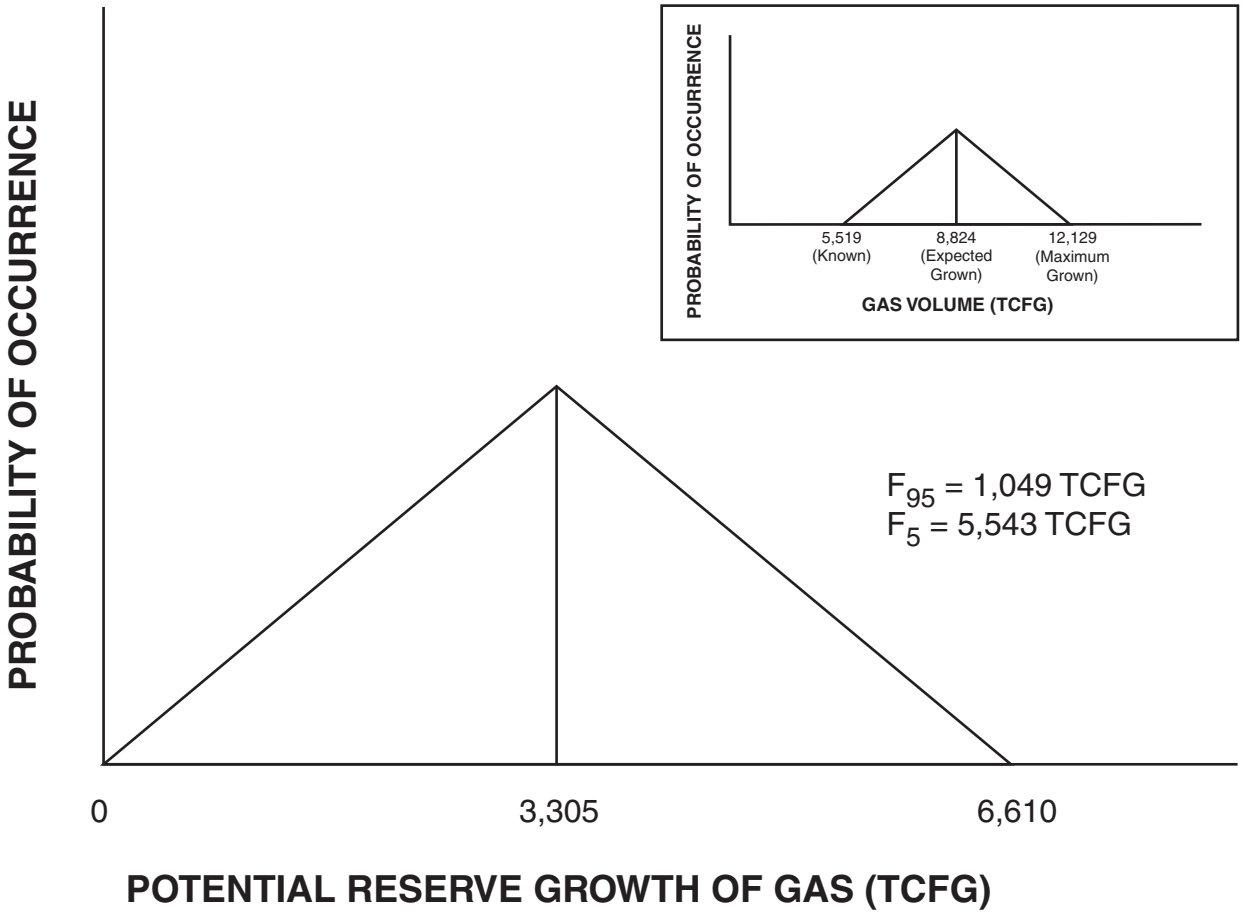

Figure AR-28. Forecast for world potential reserve growth of gas (exclusive of the U.S.), with uncertainty expressed in the form of a triangular probability distribution. Inset shows the potential increase in known gas volume predicted by the reserve-growth forecast. Fractiles other than F_{100}, F_{50}, and F_0 were calculated using Monte Carlo simulation with 50,000 trials and do not precisely match those calculated using probability theory. TCFG, trillion cubic feet of gas.

World Potential Reserve Growth (excluding U.S.) NGL

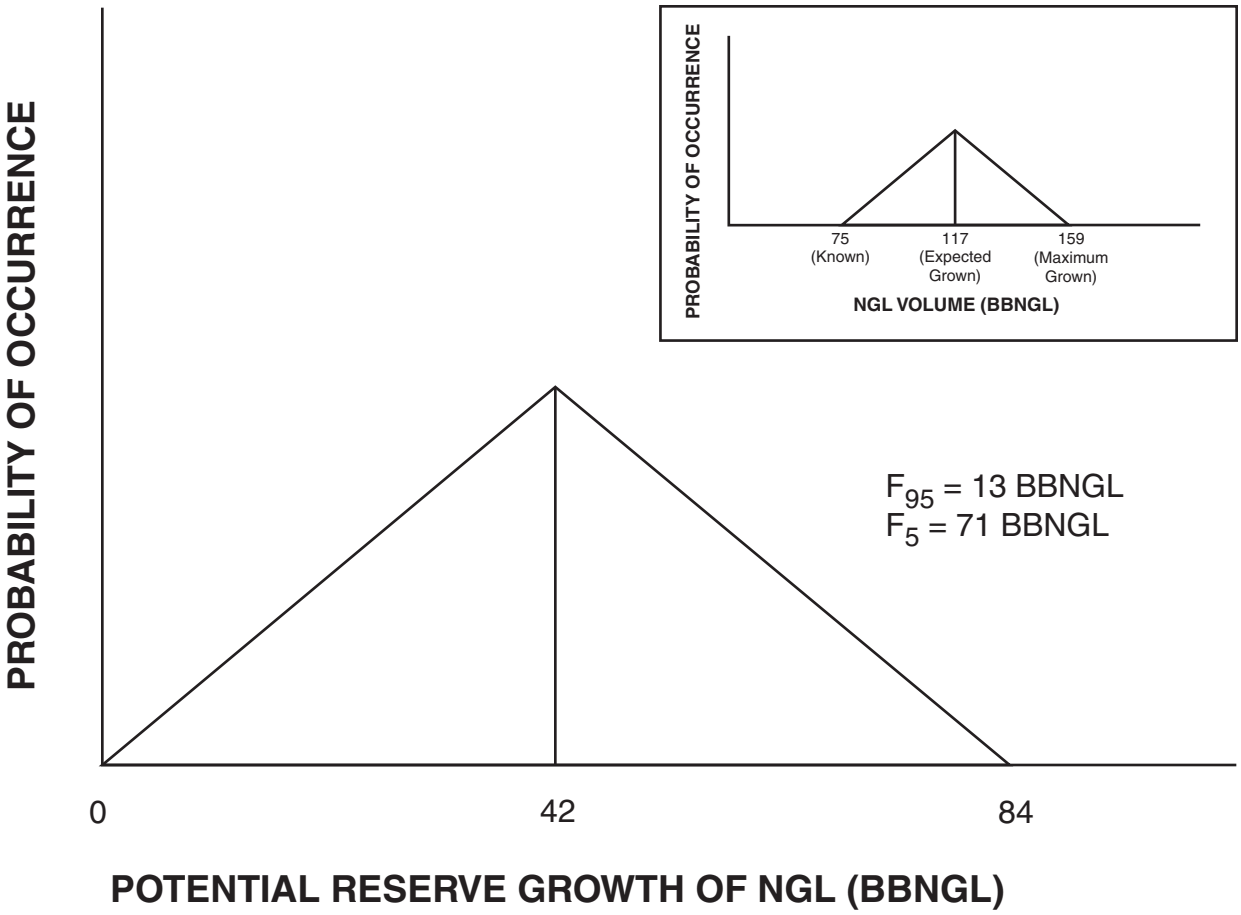

Figure AR-29. Forecast for world potential reserve growth of NGL (exclusive of the U.S.), with uncertainty expressed in the form of a triangular probability distribution. Inset shows the potential increase in known NGL volume predicted by the reserve-growth forecast. Fractiles other than F_{100}, F_{50}, and F_0 were calculated using Monte Carlo simulation with 50,000 trials and do not precisely match those calculated using probability theory. BBNGL, billion barrels of NGL.

Comparison of World Remaining Reserves, Reserve Growth, and Undiscovered Conventional Resources (Excluding the U.S.)

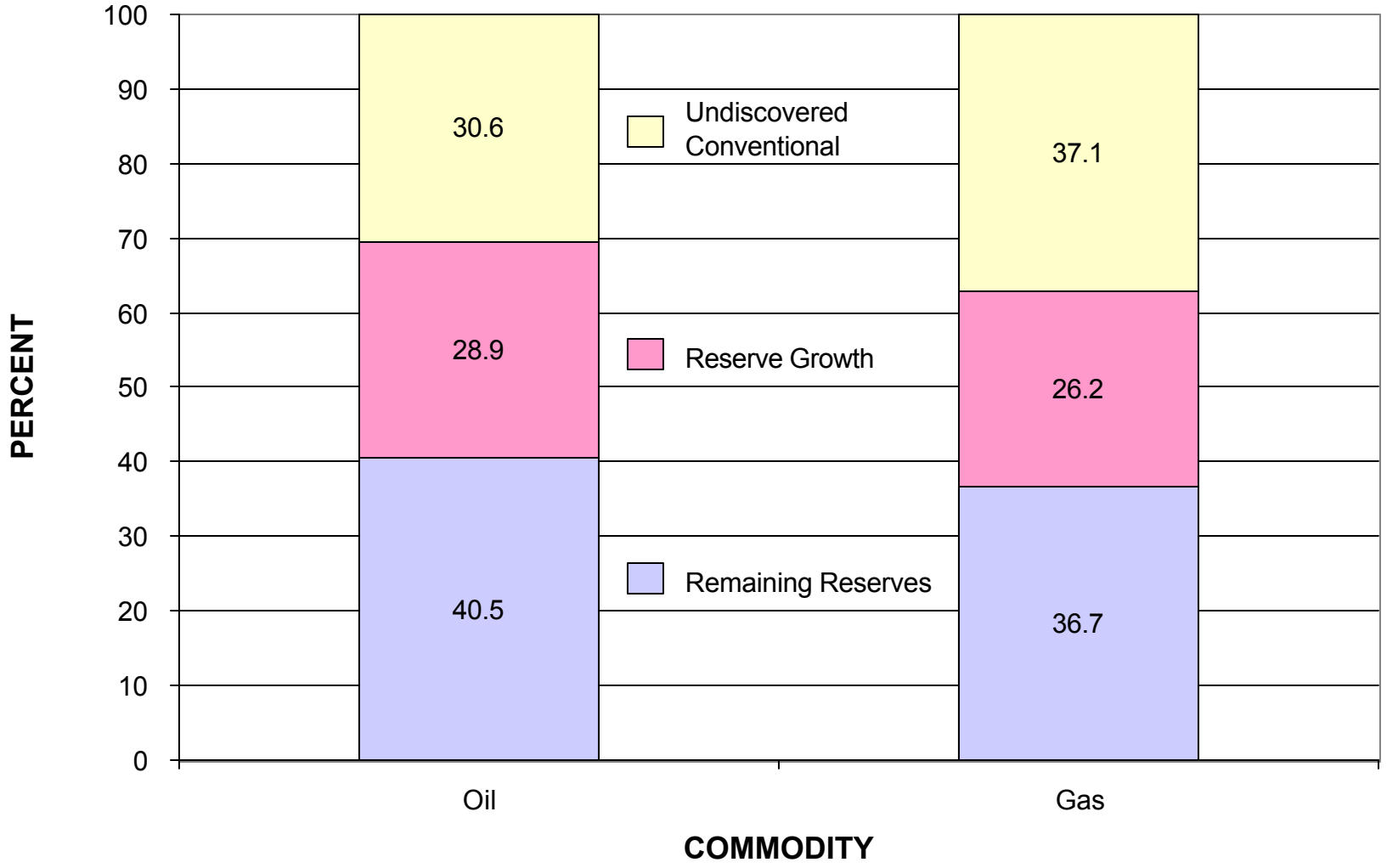

Figure AR-30. Comparison of world remaining reserves, estimated mean reserve growth, and estimated mean undiscovered conventional resources (excluding the U.S.).

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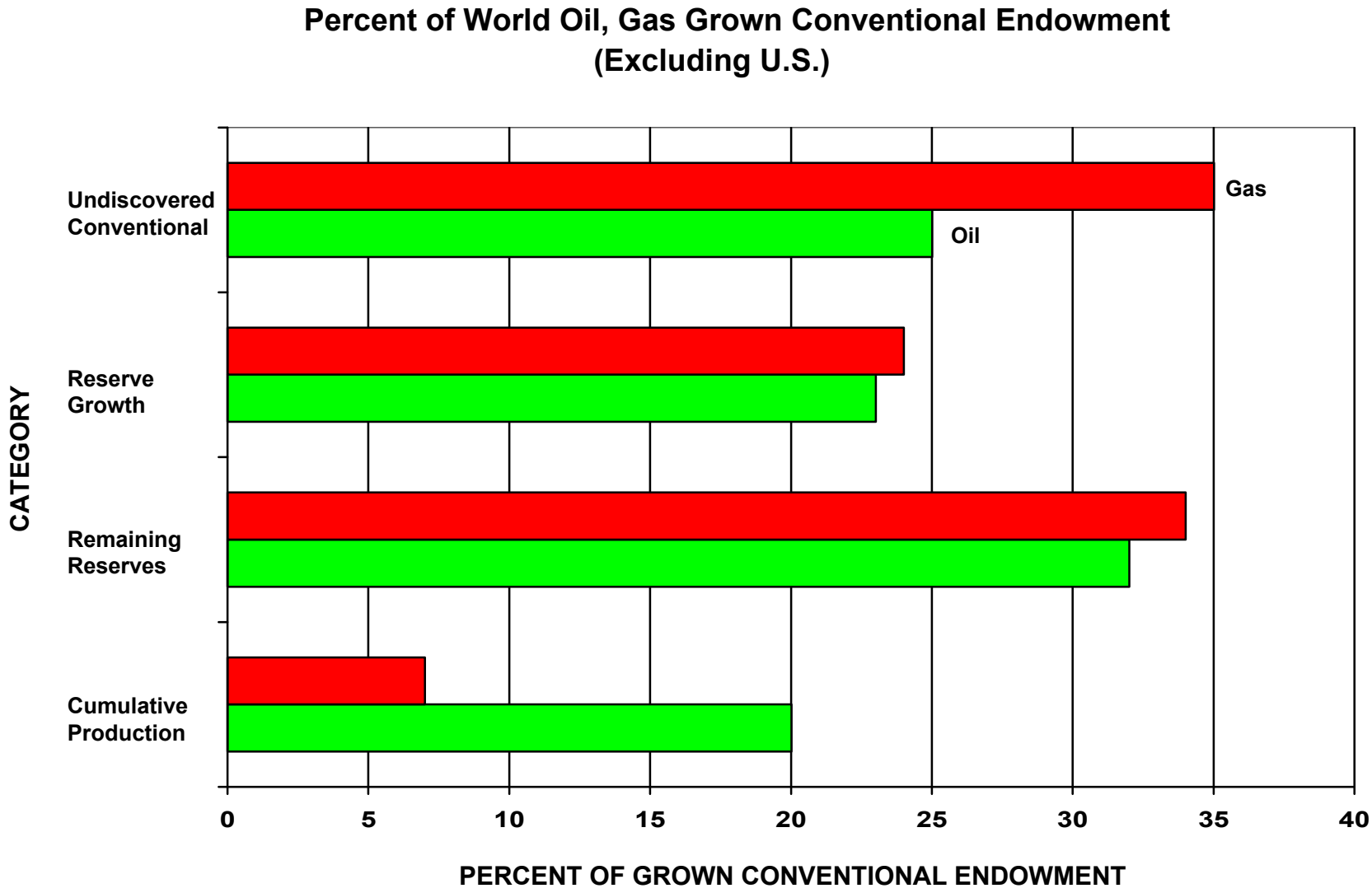

Figure AR-31. Percent of world grown conventional endowments of oil and gas (excluding the U.S.).

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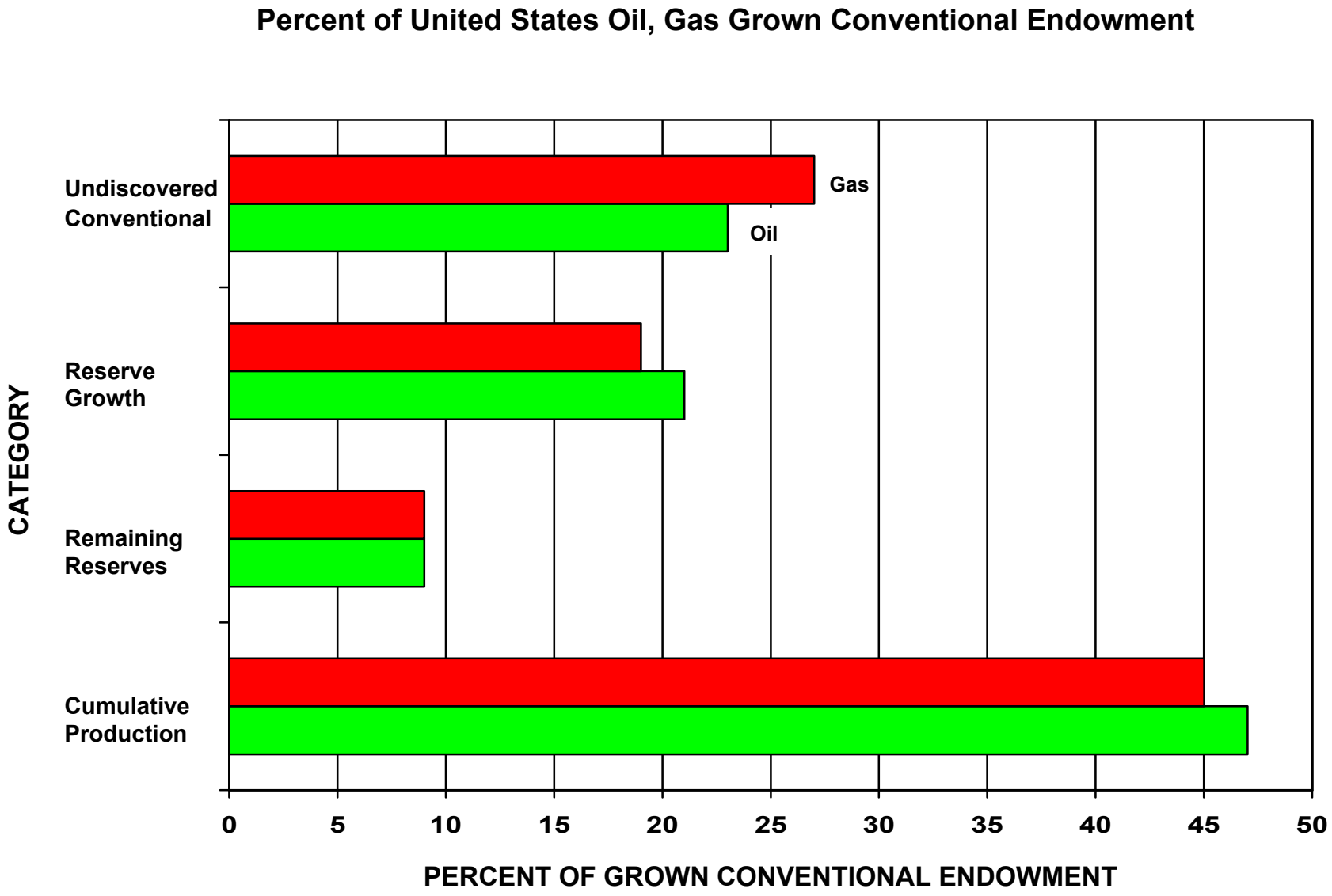

Figure AR-32. Percent of U.S. grown conventional endowments of oil and gas.

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Source Rock General Age of Assessment Units

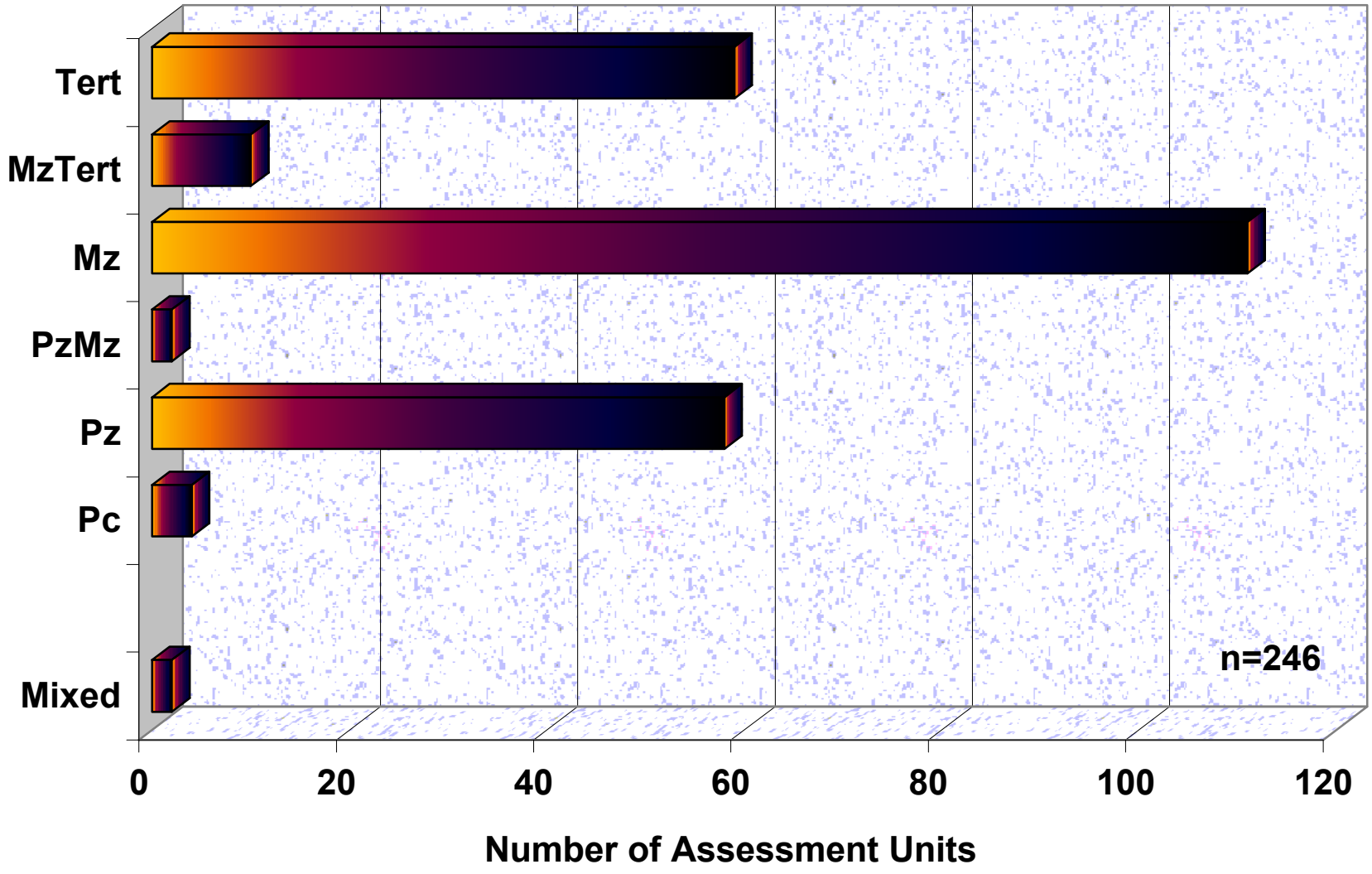

Figure AR-33. Numerical distribution of assessment units by age of source rock. Pc, PreCambrian; Pz, Paleozoic; PzMz, Paleozoic-Mesozoic; Mz, Mesozoic; MzTert, Mesozoic-Tertiary; Tert, Tertiary; Mixed, source rocks of multiple ages.

