

Worldwide Estimates of Deep Undiscovered Natural Gas Resources

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ABSTRACT

The U.S. Geological Survey World Petroleum Assessment 2000 Project recently assessed undiscovered conventional gas and oil resources in eight regions of the world outside the U.S. The resources assessed were those having the potential to be added to reserves within the next thirty years. This study is a worldwide analysis of the estimated volumes and distribution of deep (>4.5 km or about 15,000 feet), undiscovered conventional natural gas resources based on that work. A total of 246 assessment units in 128 priority geologic provinces, 96 countries, and two jointly held areas were assessed using a probabilistic petroleum system approach. Priority geologic provinces were chosen using a ranking of 937 provinces worldwide. Lower priority provinces were not assessed for the World Petroleum 2000 Project; however, "boutique" provinces were assessed if they were politically, technologically, or geographically important.

The U.S. Geological Survey World Petroleum Assessment Team did not assess undiscovered petroleum resources in the U.S. For this project, volumes of deep conventional undiscovered gas resources in the U.S. are taken from estimates of 101 deep plays (out of a total of 550 conventional plays in the U.S.) from the U.S. Geological Survey 1995 National Assessment of Oil and Gas Resources.

A probabilistic method was designed to subdivide gas resources into depth slices using a median-based triangular probability distribution as a probability model for drilling depth to estimate the percentages of estimated gas resources below various depths. For both the World Petroleum Assessment 2000 and the 1995 National Assessment of Oil and Gas Resources, minimum, median, and maximum depths were assigned to each assessment unit and play; these depths were used in our analysis.

A total of 274 deep assessment units and plays in 123 petroleum provinces were identified. These assessment units and plays contain a mean undiscovered conventional gas resource of 844 TCF below 4.5 km. The deep undiscovered conventional gas resource (844 TCF) is about 17 percent of the total world gas resource (4,928 TCF) based on the priority and boutique provinces assessed and including 259 TCF of U.S. gas from the U.S. 1995 National Assessment. The average maximum depth for all assessment units and plays is 5.9 km. Of the eight regions, the Former Soviet Union (Region 1) contains the largest estimated volume of undiscovered deep gas with a mean resource of 343 TCF. The second largest estimated gas volume (142 TCF) occurs in Europe (Region 4).