

## **Petroleum and construction stone resources of Balochistan, Sulaiman and Kirthar basins (Pakistan)**

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### **Abstract**

Due to present energy crises, the hydrocarbons (and coal) are the hottest commodities. Pakistan has large sedimentary basins like Indus (533,500 km<sup>2</sup>) and Balochistan (300,000 km<sup>2</sup>) basins but the production from Balochistan basin is nothing so far may be due to extensive imbrications/faults and igneous rocks. Balochistan basin comprises about 10 km thick flysch, deltaic and continental sediments. The source and seal rocks of Balochistan basin are shales of Cretaceous-Paleocene Akhtar Nika, Jabrai and Nisai formations, Eocene Murgha Faqirzai and Mina formations. The reservoir rocks of Balochistan basin are limestones of Cretaceous-Paleocene Akhtar Nika, Jabrai and Nisai formations, sandstones of Eocene Mina and Shagala formations and Vihowa/Talar/Pishi groups. The Chagai-Raskoh-Wazhdad arc show negligible chances of hydrocarbons due to dominant igneous influence while the Kakar-Khorasan/northern Balochistan and Makran/southern Balochistan basins may show some chances of petroleum due to dominant sedimentary rocks especially the carbonate rocks (shale, marl and limestone) of Nisai group. Oil resources are frequently being developed from upper Indus basin, while gas resources are being developed from Sulaiman (middle Indus) and Kirthar (lower Indus) basins. 15-20km thick sedimentary cover with attractive structures, extensive source and cap rocks are found in Indus basin. The source and cap rocks of Sulaiman basin are shales of Jurassic Sulaiman group, Cretaceous Sembar, Goru and Mughalkot, Paleocene Rakhi Gaj (Bawata member), Dungan, Eocene Shaheed Ghat, Toi, Drug, Baska, Habib Rahi, Domanda, Pirkoh and Drazinda formations. The reservoir rocks of Sulaiman basin are Jurassic Sulaiman group limestone, Cretaceous Sembar, Goru, Parh, Mughalkot, Fort Munro, Pab and Vitakri sandstones and limestones, Paleocene Rakhi Gaj (Girdu member/Gorge beds) sandstone, Dungan limestone, Eocene Toi and Kingri sandstones, Drug marl/limestone, Habib Rahi and Pirkoh limestones, Vihowa group sandstone and conglomerate, etc. Source and cap rocks of Kirthar basin are shales of Jurassic Sulaiman group, Cretaceous Sembar, Goru and Mughalkot, Paleocene Khadro, Bara and Lakhra, Eocene Shaheed Ghat, Sohnari, Laki and Kirthar formations. Reservoir rocks of Kirthar basin are limestones/sandstones of Jurassic Sulaiman group, Cretaceous Sembar, Goru, Parh, Mughalkot and Pab, Paleocene Khadro, Bara and Lakhra, Eocene Laki and Kirthar formations. Due to increasing population and advance technology the demands of construction and dimension stones are increasing. Vast and huge deposits of easily mineable (200m depth to exposed surface) bed rocks of Sulaiman, Kirthar and Balochistan basins are being estimated as limestone deposits about 1205 billion ton/bt with breakup as Jurassic 490bt, Cretaceous 75bt, Paleocene 18bt, and Eocene 622bt; shale deposits 5799bt with breakup as Jurassic 33bt, Cretaceous 418bt, Paleocene 27bt, Eocene 4131bt and Oligocene-Pliocene 1190bt; sandstone deposits 5730bt with breakup as Cretaceous 1129bt, Paleocene 15bt, Eocene 953bt and Oligocene-Pliocene 3640bt. Further the eastern parts of Khuzdar district host the very large and good quality Paleocene Dungan limestone especially Mandhre Jove, Kharzan, Karkh areas and Jurassic Zidi limestone.