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Mean Petroleum Volumes by Source Rock General Age

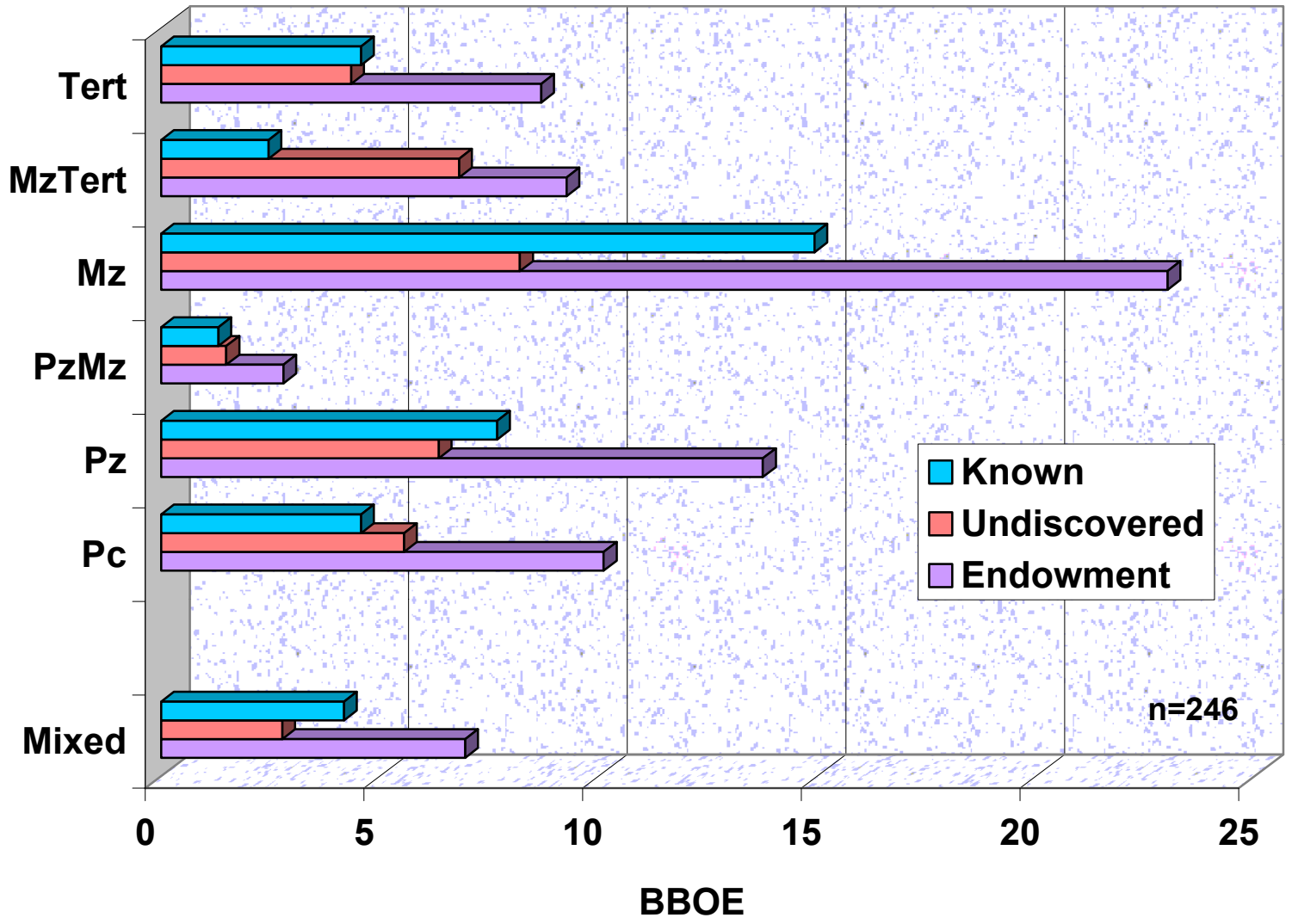

Figure AR-34. Distribution of mean petroleum volumes of assessment units by age of source rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. Pc, PreCambrian; Pz, Paleozoic; PzMz, Paleozoic-Mesozoic; Mz, Mesozoic; MzTert, Mesozoic-Tertiary; Tert, Tertiary; Mixed, source rocks of mixed ages. BBOE, billion barrels of oil equivalent.

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Source Rock Specific Age of Assessment Units

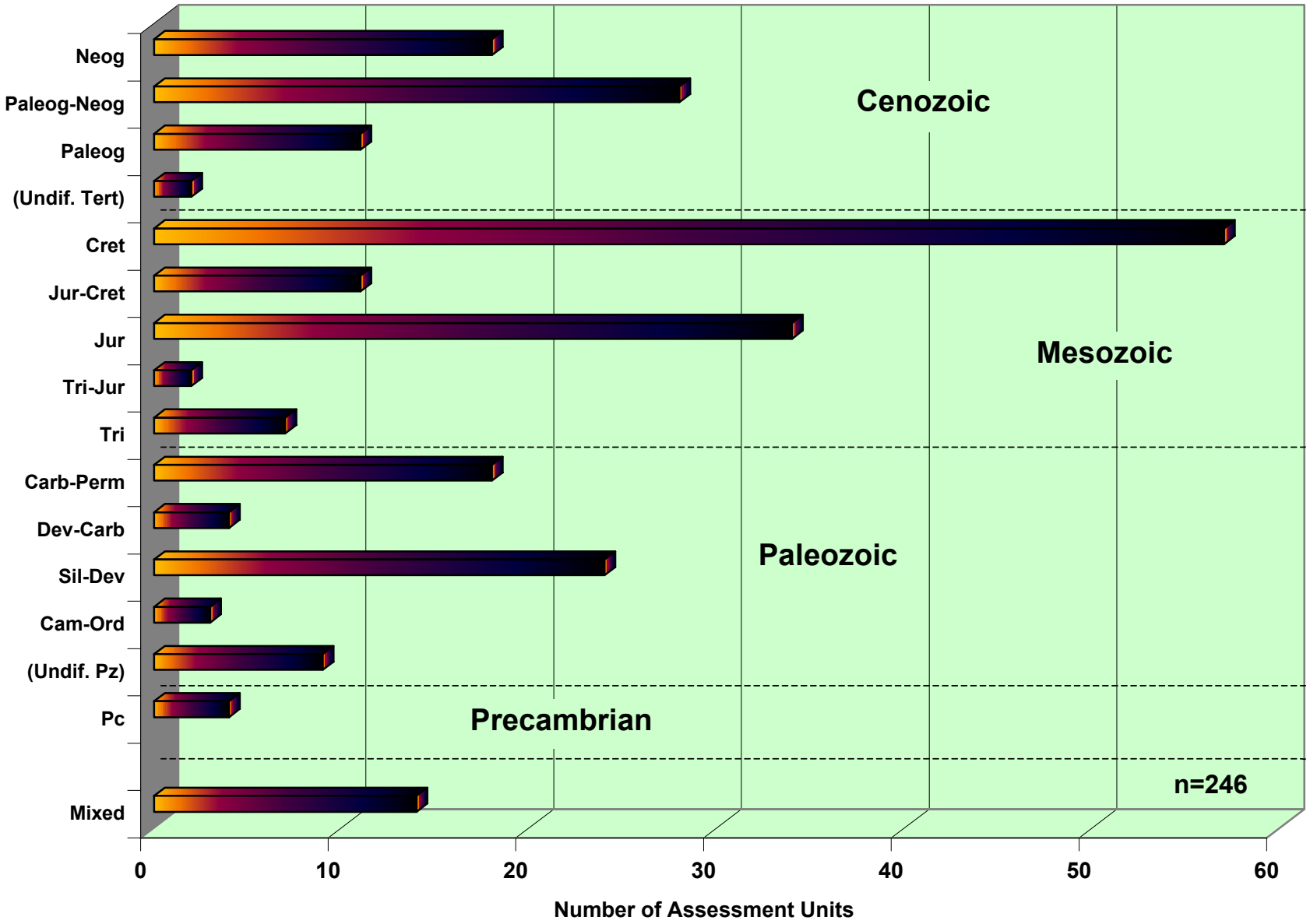

Figure AR-39. Numerical distribution of assessment units by specific geologic age of source rock. Pc, PreCambrian; Undif Pz, Undifferentiated Paleozoic; Cam-Ord, Cambrian-Ordovician; Sil-Dev, Silurian-Devonian; Dev-Carb, Devonian-Carboniferous; Carb-Perm, Carboniferous-Permian; Tri, Triassic; Tri-J, Triassic-Jurassic; Jur, Jurassic; J-K, Jurassic-Cretaceous; Cret, Cretaceous; Undif Tert, Undifferentiated Tertiary; Paleog, Paleogene; PgNg, Paleogene-Neogene; Neog, Neogene; Mixed, source rocks of multiple ages.

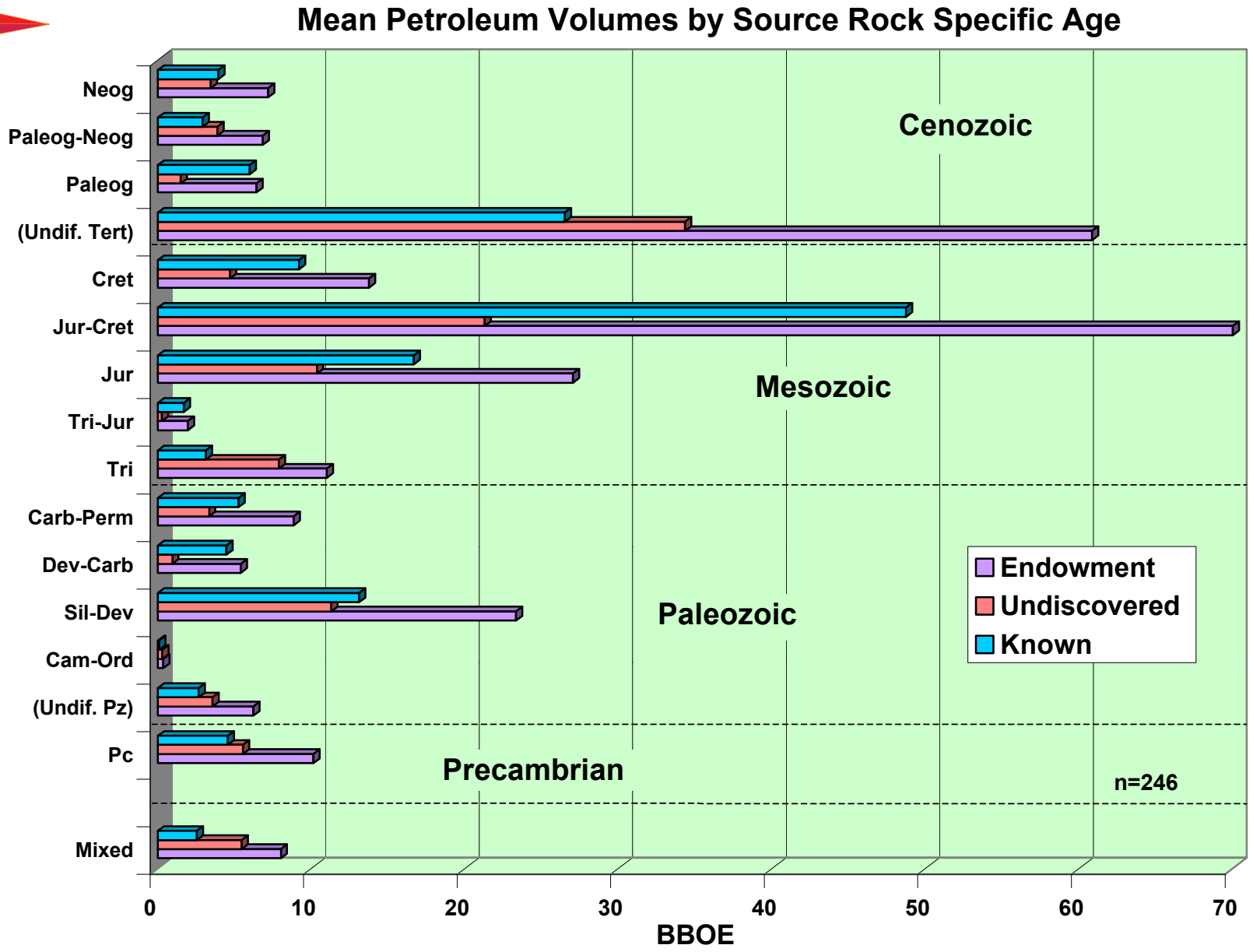

Figure AR-40. Distribution of mean petroleum volumes of assessment units by specific age of source rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. Pc, PreCambrian; Undif Pz, Undifferentiated Paleozoic; Cam-Ord, Cambrian-Ordovician; Sil-Dev, Silurian-Devonian; Dev-Carb, Devonian-Carboniferous; Carb-Perm, Carboniferous-Permian; Tri, Triassic; Tri-J, Triassic-Jurassic; Jur, Jurassic; J-K, Jurassic-Cretaceous; Cret, Cretaceous; Undif Tert, UndifferentiatedTertiary; Paleog, Paleogene; PgNg, Paleogene-Neogene; Neog, Neogene; Mixed, source rocks of multiple ages. BBOE, billion barrels of oil equivalent.

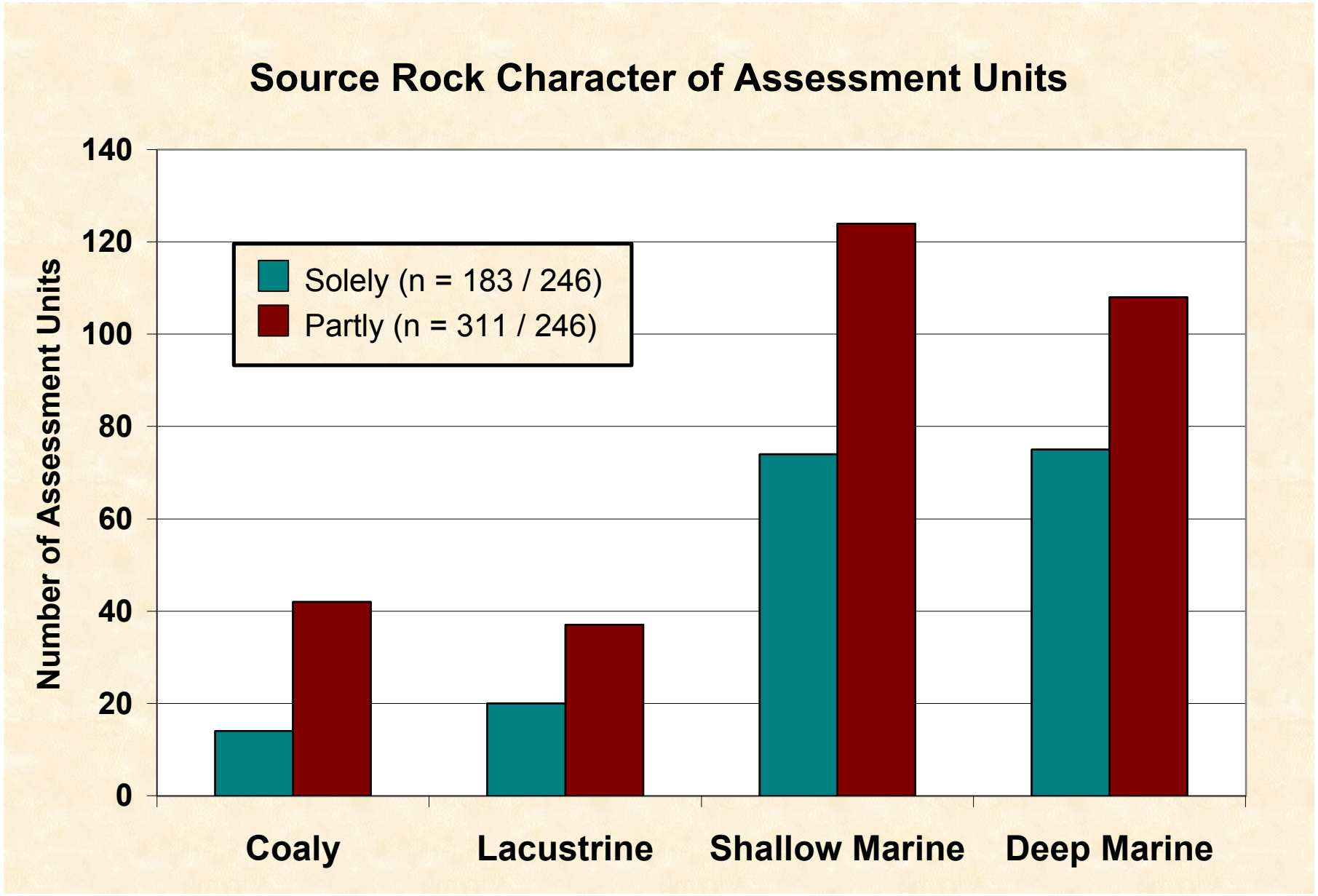

Figure AR-41. Numerical distribution of assessment units by character of source rock. The four categories are coaly, lacustrine, shallow marine, and deep marine as defined for each assessment unit by the assessors.

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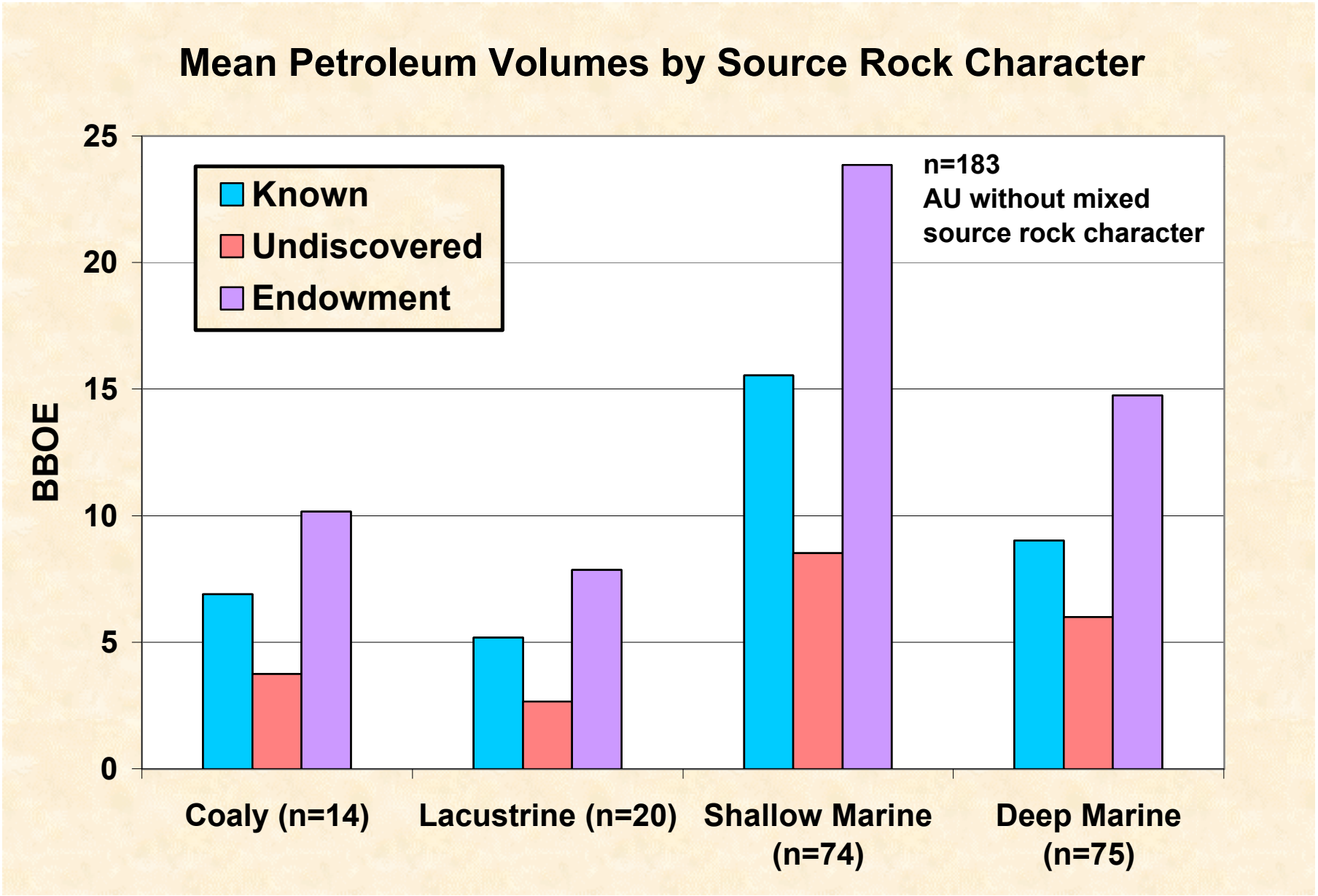

Figure AR-42. Distribution of mean petroleum volumes of assessment units by character of source rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. The four categories are coaly, lacustrine, shallow marine, and deep marine as defined for each assessment unit by the assessors. BBOE, billion barrels of oil equivalent.

