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Potential for Oil Shale Development in the United States

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Abstract

The development of domestic oil shale resources has regained significant attention in the past few years. Several factors have contributed to this, including high oil prices, emerging recovery technologies, increasing world demand for liquid hydrocarbons, and the continued decline in U.S. conventional oil production. In recent years, several initiatives have been taken by the Federal Government and the private sector to encourage the development of a domestic oil shale industry.

The United States has vast deposits of oil shale – Nearly 2.0 trillion barrels across the eastern and western states. The development of this massive resource, however, is constrained, however, by a number of key factors including, but not limited to; 1) resource access, 2) technology, 3) economics, 4) environmental and regulatory issues, and 5) infrastructure.

A comprehensive analysis has been completed to review emerging oil shale technologies from 23 companies and identify options to accelerate the development of this resource. The analysis is based on a representative sample (about 70 Billion Barrels) of Western Oil shale resource divided among multiple development “tracts”. The presentation will present a summary of the technologies; including but not limited to emerging in-situ processes as well as traditional mining with surface retorting technology. Each development “tract” was screened for the potential application of representative recovery technologies. A detailed economic evaluation was conducted for each “tract” and the selected technology with consideration for development under alternative economics, environmental, technology, and socio-economic options. The analysis indicated that with a concerted effort from industry, local, state, and Federal governments, the oil shale production potential could reach 2.5 million barrels per day (MMBbl/d) with substantial benefits to the local and national economy.

Introduction

Oil shale is carbonate rock, generally marlstone that is very rich in organic sedimentary material called “kerogen.” Oil shales are “younger” in geologic age than crude oil-bearing formations; natural forces of pressure and temperature have not yet converted the sediments to crude oil. Kerogen can be converted to superior quality jet fuel, #2 diesel, naphtha, and other high value by-products. The kerogen content of “oil shale” ore can range from 10 to 60 or more gallons of oil per ton².

Worldwide, there are nearly 10 trillion barrels of shale oil resource. These resources are located in North America, South American, Europe, Middle East, North Africa (MENA), Asia, and Australia (Figure 1). Table 1 shows the resource for the top ten countries. Nearly 60% of the total resource is located in the United States with significant deposits in the western and eastern states.

Figure 1: 10 Trillion Barrels of Shale Oil Worldwide

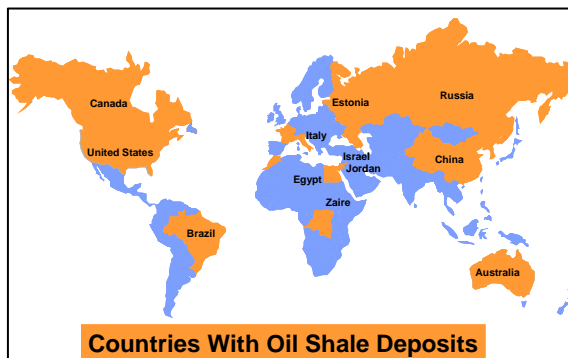


Table 1: Top Ten Countries^{9/10}

Oil Shale Resources in Barrels	
China	16 Billion
Estonia	16 Billion
Australia	32 Billion
Jordan	34 Billion
Morocco	53 Billion
Italy	73 Billion
Brazil	82 Billion
Zaire	100 Billion
Russia	248 Billion
United States	6,000 Billion