Peak Maturation Age of Assessment Units

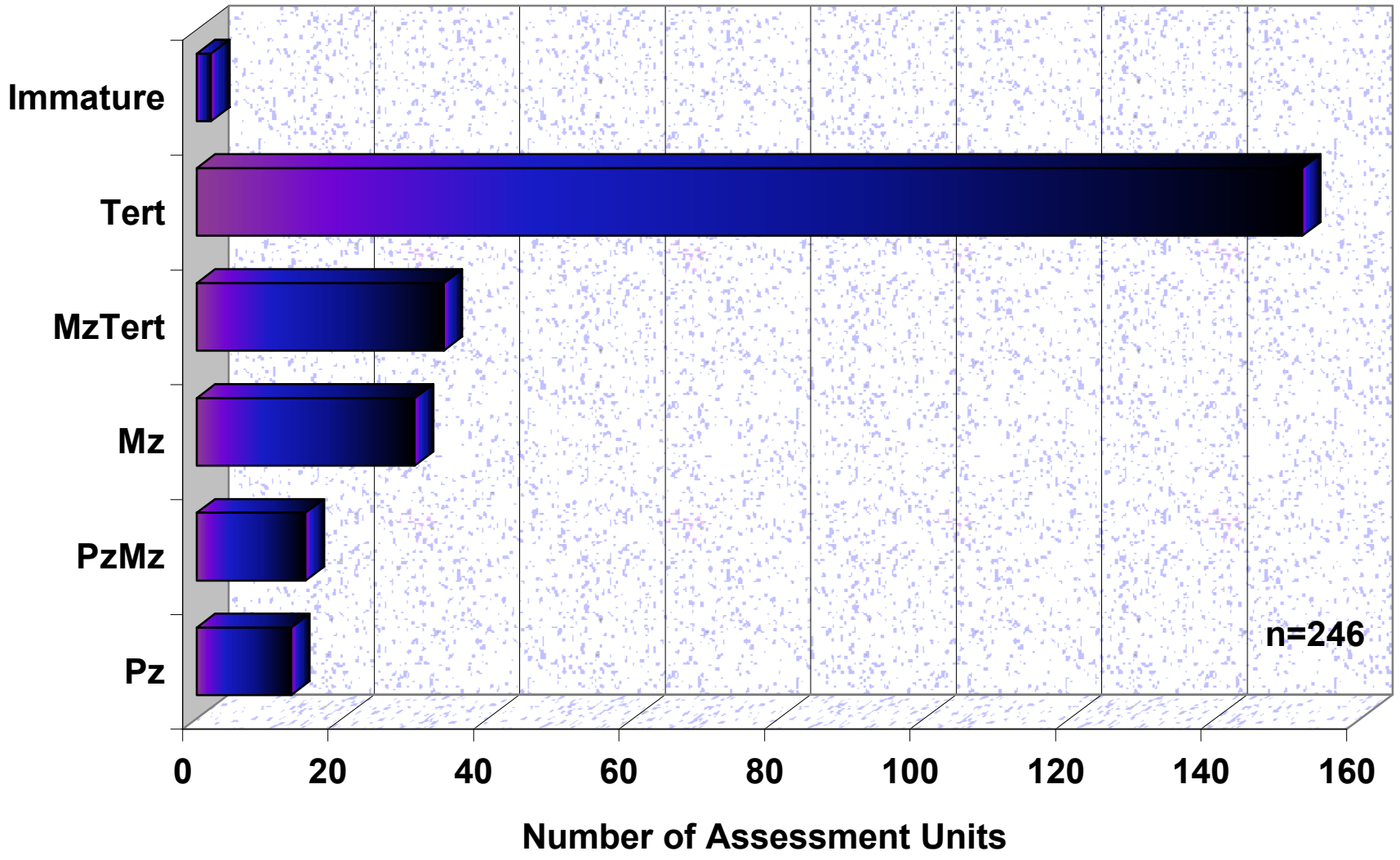

Figure AR-47. Numerical distribution of assessment units by age at which peak maturation occurred. Pc, PreCambrian; Pz, Paleozoic; PzMz, Paleozoic-Mesozoic; Mz, Mesozoic; MzTert, Mesozoic-Tertiary; Tert, Tertiary; Immature, assessment unit in which source rock is immature.

Mean Petroleum Volumes by Peak Maturation Age

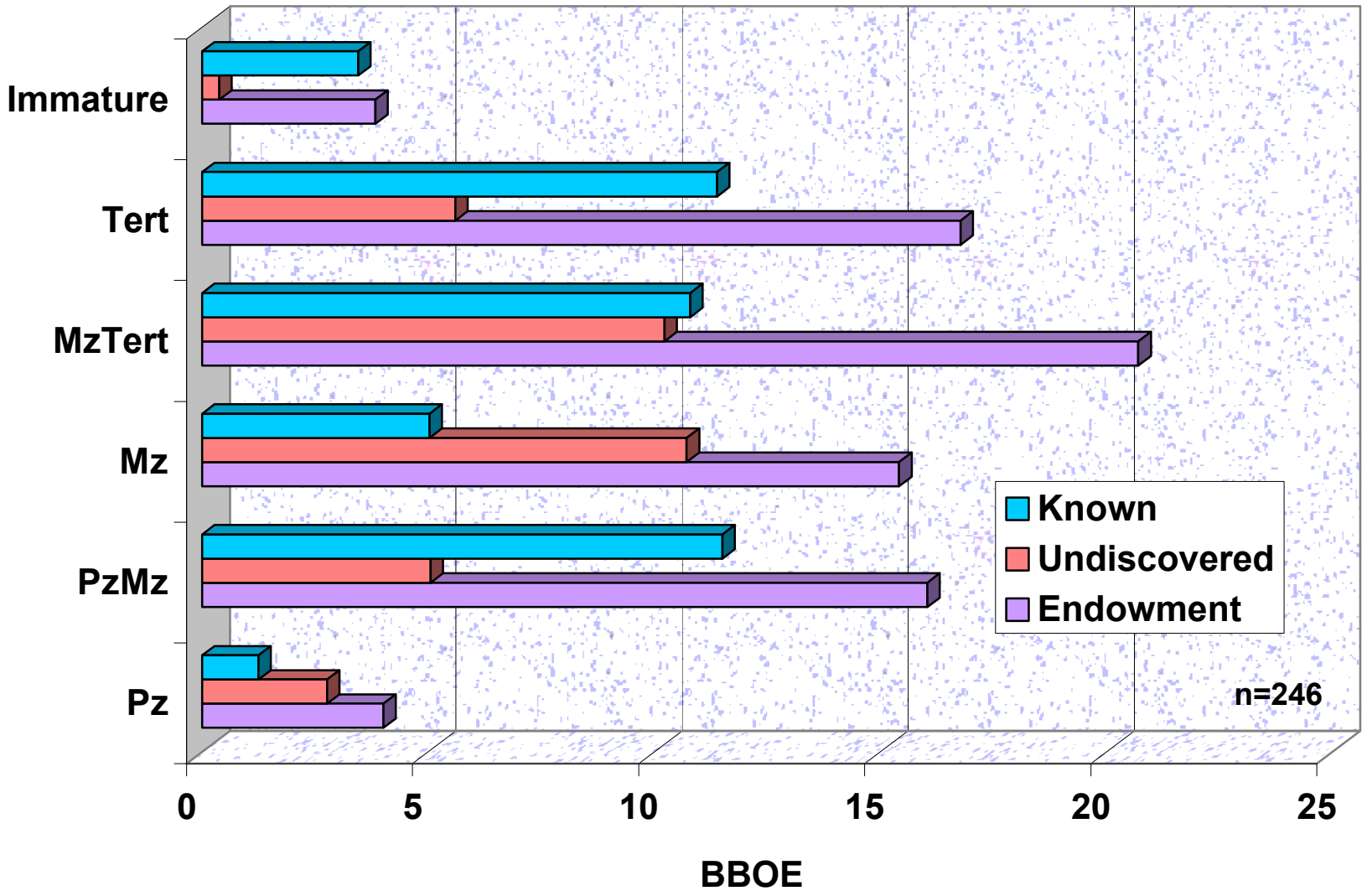

Figure AR-48. Distribution of total petroleum volumes of assessment units by age at which peak maturation occurred. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. Pc, PreCambrian; Pz, Paleozoic; PzMz, Paleozoic-Mesozoic; Mz, Mesozoic; MzTert, Mesozoic-Tertiary; Tert, Tertiary; Immature, assessment unit in which source rock is immature. BBOE, billion barrels of oil equivalent.

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Reservoir Rock General Age of Assessment Units

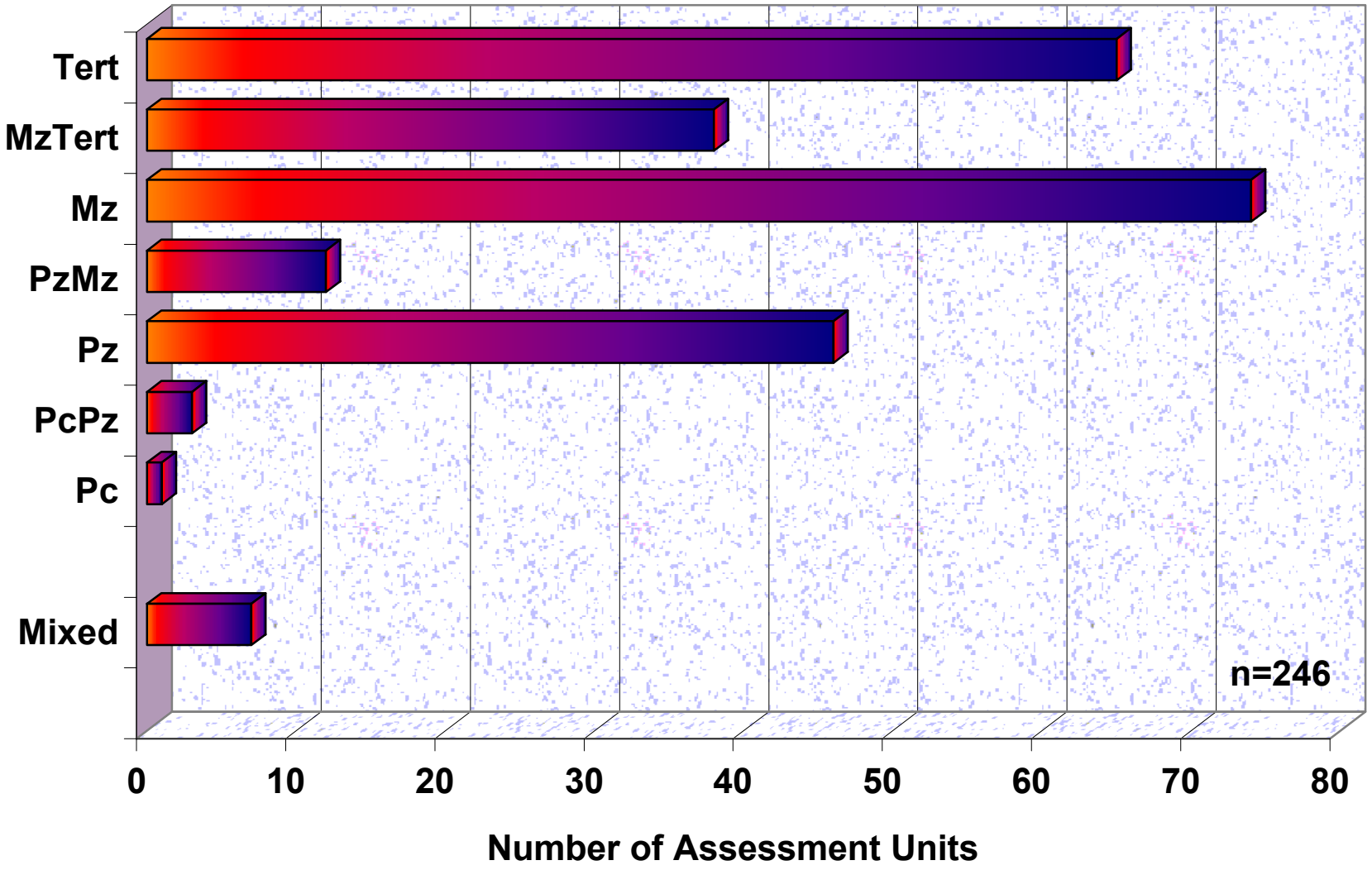

Figure AR-52. Numerical distribution of assessment units by age of reservoir rock. Pc, PreCambrian; PcPz, PreCambrian-Paleozoic; Pz, Paleozoic; PzMz, Paleozoic-Mesozoic; Mz, Mesozoic; MzTert, Mesozoic-Tertiary; Tert, Tertiary; Mixed, reservoir rocks of multiple ages.

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Mean Petroleum Volumes by Reservoir Rock General Age

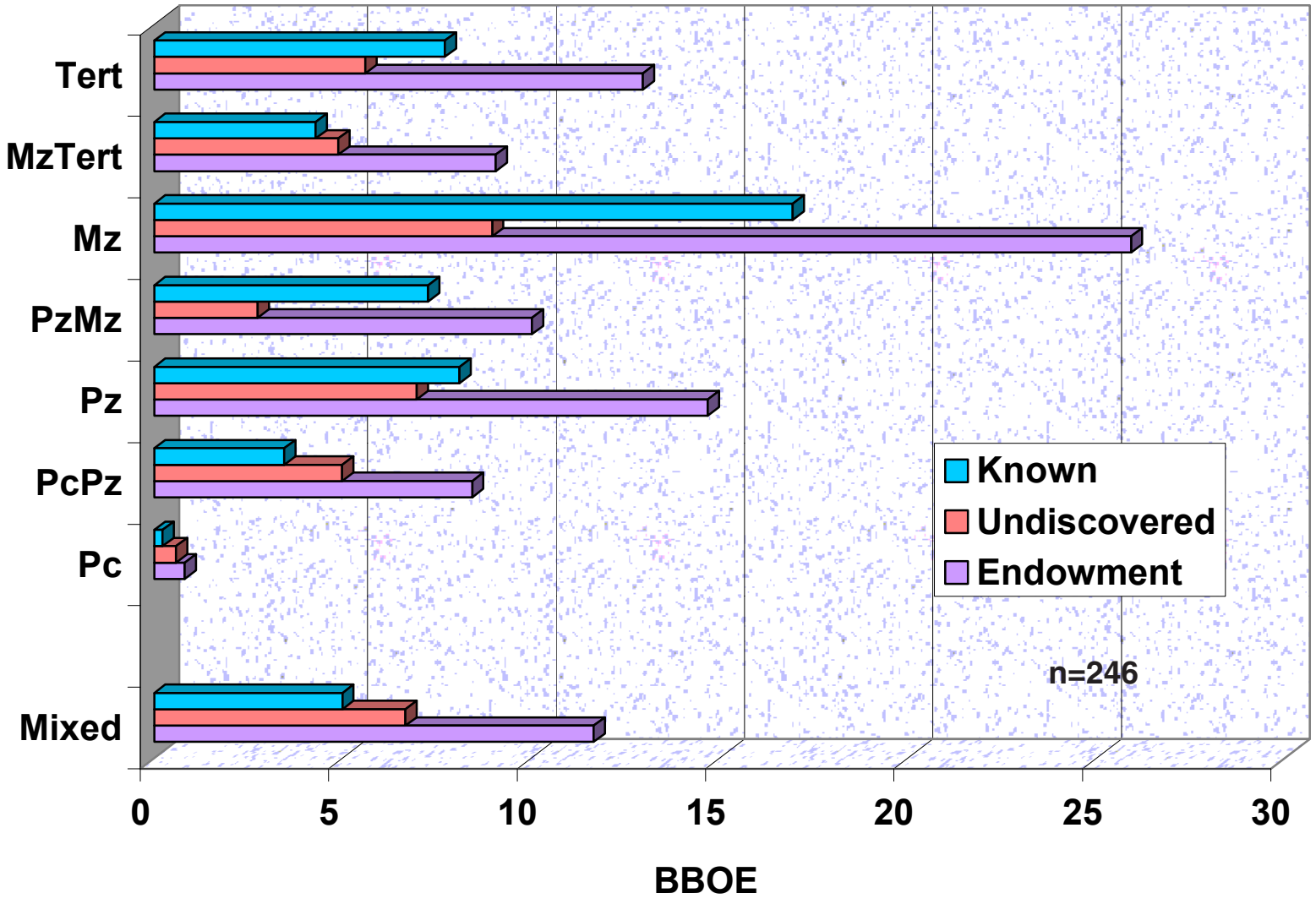

Figure AR-53. Distribution of mean petroleum volumes of assessment units by age of reservoir rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. Pc, PreCambrian; PcPz, PreCambrian-Paleozoic; Pz, Paleozoic; PzMz, Paleozoic-Mesozoic; Mz, Mesozoic; MzTert, Mesozoic-Tertiary; Tert, Tertiary; Mixed, reservoir rocks of multiple ages. BBOE, billion barrels of oil equivalent.

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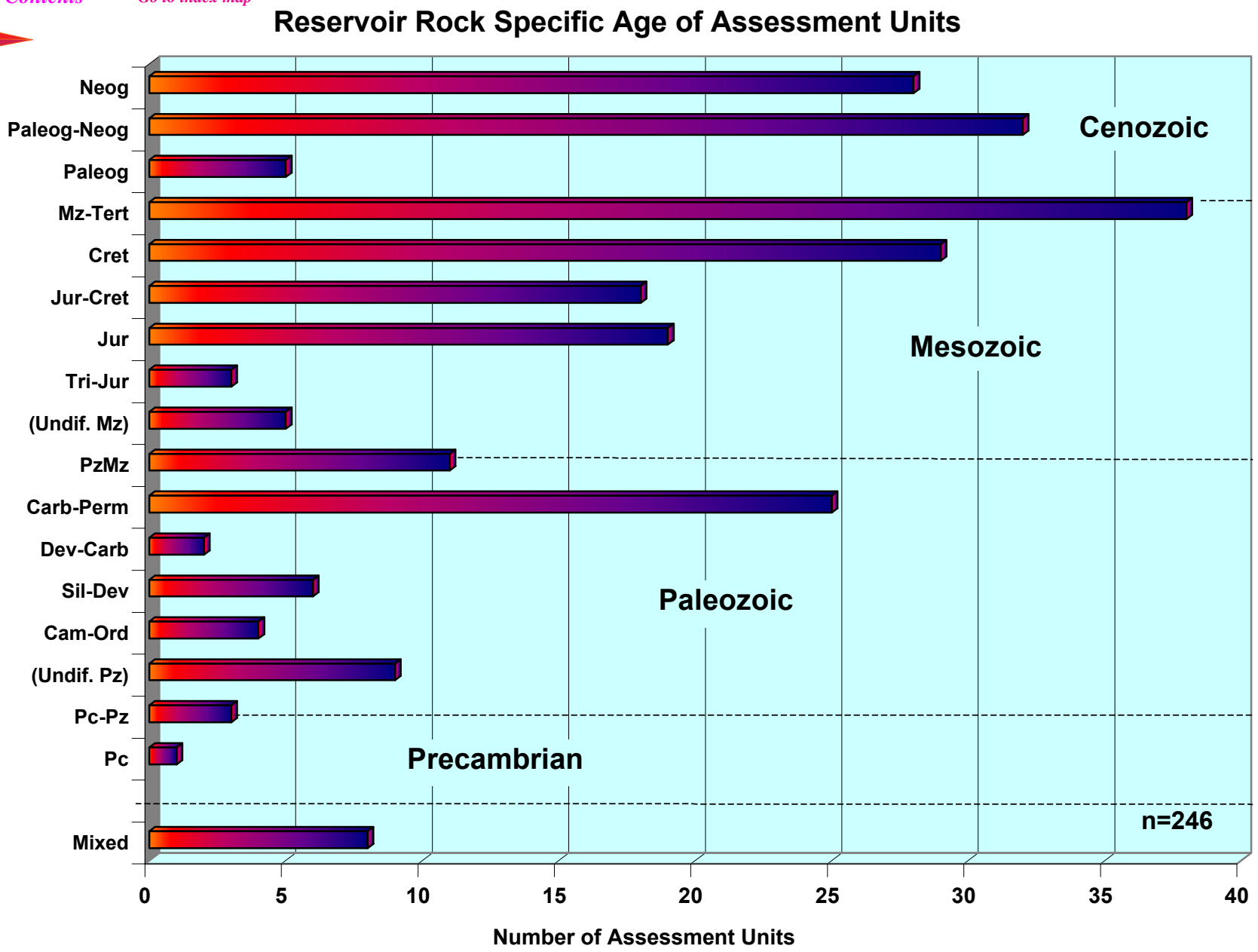

Figure AR-58. Numerical distribution of assessment units by specific age of reservoir rock. Pc, PreCambrian; Undif Pz, Undifferentiated Paleozoic; Cam-Ord, Cambrian-Ordovician; Sil-Dev, Silurian-Devonian; Dev-Carb, Devonian-Carboniferous; Carb-Perm, Carboniferous-Permian; Tri, Triassic; Tri-J, Triassic-Jurassic; Jur, Jurassic; J-K, Jurassic-Cretaceous; Cret, Cretaceous; Undif Tert, Undifferentiated Tertiary; Paleog, Paleogene; PgNg, Paleogene-Neogene; Neog- Neogene; Mixed, reservoir rocks of multiple ages.

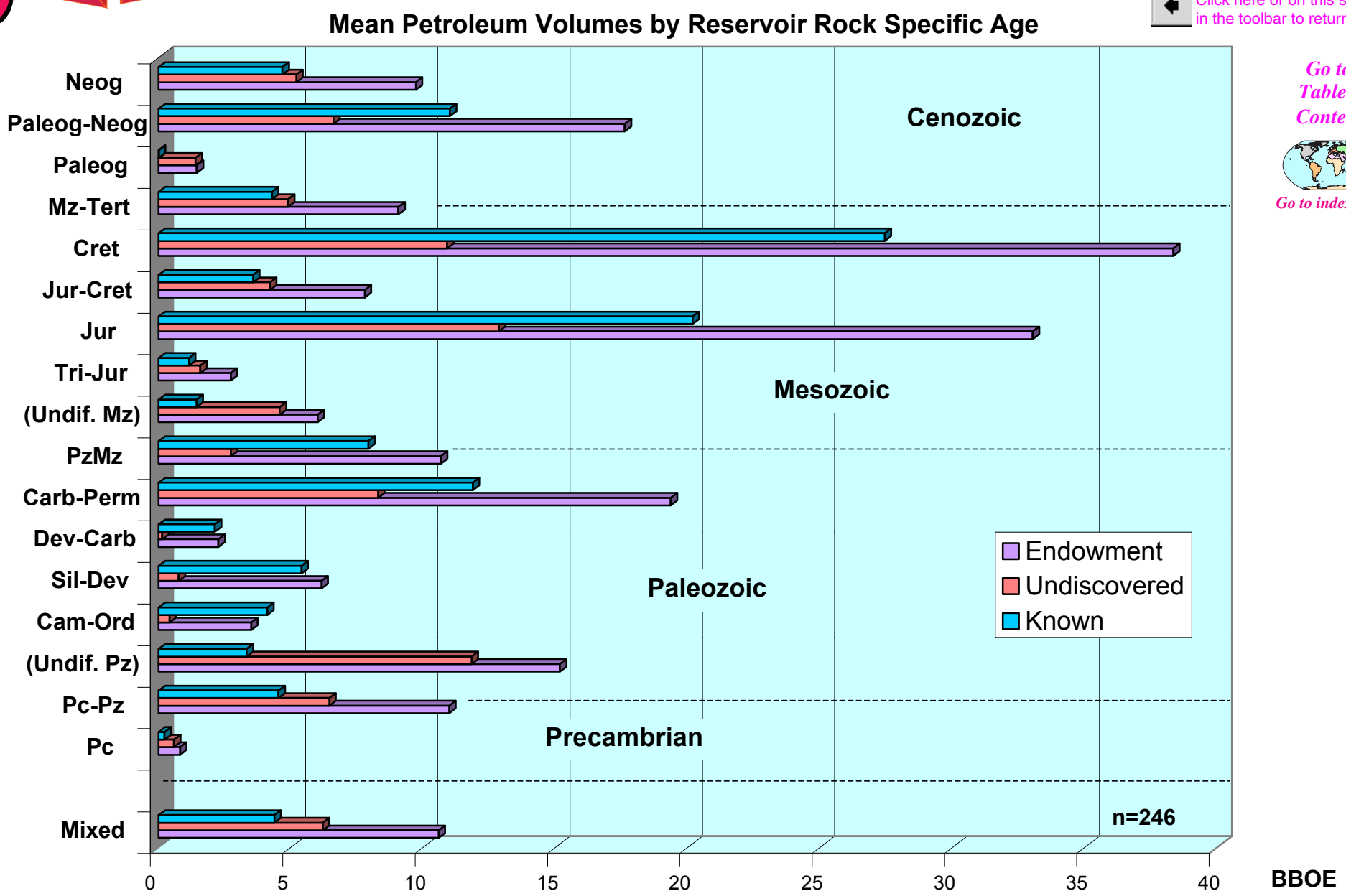

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Figure AR-59. Distribution of mean petroleum volumes of assessment units by age of source rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. Pc, PreCambrian; Undif Pz, Undifferentiated Paleozoic; Cam-Ord, Cambrian-Ordovician; Sil-Dev, Silurian-Devonian; Dev-Carb, Devonian-Carboniferous; Carb-Perm, Carboniferous-Permian; Tri, Triassic; Tri-J, Triassic-Jurassic; Jur, Jurassic; J-K, Jurassic-Cretaceous; Cret, Cretaceous; Undif Tert, Undifferentiated Tertiary; Paleog, Paleogene; PgNg, Paleogene-Neogene; Neog, Neogene; Mixed, reservoir rocks of multiple ages. BBOE, billion barrels of oil equivalent.

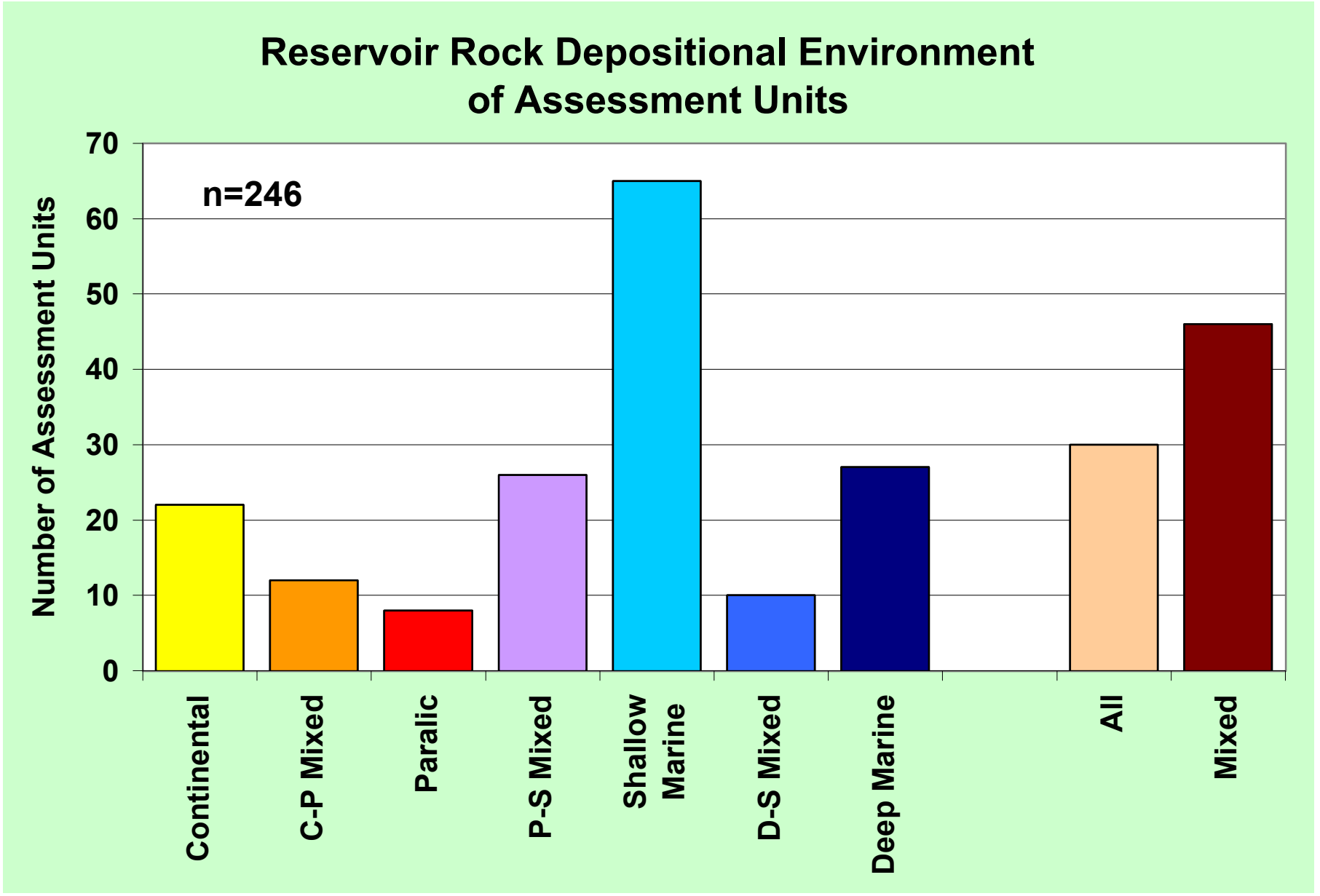

Figure AR-60. Numerical distribution of assessment units by depositional environment of reservoir rock. C-P, continental and paralic mixed; P-S, paralic and shallow marine mixed; All, all depositional environments represented; Mixed, multiple depositional environments, but not necessarily all.

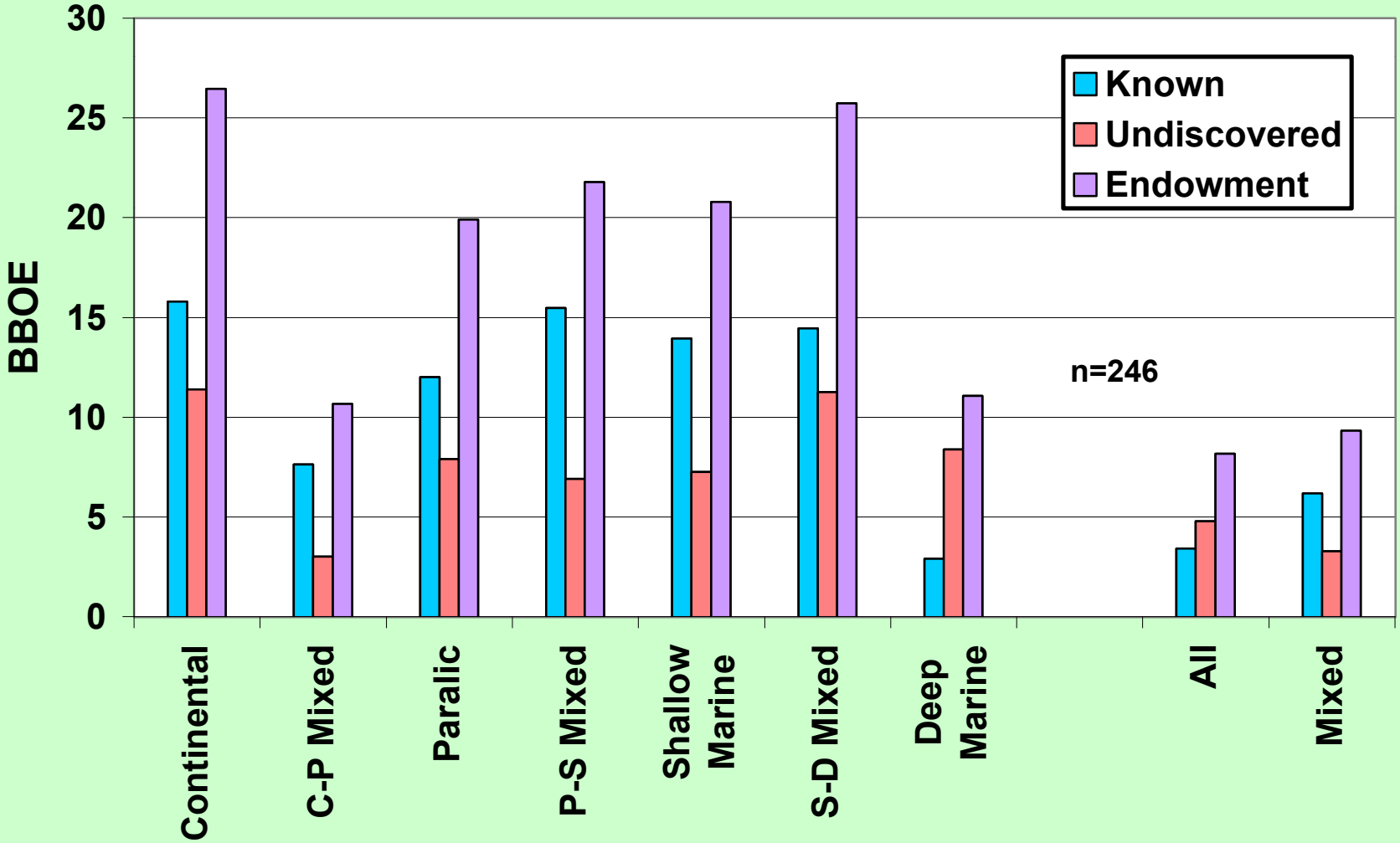

Figure AR-61. Distribution of mean petroleum volumes of assessment units by depositional environment of reservoir rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. C-P, continental and paralic mixed; P-S, paralic and shallow marine mixed; All, all depositional environments represented; Mixed, multiple depositional environments, but not necessarily all. BBOE, billion barrels of oil equivalent.

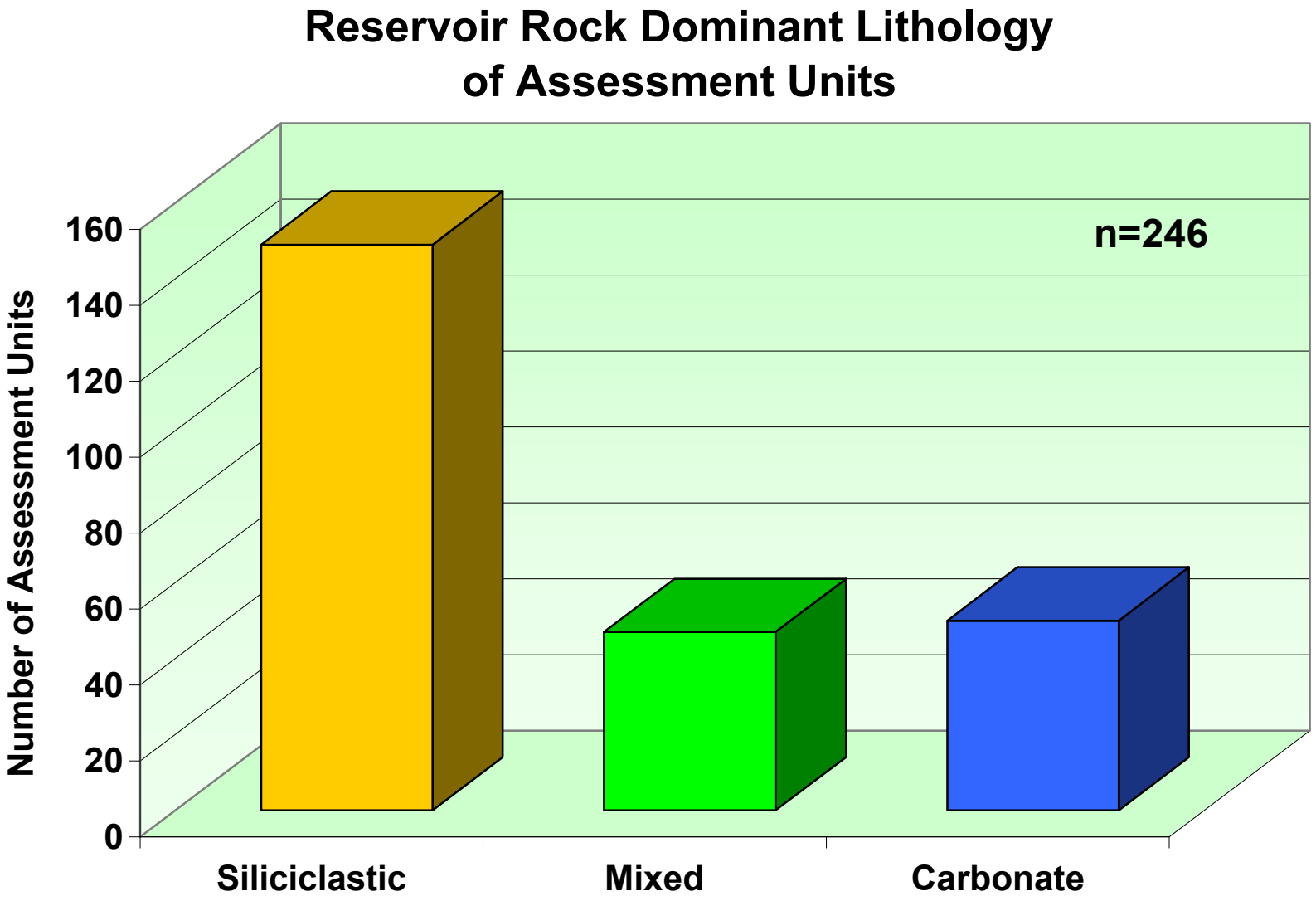

Figure AR-66. Numerical distribution of assessment units by lithology of reservoir rock.

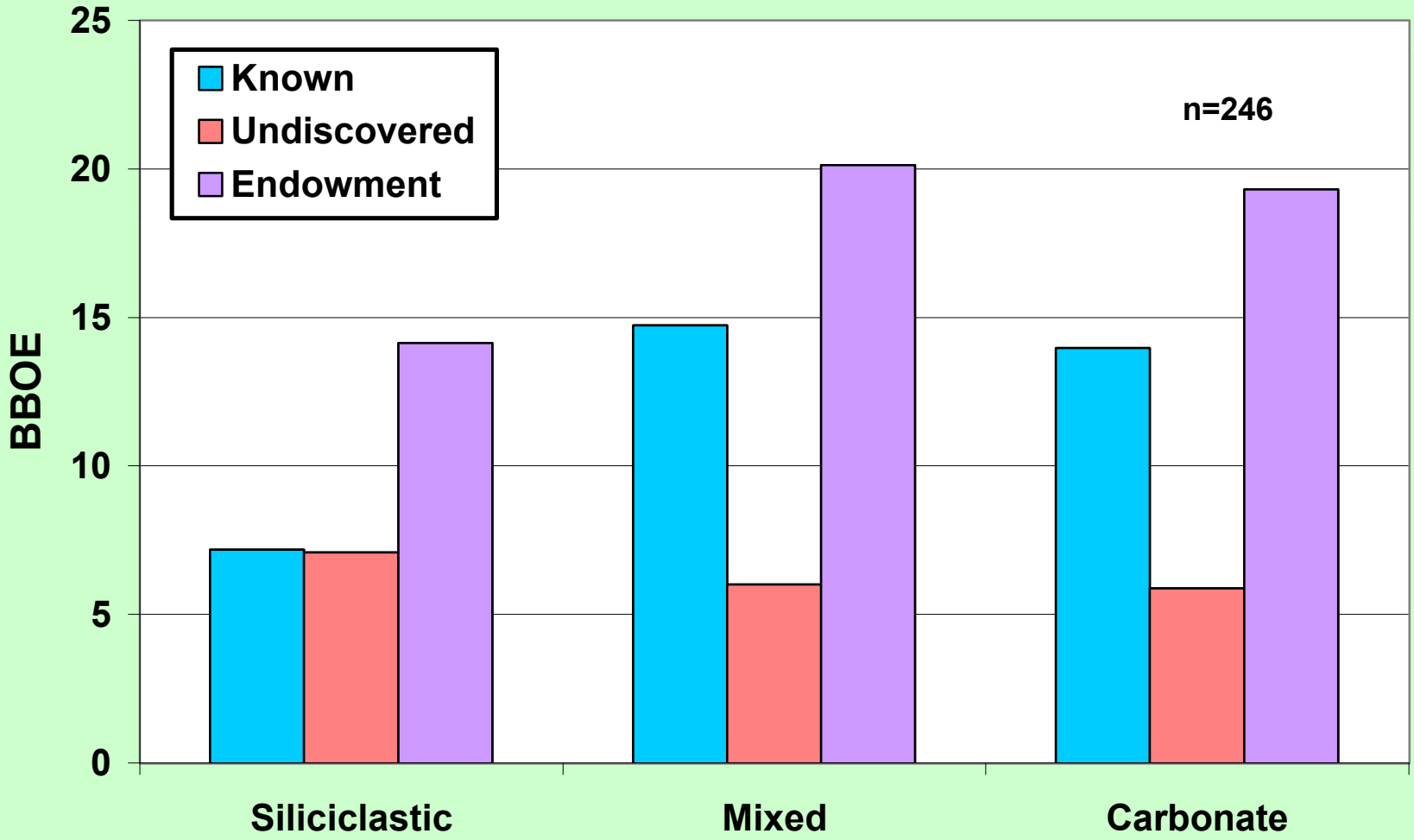

Figure AR-67. Distribution of mean petroleum volumes of assessment units by lithology of reservoir rock. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. BBOE, billion barrels of oil equivalent.

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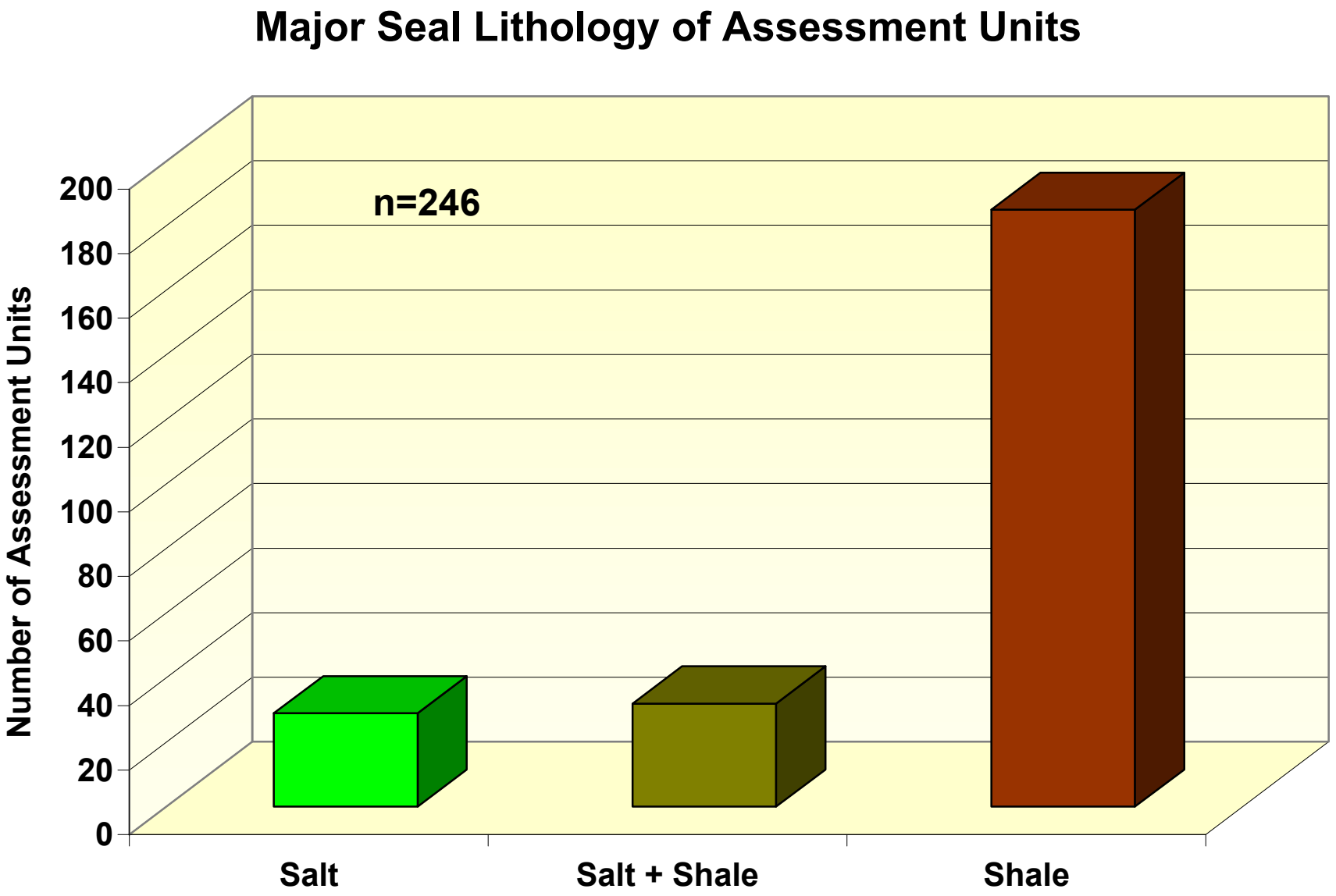

Figure AR-71. Numerical distribution of assessment units by lithology of major seal.

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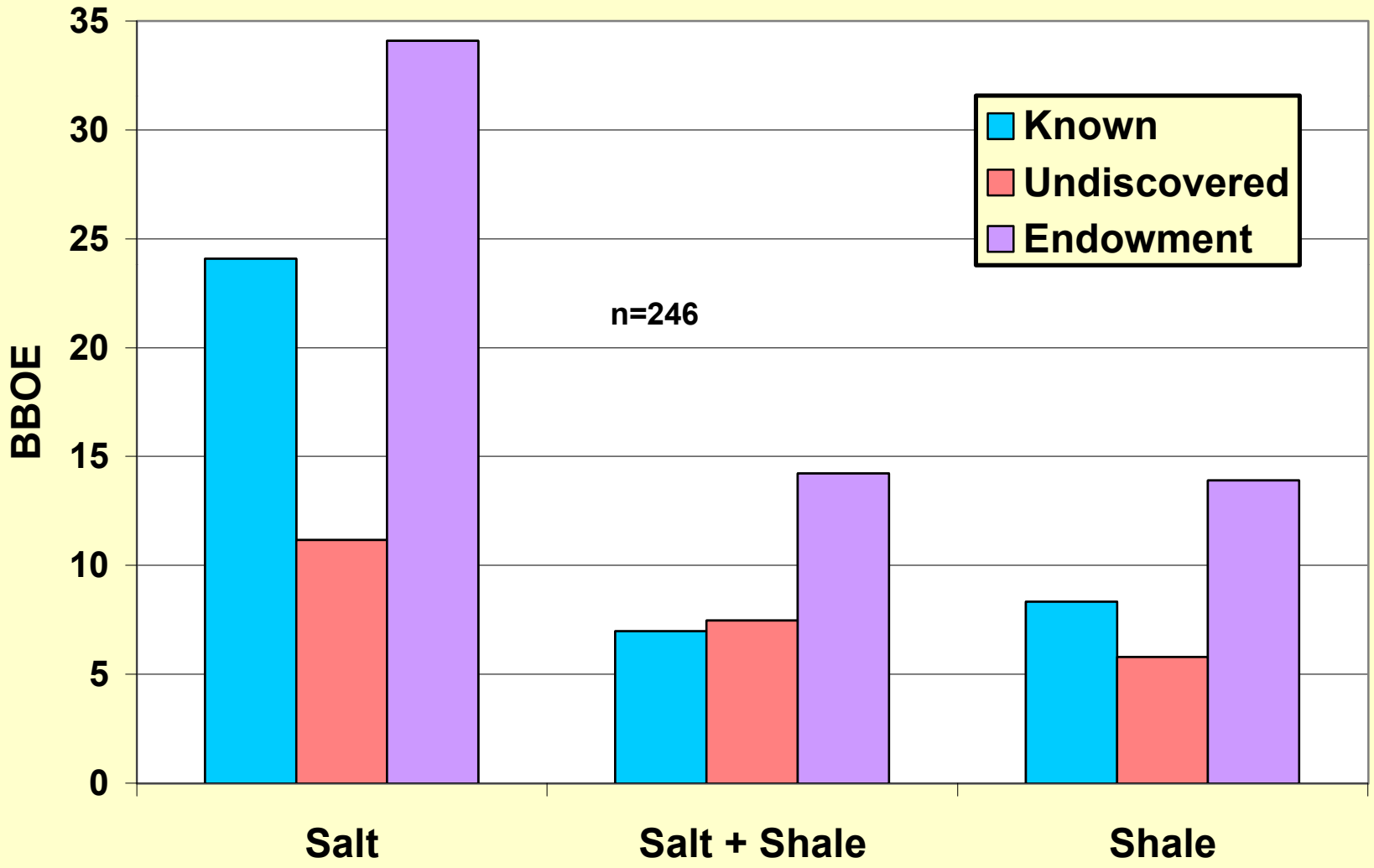

Figure AR-72. Distribution of mean petroleum volumes of assessment units by lithology of major seal. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. BBOE, billion barrels of oil equivalent.

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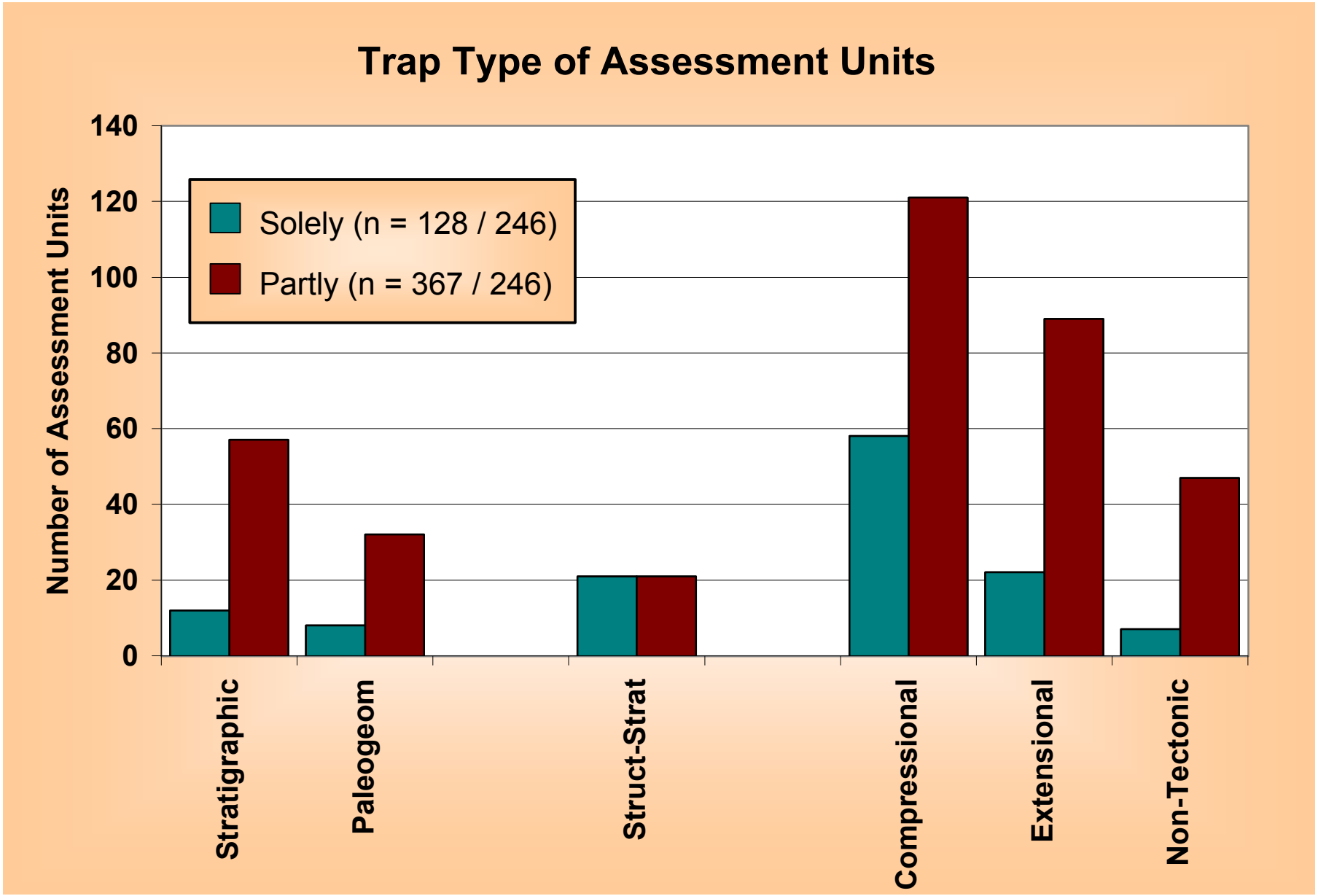

Figure AR-76. Numerical distribution of assessment units by trap type. The six trap categories are stratigraphic, paleogeomorphic (reefs, erosional relief), non-specified structural-stratigraphic, compressional structural, extensional structural and non-tectonic structural (diapirs, drapes).

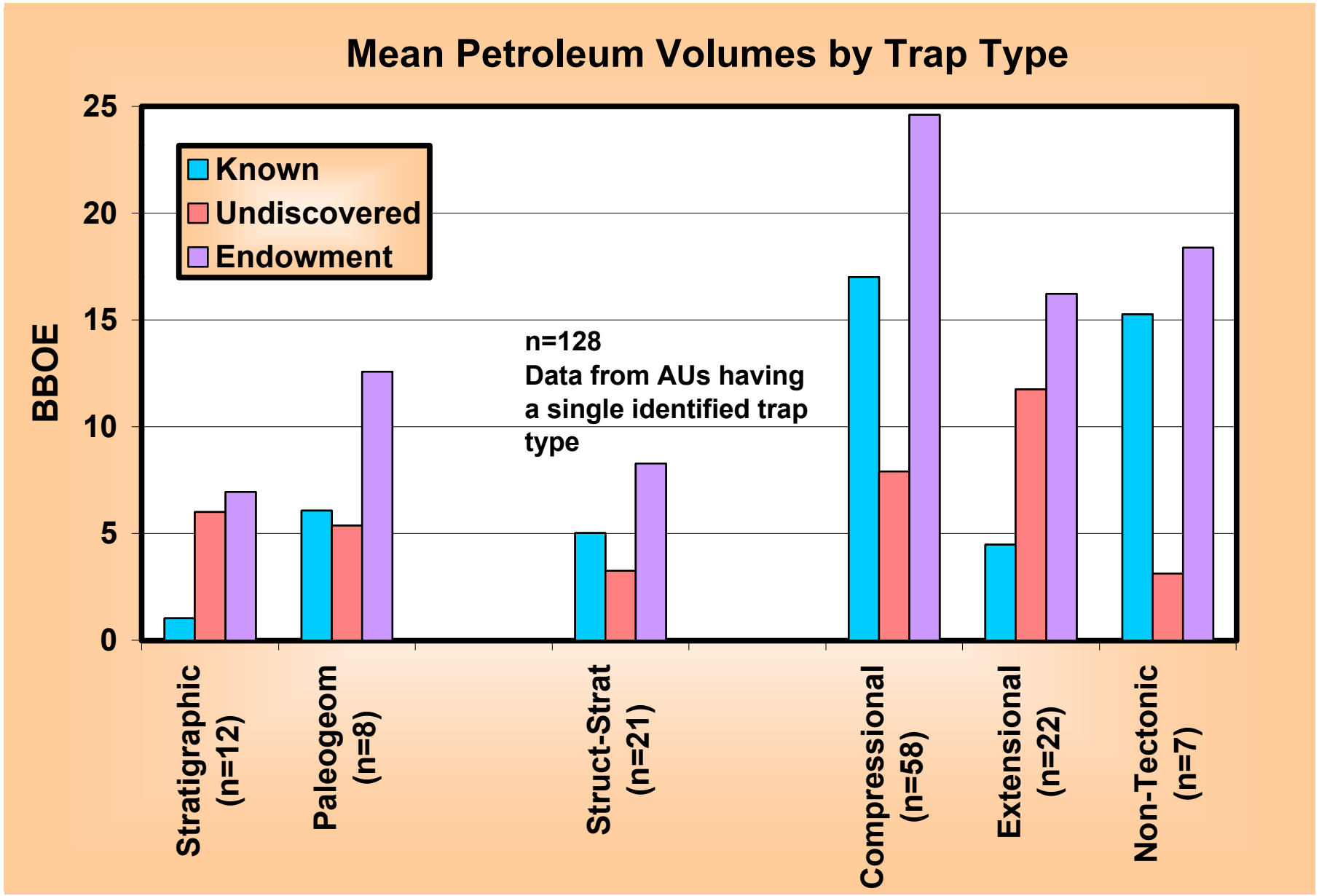

Figure AR-77. Distribution of mean petroleum volumes of assessment units by trap type. Known volume, cumulative production plus remaining reserves; undiscovered volume, estimated in this study; and conventional endowment, sum of known and undiscovered volumes. The six trap categories are stratigraphic, paleogeomorphic (reefs, erosional relief), non-specified structural-stratigraphic, compressional structural, extensional structural and non-tectonic structural (diapirs, drapes). BBOE, billion barrels of oil equivalent.

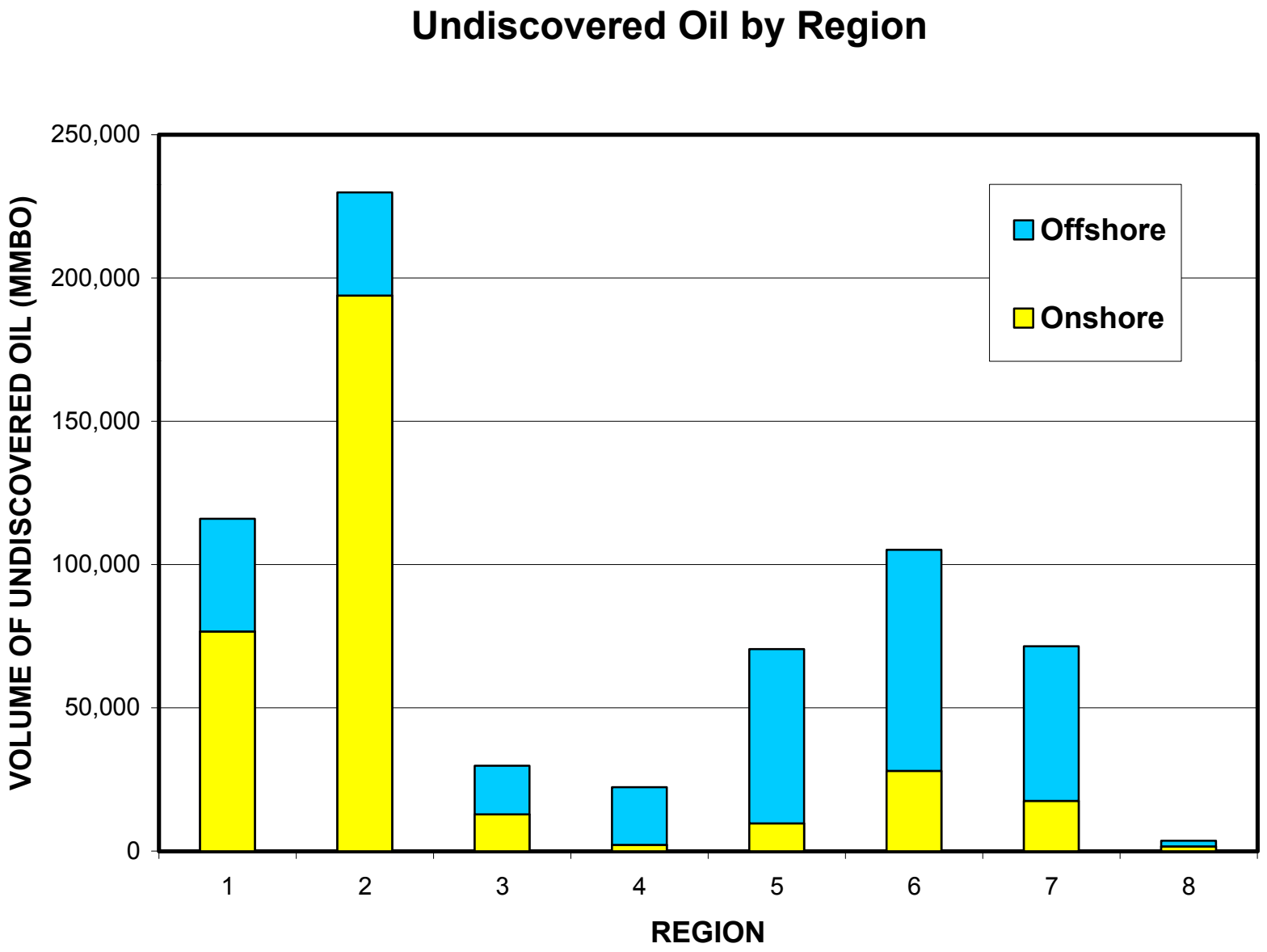

Figure AR-84. Onshore and offshore estimated volumes of undiscovered oil by the assessed part of regions (excluding the U.S.). MMBO, million barrels of oil.

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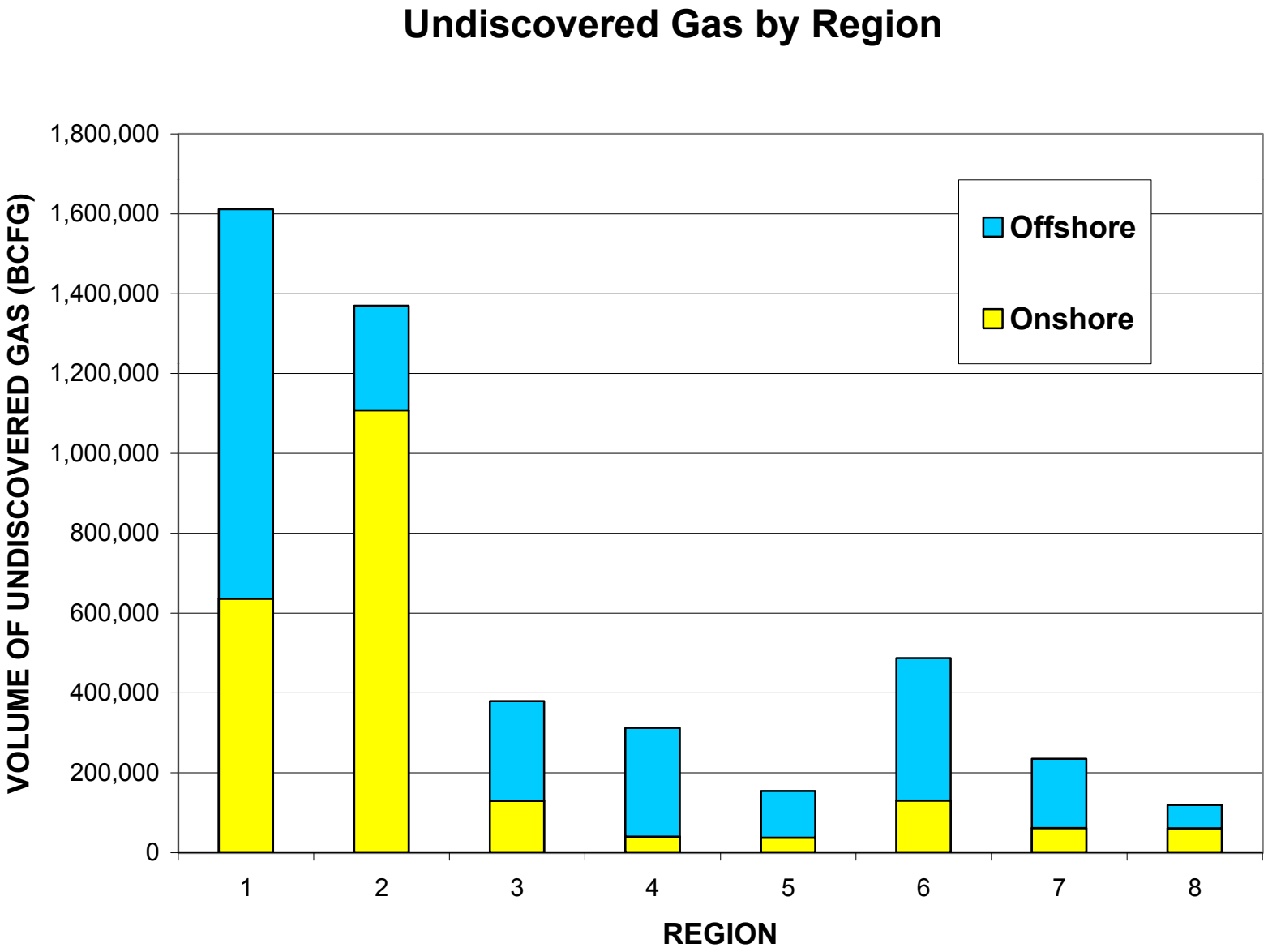

Figure AR-85. Onshore and offshore estimated volumes of undiscovered gas by the assessed part of regions (excluding the U.S.). BCFG, billion cubic feet of gas.

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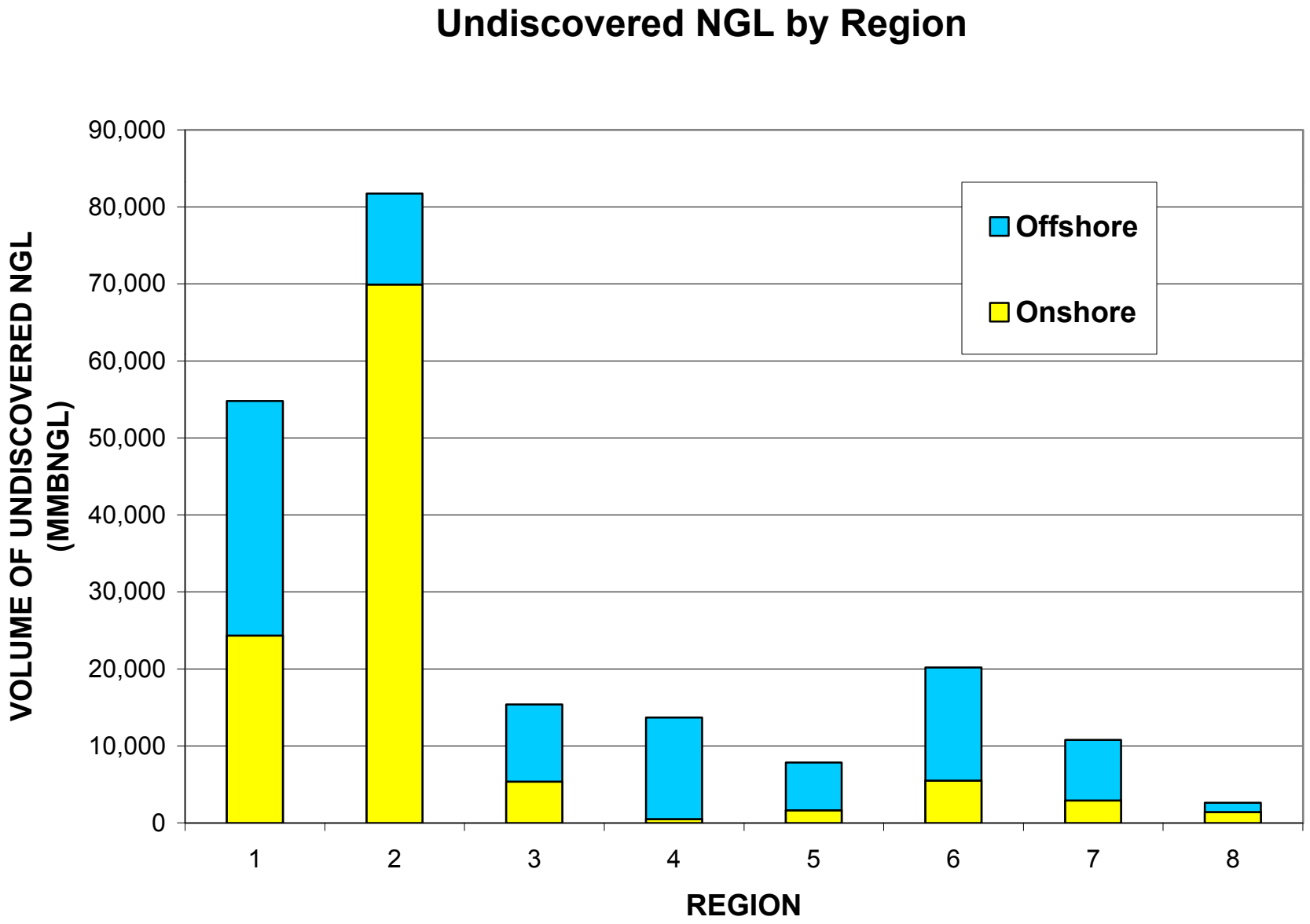

Figure AR-86. Onshore and offshore estimated volumes of undiscovered NGL by the assessed part of regions (excluding the U.S.). MMBNGL, million barrels of NGL.

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Onshore and Offshore Proportions of Assessed Undiscovered Resources for the World

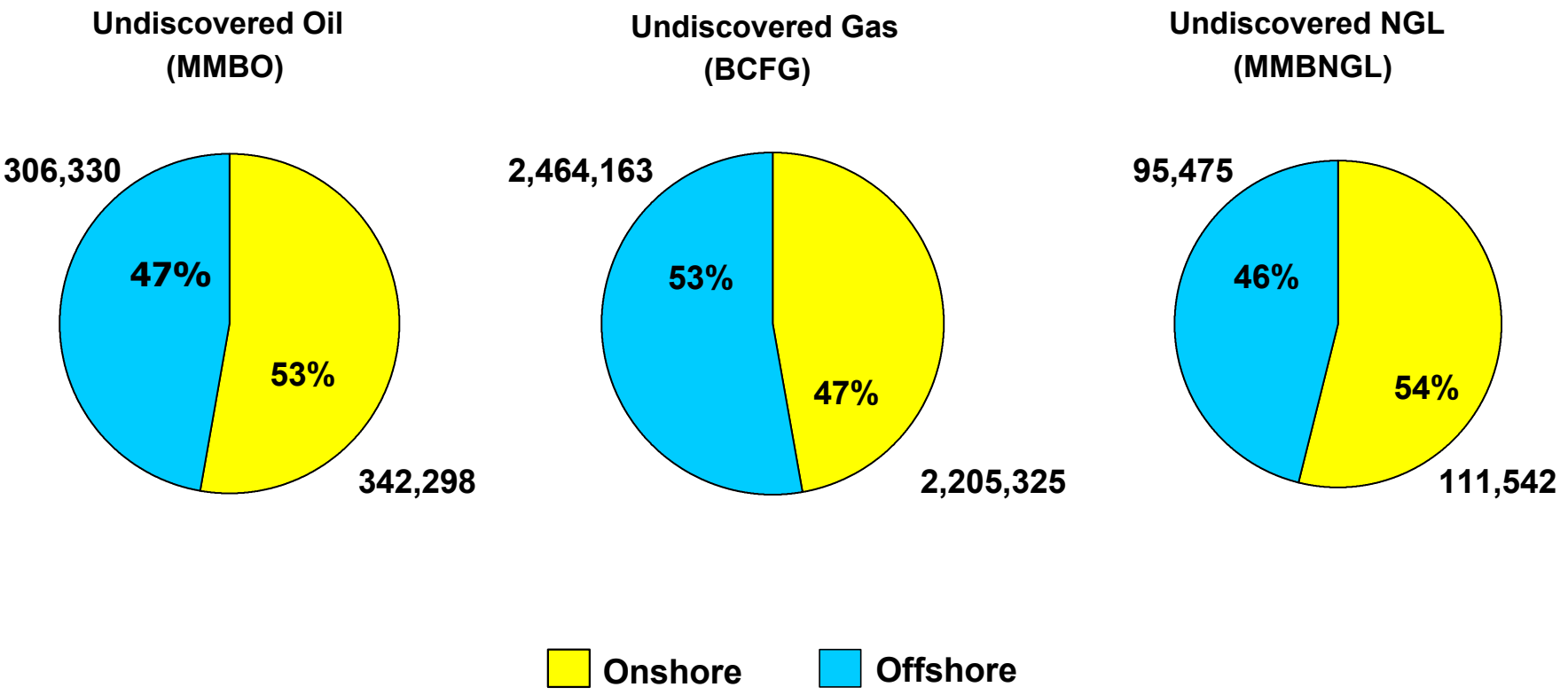

Figure AR-87. Proportions of onshore and offshore estimated volumes of undiscovered oil, gas, and NGL for the assessed parts of the world (excluding the U.S.). MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MMBNGL, million barrels of NGL.

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Onshore and Offshore Proportions of Assessed Undiscovered Resources for Regions 3 through 8

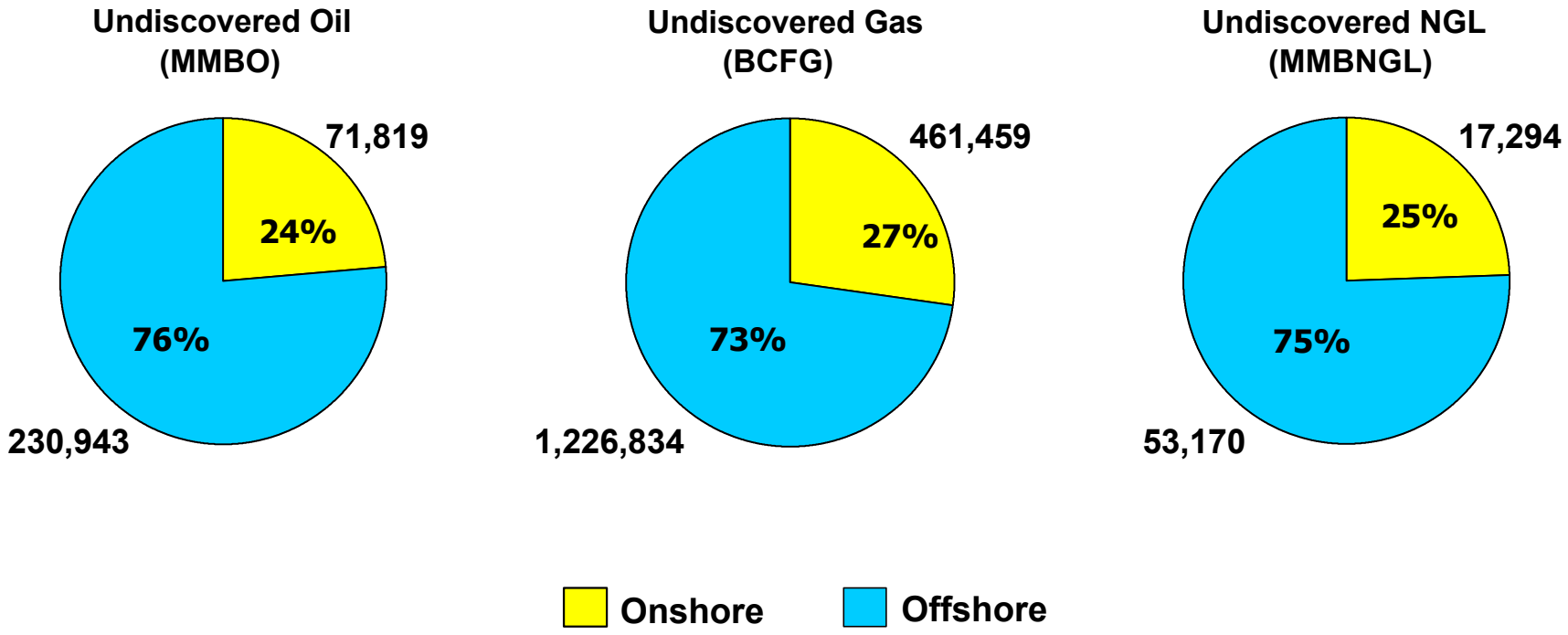

Figure AR-88. Proportions of onshore and offshore estimated volumes of undiscovered oil, gas, and NGL for the assessed parts of Regions 3 through 8 (excluding the U.S.). MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MMBNGL, million barrels of NGL.

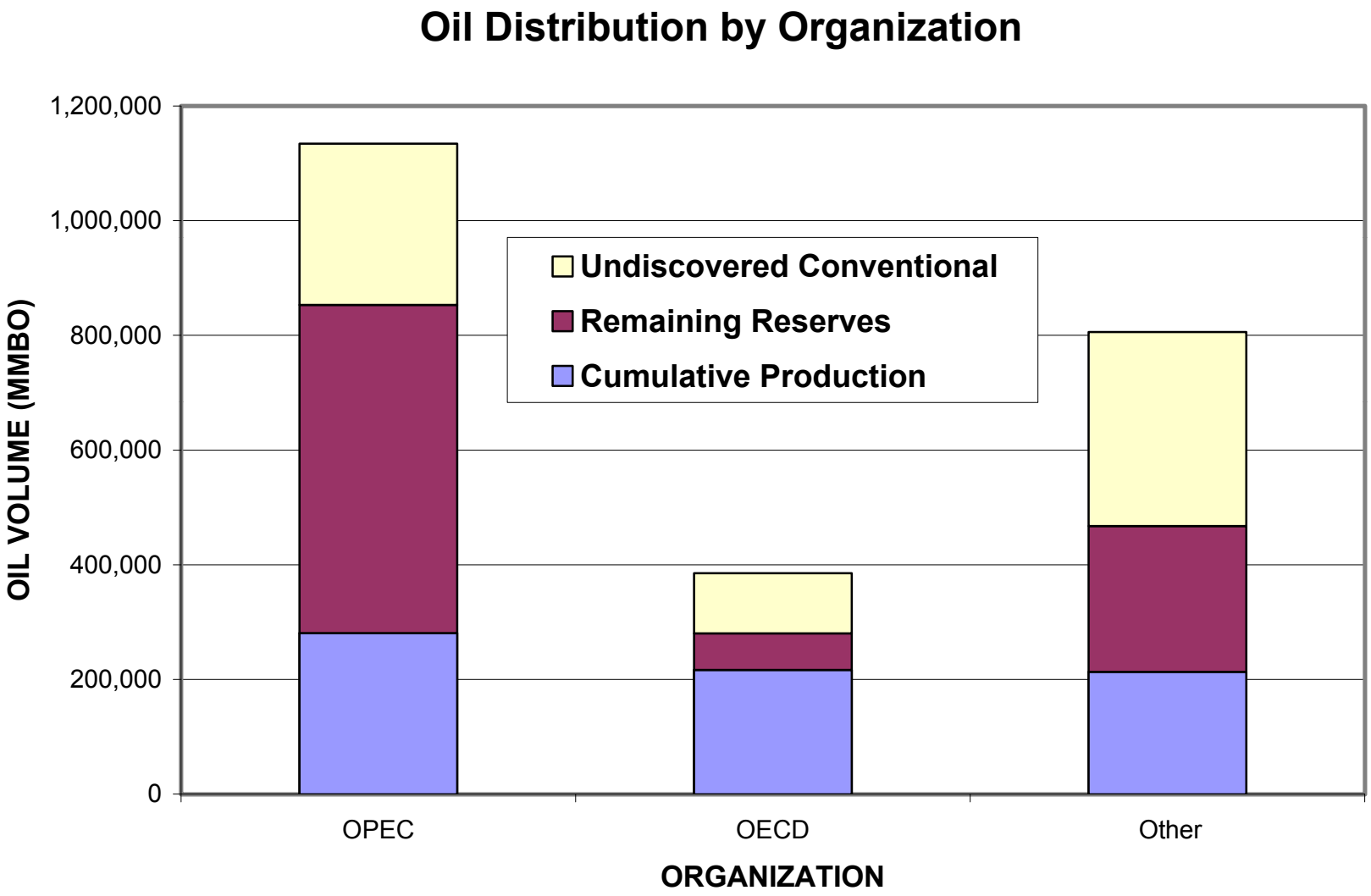

Figure AR-89. Volumes of cumulative production, remaining reserves, and estimated undiscovered oil for the assessed parts of the Organization of the Petroleum Exporting Countries (OPEC); the Organisation for Economic Co-operation and Development (OECD), which includes U.S. volumes; and the remaining countries of the world. MMBO, million barrels of oil.

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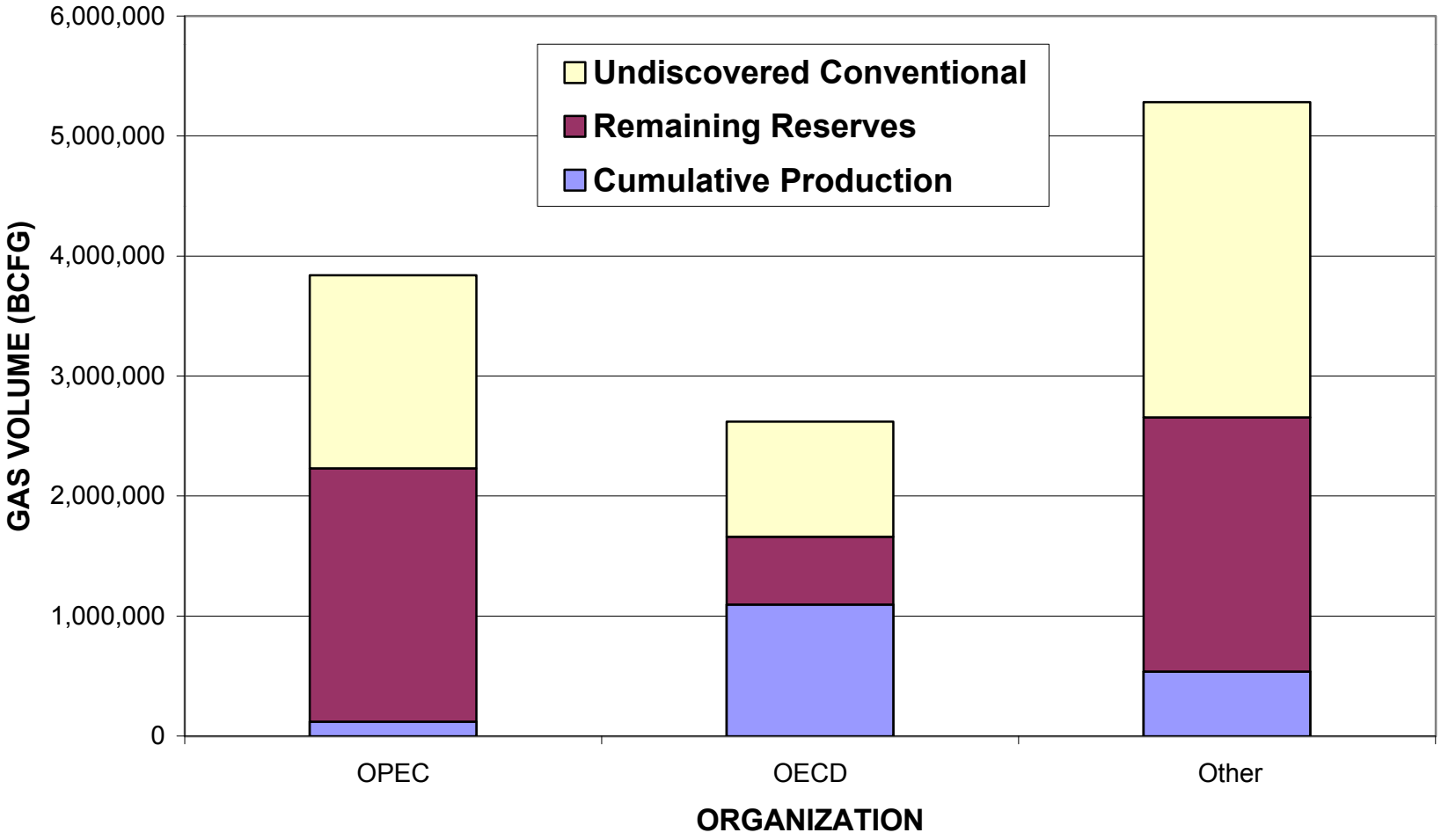

Figure AR-90. Volumes of cumulative production, remaining reserves, and estimated undiscovered gas for the assessed parts of the Organization of the Petroleum Exporting Countries (OPEC); the Organisation for Economic Co-operation and Development (OECD), which includes U.S. volumes; and the remaining countries of the world. BCFG, billion cubic feet of gas.

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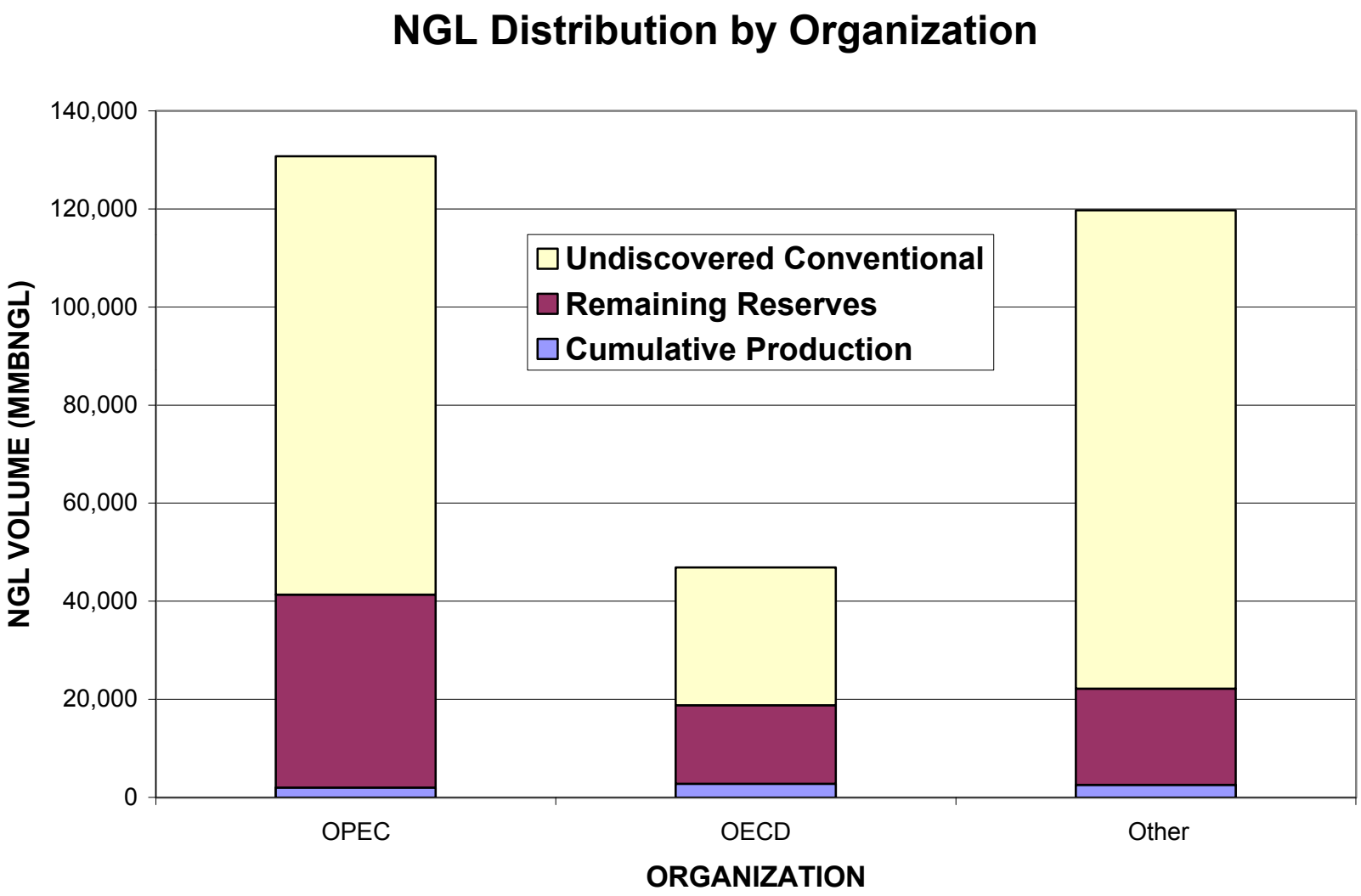

Figure AR-91. Volumes of cumulative production, remaining reserves, and estimated undiscovered NGL for the assessed parts of the Organization of the Petroleum Exporting Countries (OPEC); the Organisation for Economic Co-operation and Development (OECD), which includes U.S. volumes; and the remaining countries of the world. MMBNGL, million barrels of NGL.

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Distribution of Undiscovered Oil by Organization

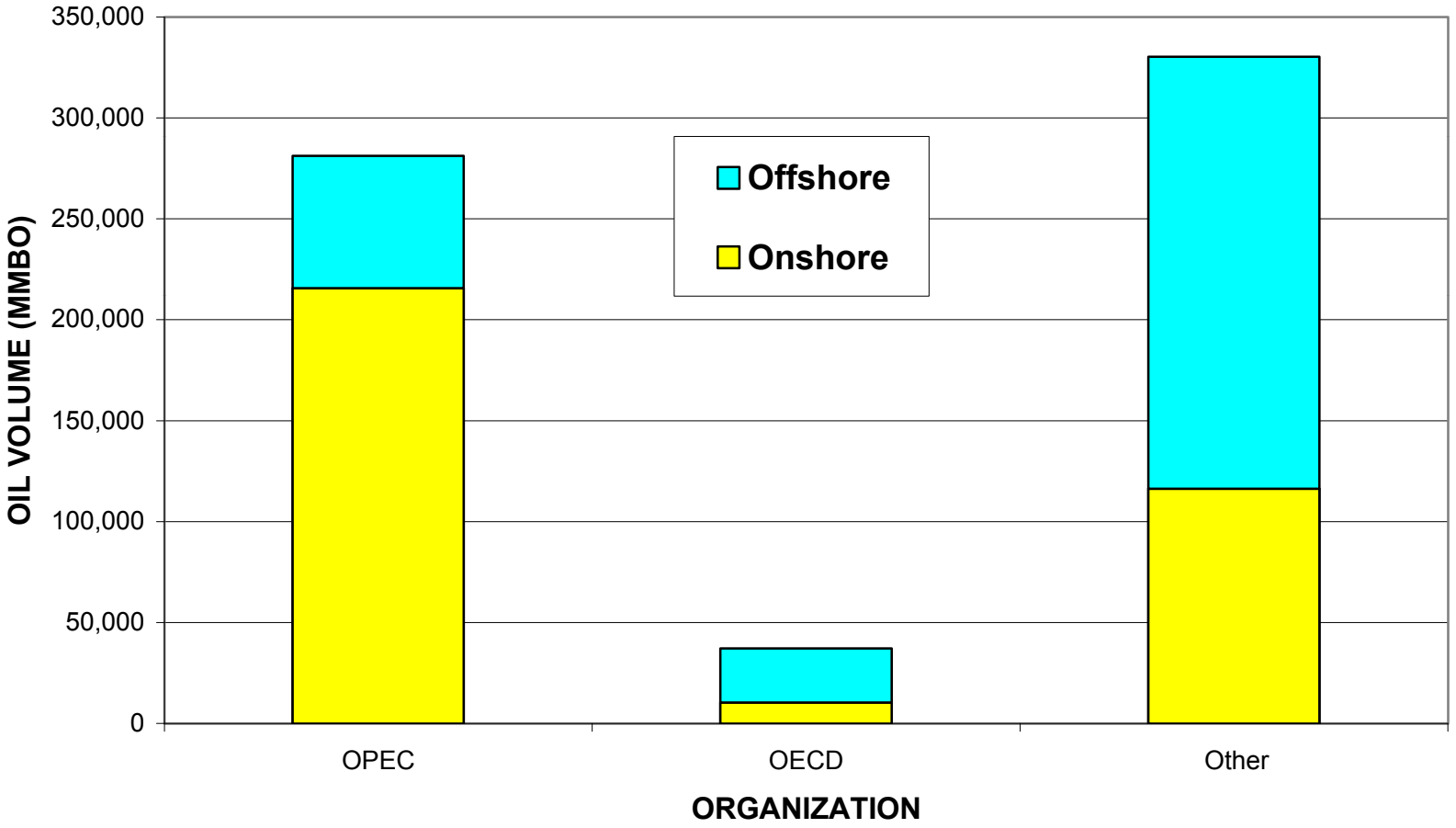

Figure AR-92. Onshore and offshore estimated volumes of undiscovered oil by the assessed parts of the Organization of the Petroleum Exporting Countries (OPEC); the Organisation for Economic Co-operation and Development (OECD), which includes U.S. volumes; and the remaining countries of the world. MMBO, million barrels of oil.

Distribution of Undiscovered Gas by Organization

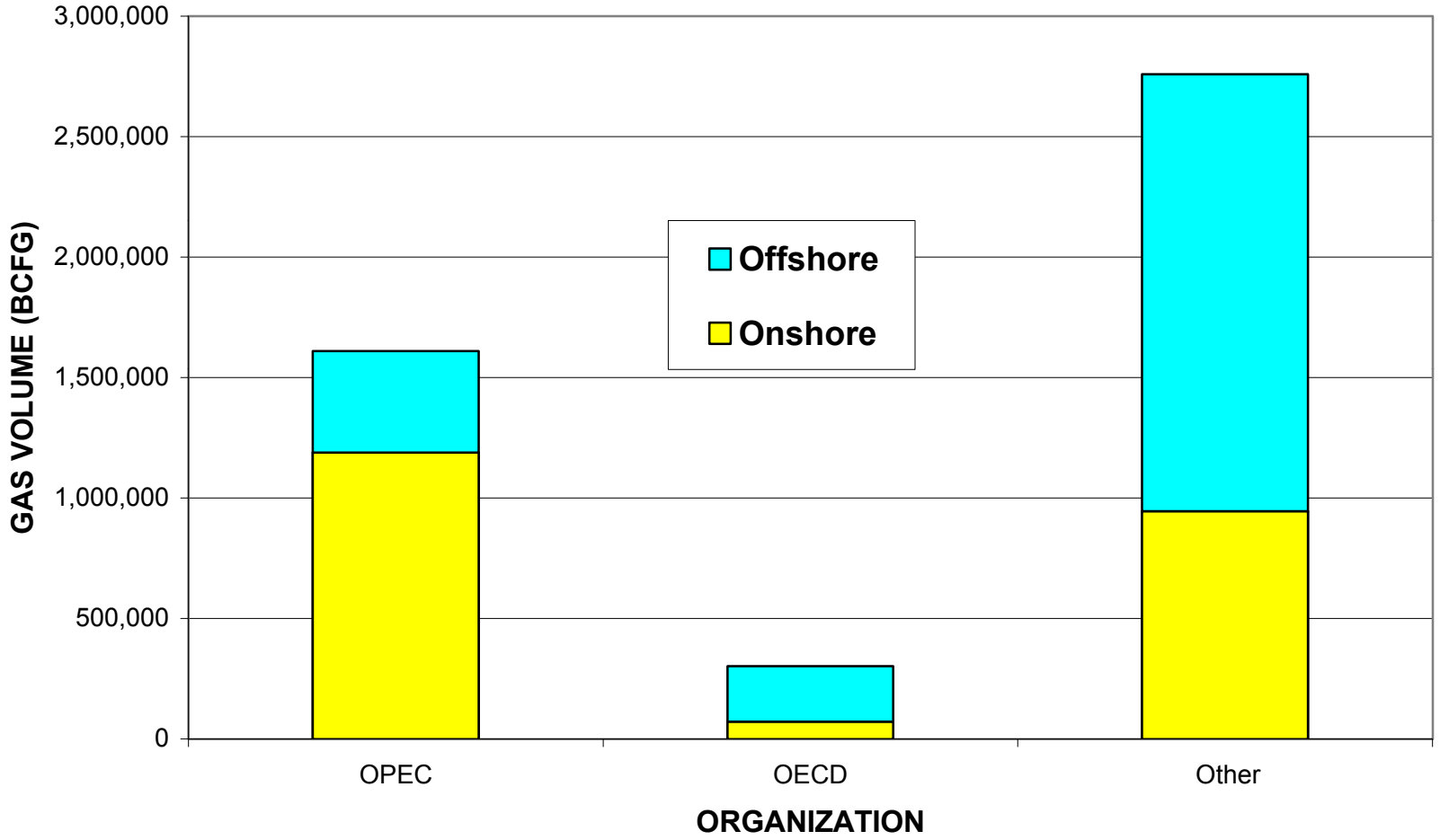

Figure AR-93. Onshore and offshore estimated volumes of undiscovered gas by the assessed parts of the Organization of the Petroleum Exporting Countries (OPEC); the Organisation for Economic Co-operation and Development (OECD), which includes U.S. volumes; and the remaining countries of the world. BCFG, billion cubic feet of gas.

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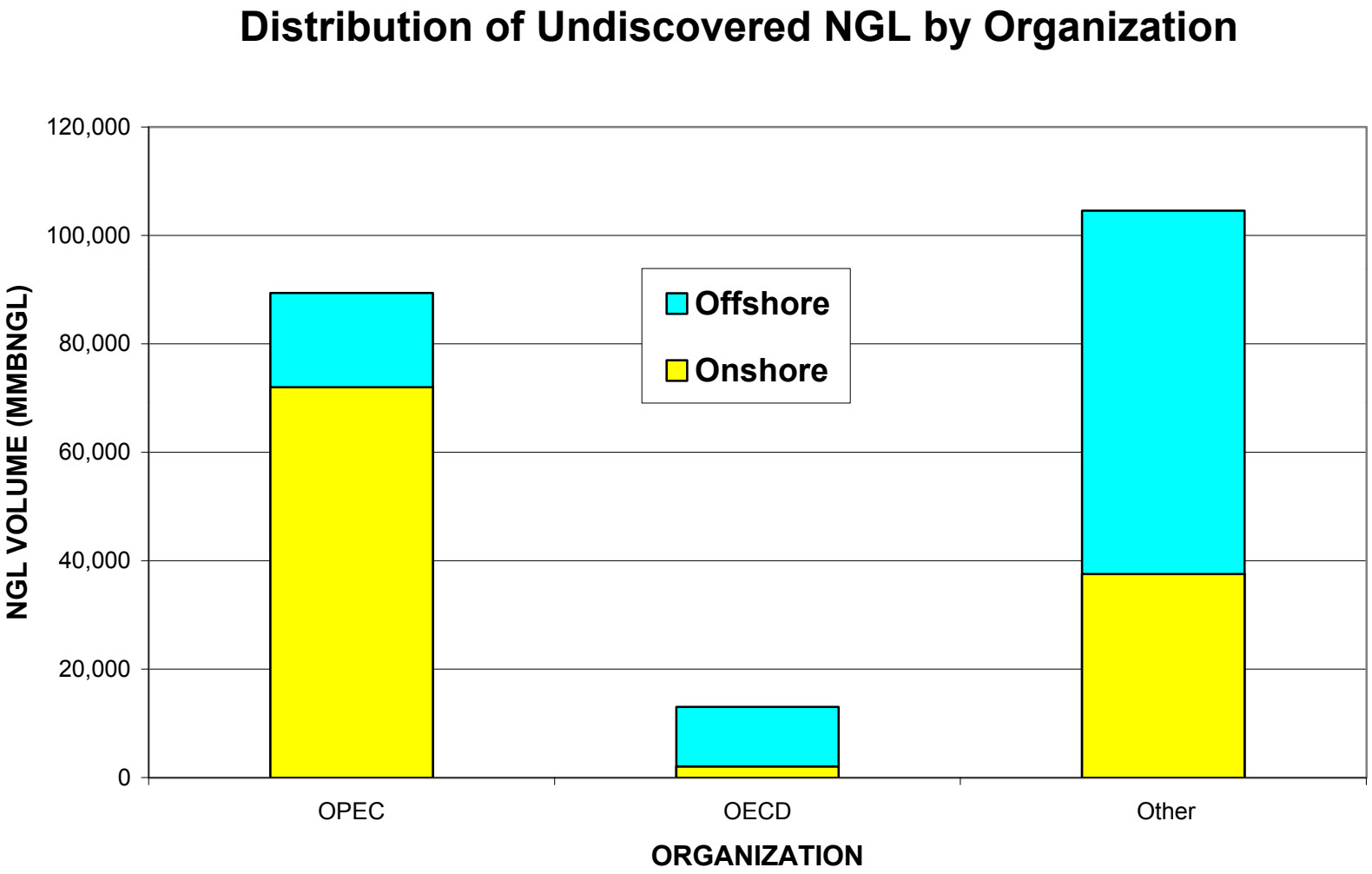

Figure AR-94. Onshore and offshore estimated volumes of undiscovered NGL by the assessed parts of the Organization of the Petroleum Exporting Countries (OPEC); the Organisation for Economic Co-operation and Development (OECD), which includes U.S. volumes; and the remaining countries of the world. MMBNGL, million barrels of NGL.

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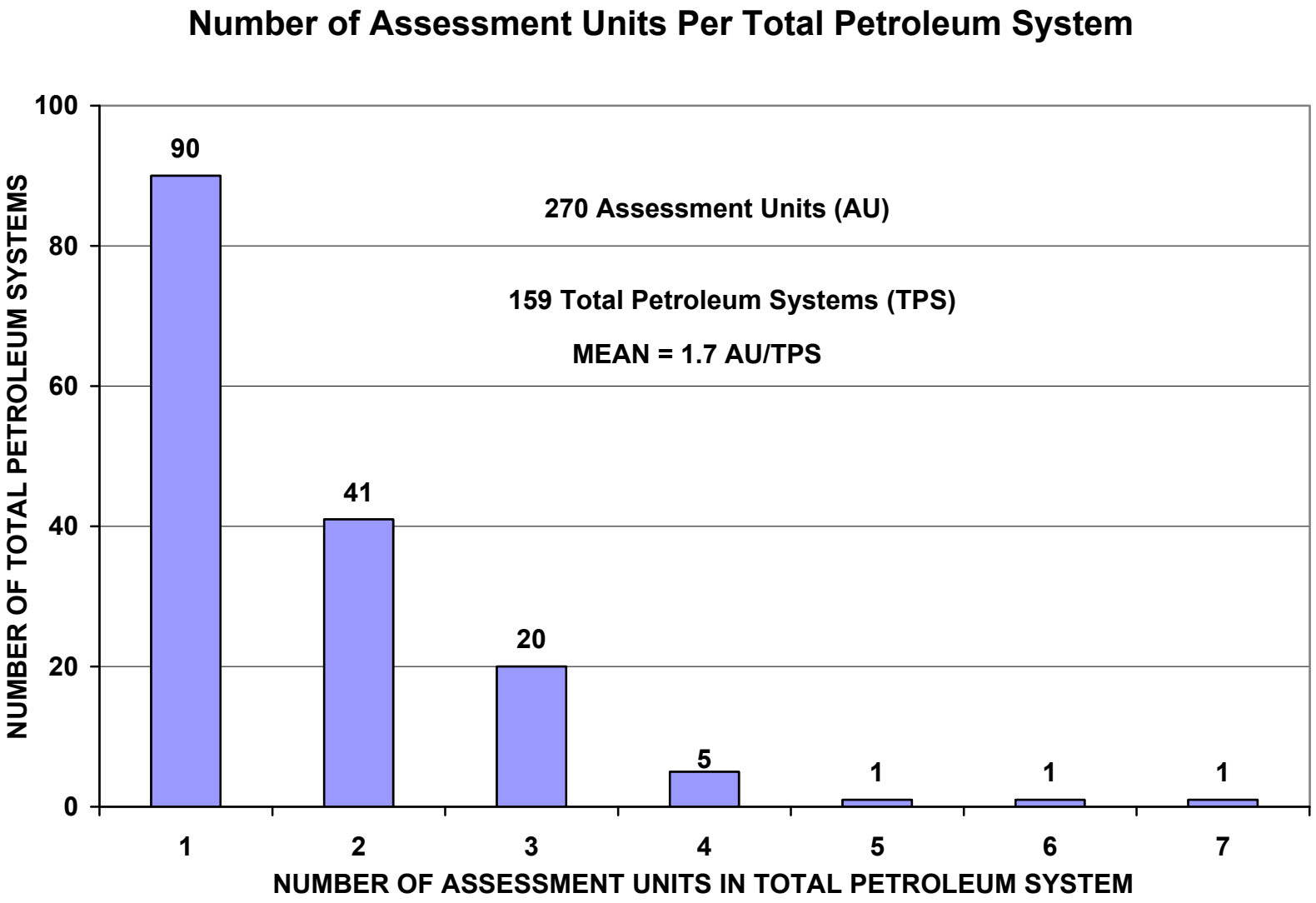

Figure AR-95. Number of total petroleum systems that have 1, 2, 3, 4, 5, 6, or 7 assessment units. No total petroleum system has more than 7 assessment units.

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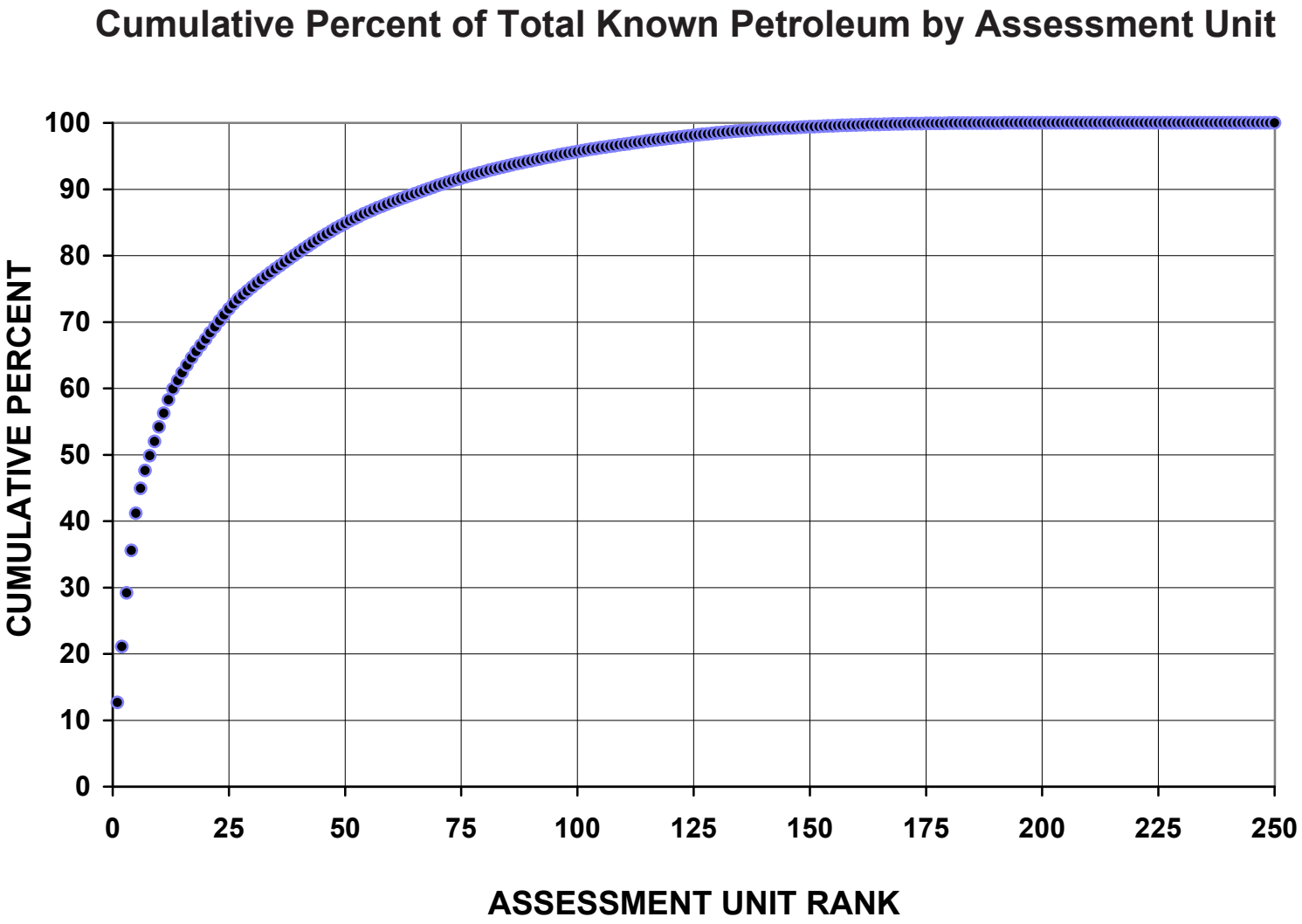

Figure AR-96. Cumulative percent of the total known petroleum volume (cumulative production plus remaining reserves for oil, gas, and NGL; expressed as BOE) within the 270 defined assessment units of the world ranked by decreasing volume.

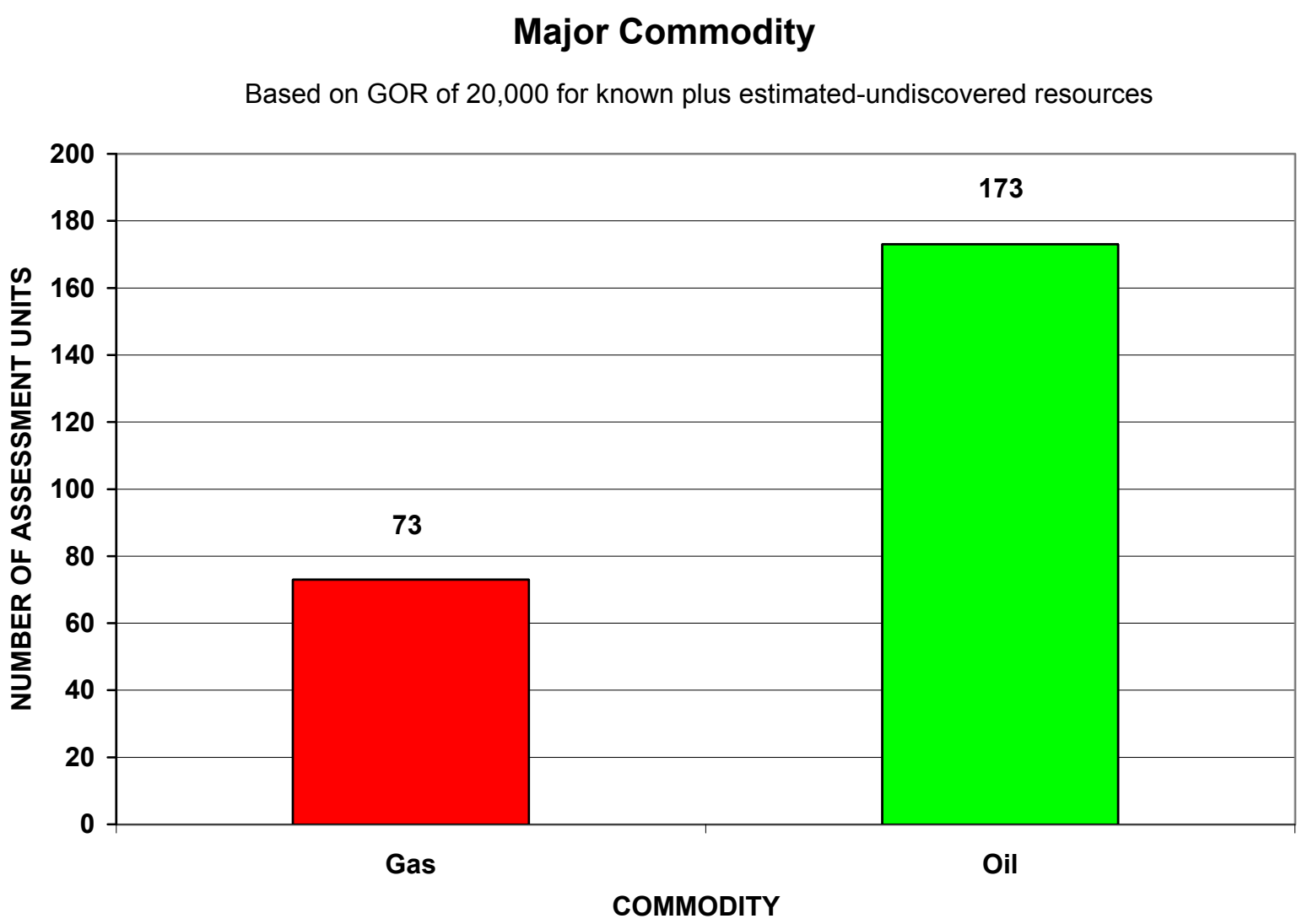

Figure AR-97. Number of assessment units in which gas is the major commodity compared to the number in which oil is the major commodity. GOR, gas/oil ratio in cubic feet of gas per barrel of oil.

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Minimum Field Sizes

15 Assessment Units in Canada had Minimum Pool Size of 0.5 MMBOE

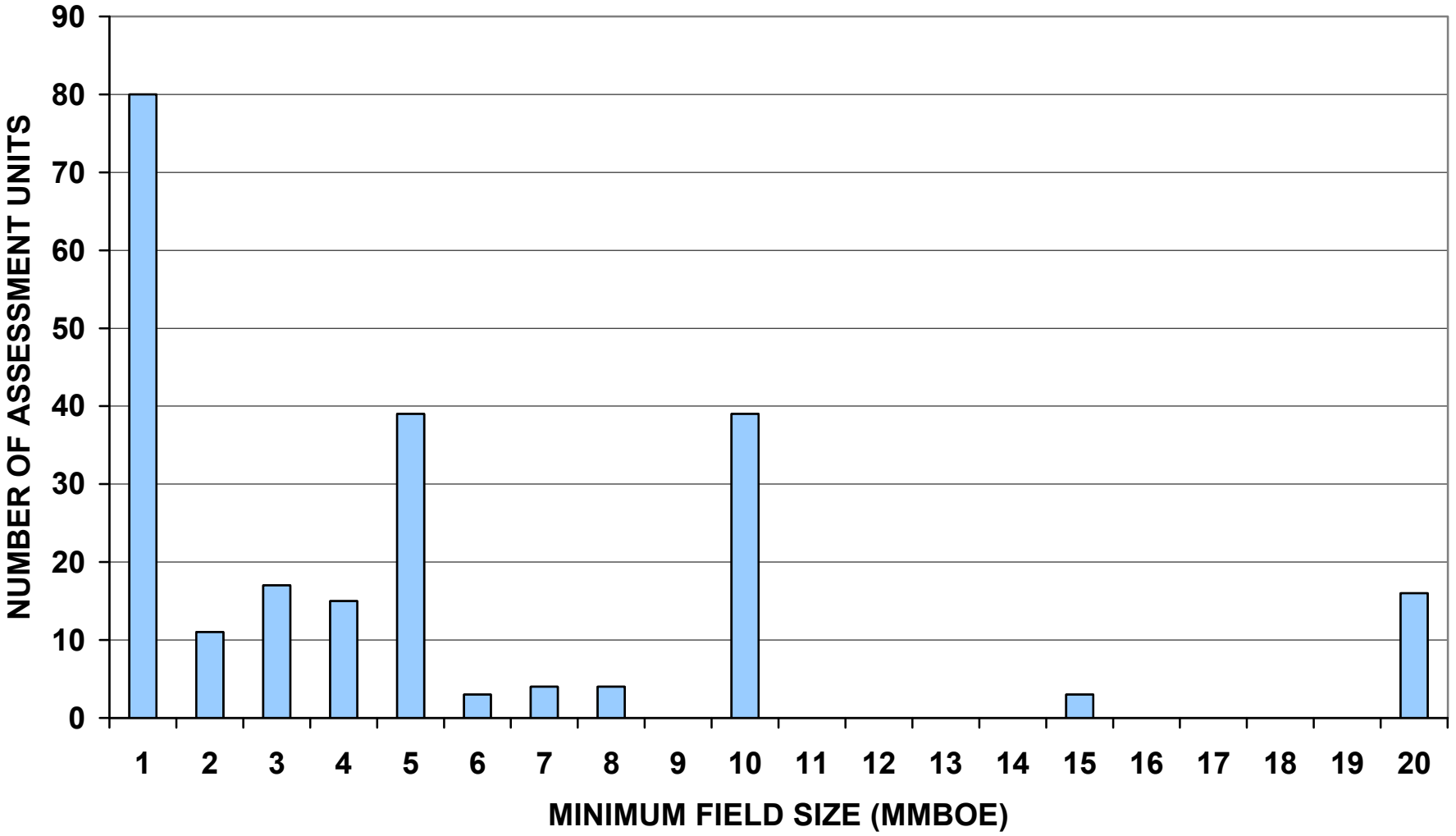

Figure AR-98. Number of assessment units that have a given minimum field size. No minimum field size exceeded 20 million barrels of oil equivalent (MMBOE).

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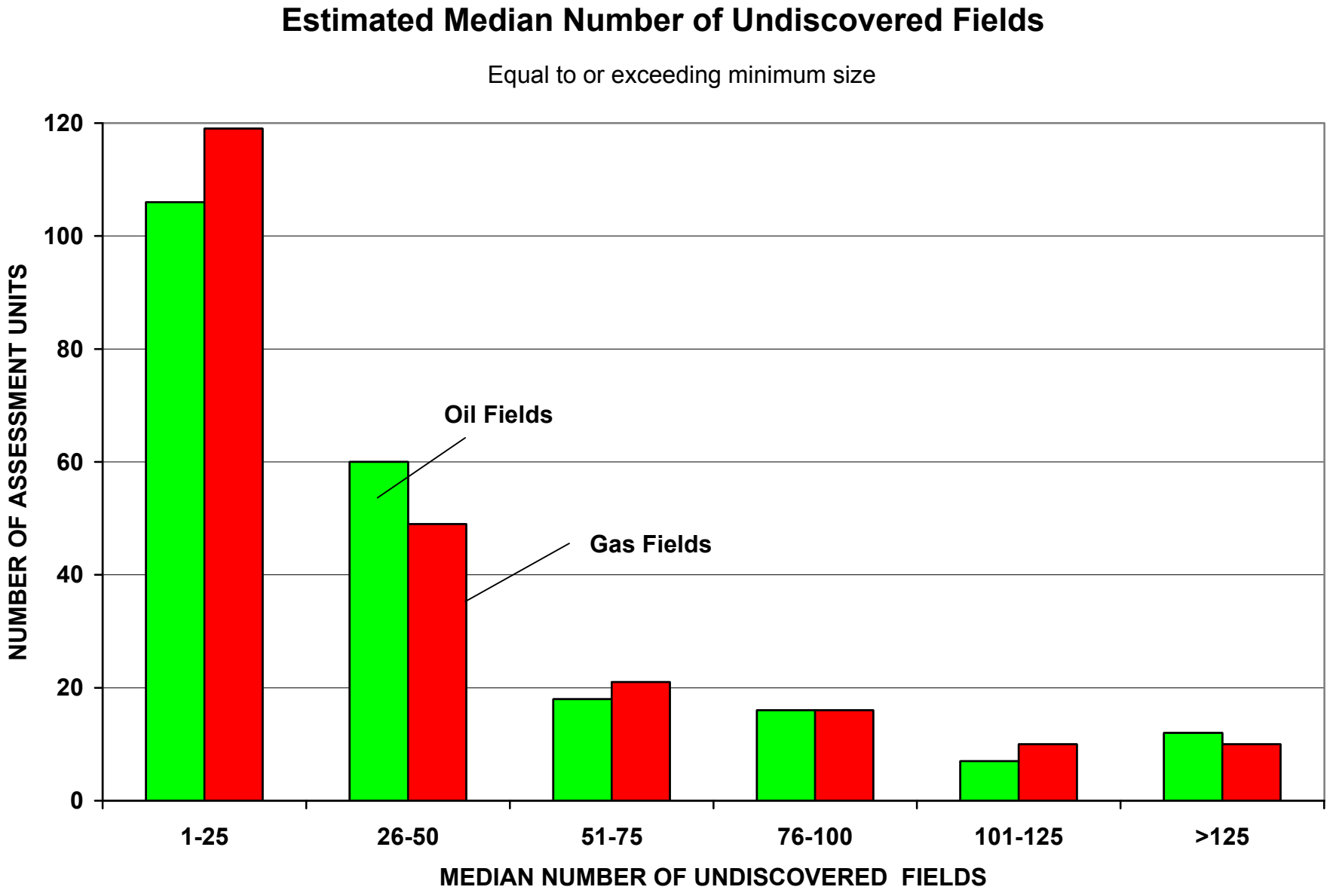

Figure AR-99. Distributions of the estimated median number of undiscovered conventional oil and gas fields in an assessment unit.

Estimated Median Size of Undiscovered Fields

Equal to or exceeding minimum size

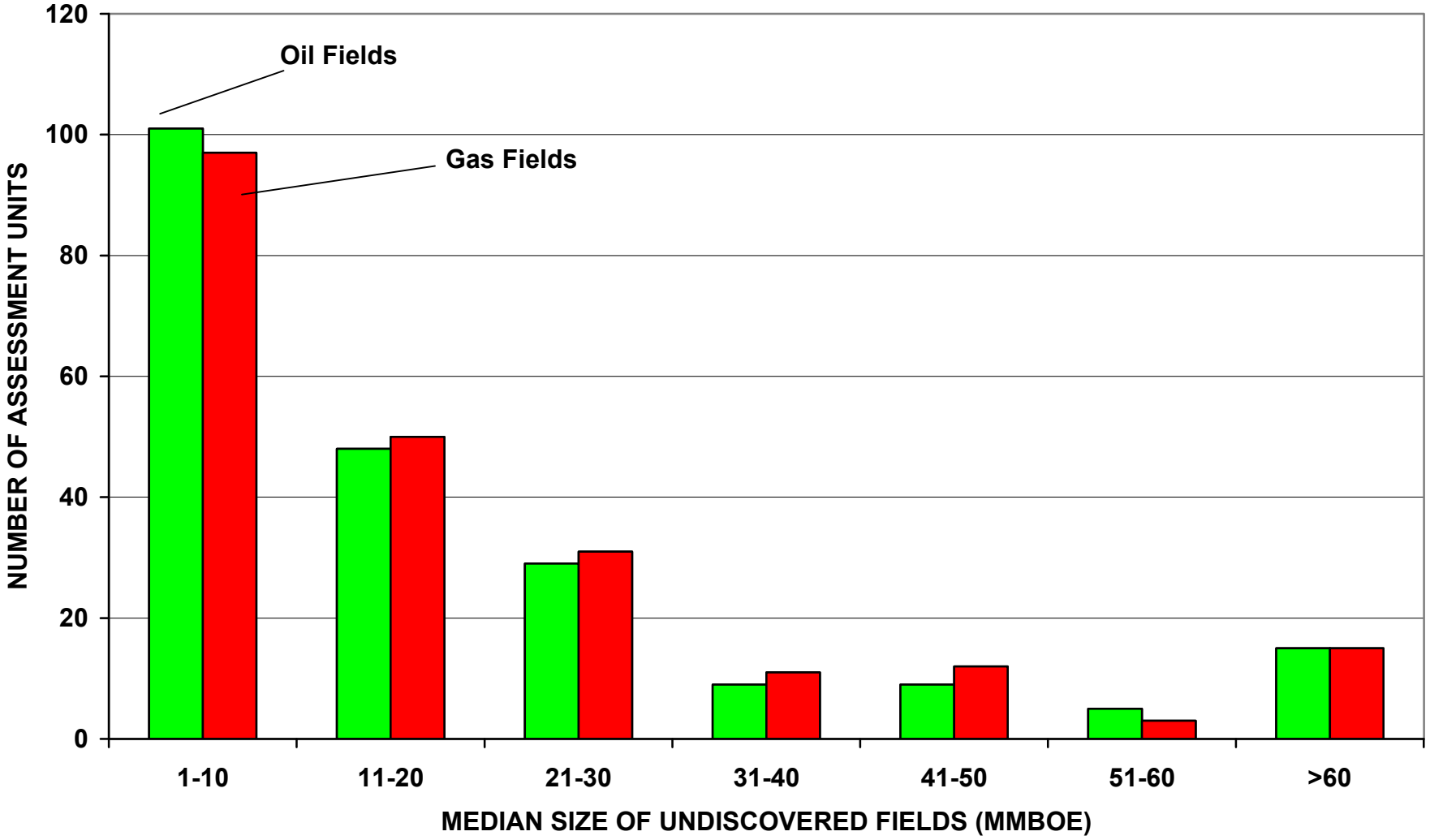

Figure AR-100. Distributions of the estimated median size of undiscovered conventional oil and gas fields in an assessment unit. MMBOE, million barrels of oil equivalent.

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Estimated Average Gas/Oil Ratio (GOR) of Undiscovered Oil Fields

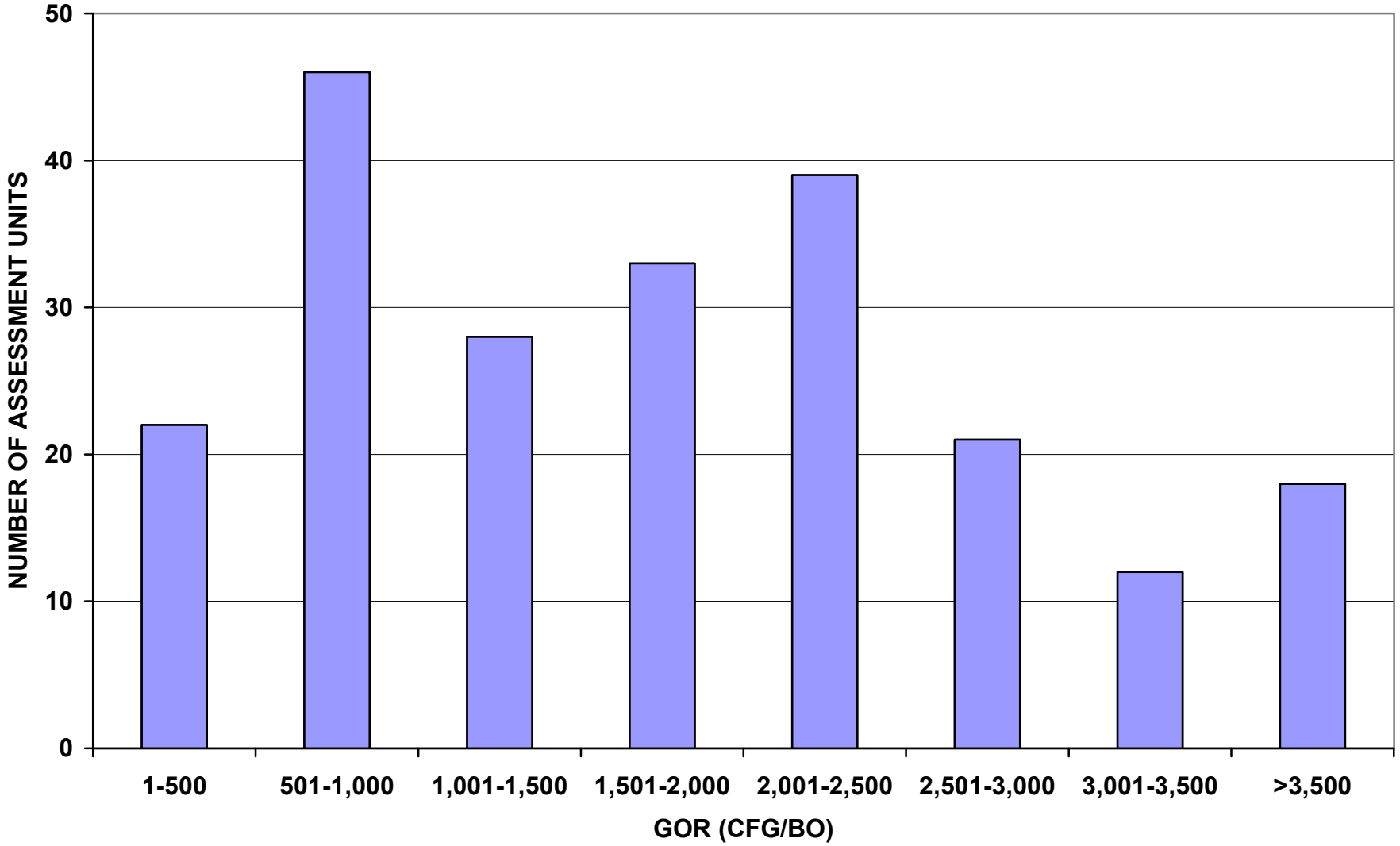

Figure AR-101. Distribution of the estimated average gas/oil ratio of the undiscovered conventional oil fields in an assessment unit. GOR (CFG/BO), gas/oil ratio in cubic feet of gas per barrel of oil.

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Estimated Average Liquids/Gas Ratio of Undiscovered Gas Fields

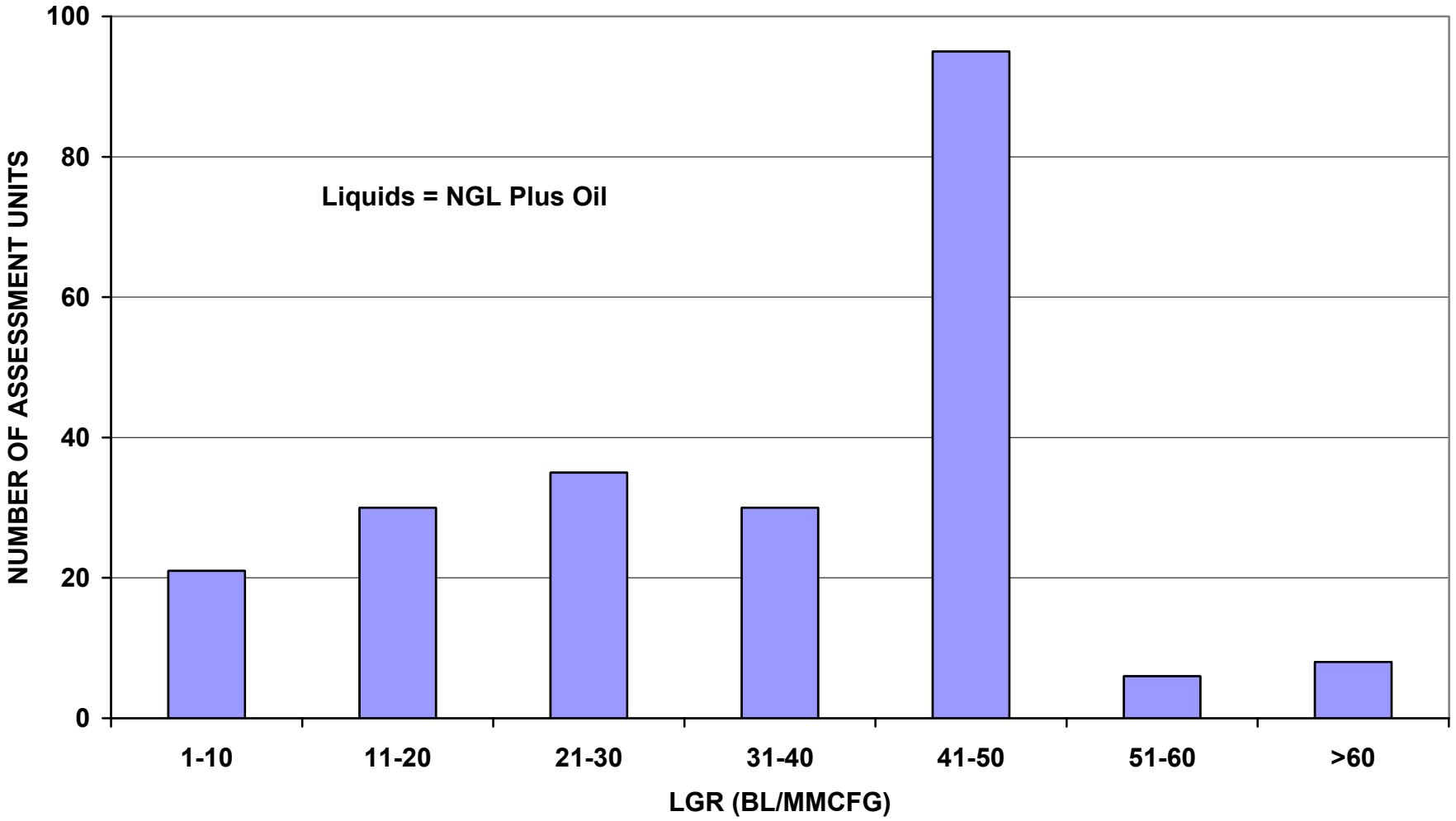

Figure AR-102. Distribution of the estimated average liquids/gas ratio (LGR) of the undiscovered conventional gas fields in an assessment unit. LGR (BL/MMCFG), liquids/gas ratio in barrels of liquid per million cubic feet of gas.

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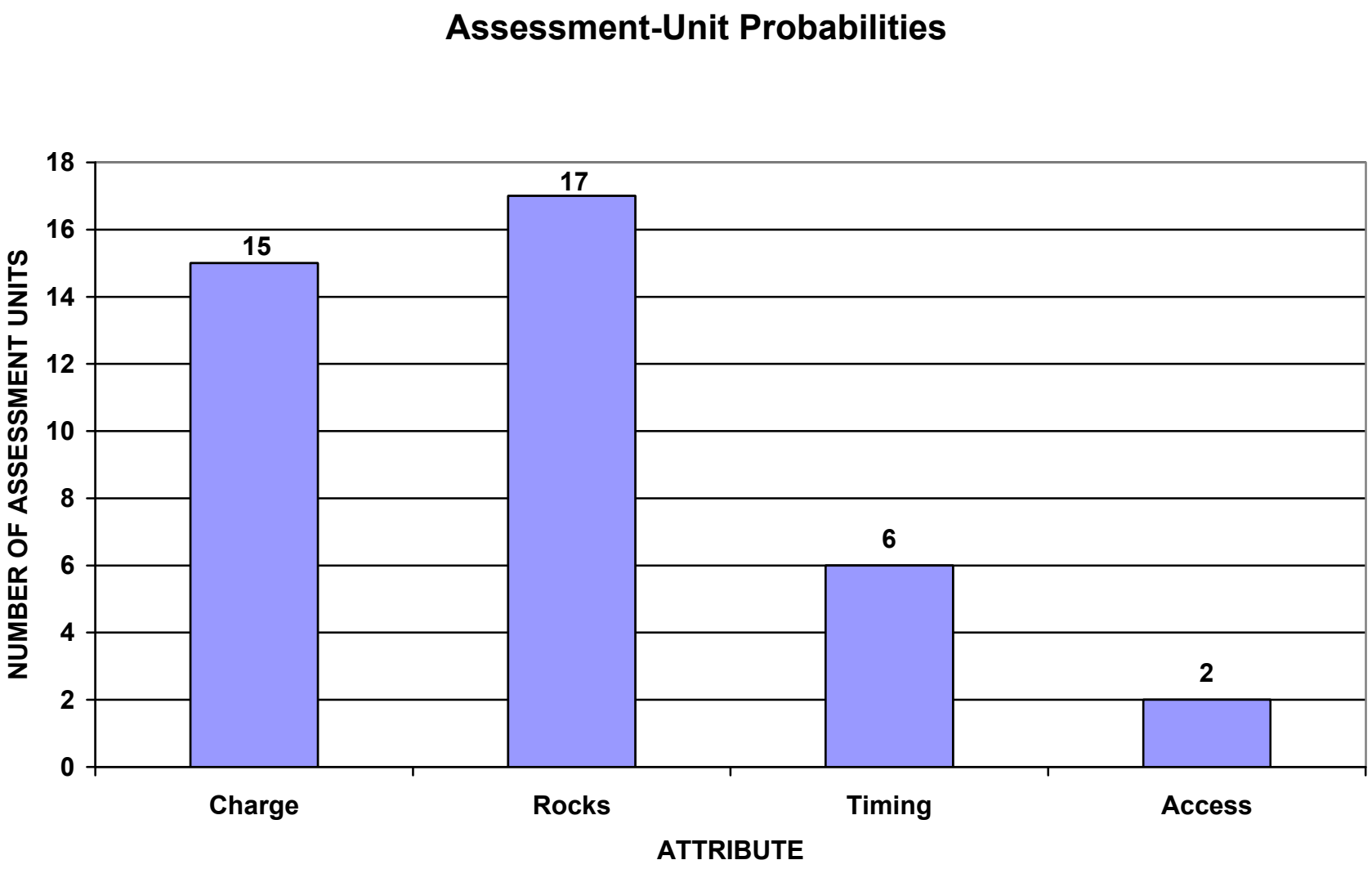

Figure AR-103. Number of assessment units for which the probability that an attribute is adequate for at least one undiscovered field of minimum size is less than 1.0. The attributes considered are petroleum charge, rocks (reservoirs, traps and seals), timing of geologic events, and the access necessary for exploration and development in a 30-year forecast span.