

## 15.1 **Unconventional Sources of Fossil Fuel and Carbon Management: India's Perspective**

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Oil shale, shale & tight gas, coal bed methane (CBM) and gas hydrate are unconventional sources of fuel. The R&D efforts towards exploration and exploitation of these resources have been/is being initiated to meet the challenges of India's energy requirements. The oil shale, shale and tight gas have limited resource potential; however the estimates for the potential resources for CBM and gas hydrate are around 20 and 2,000 TCF, respectively.

Oil shale in India is mostly reported from the Northeast from the area known as the belt of Schuppen and have in place oil reserves of ~15 billion tons. Shale liquification by retorting may involve CO<sub>2</sub> emissions, which could be a matter of concern for meeting the challenges of global climate change. Shale and tight gas exploration is still in a primitive stage and resource evaluations are being taken up.

Gas hydrate exploration in India is being conducted under the National Gas Hydrate Programme and the hydrates have been found in Krishna-Godavari, Mahanadi and Andaman basins. The hydrates delineated in Krishna-Godavari are considered one of the richest methane gas accumulations. CBM exploration and exploitation has started in India. The Great Eastern Energy Corporation Ltd (GEECL) has begun the first commercial production of CBM in West Bengal using hydraulic fracturing. The estimated in-place methane gas in the GEECL block is ~ 2 TCF. Reliance Industries Ltd. and Oil and Natural Gas Corporation have significant CBM reserves in their blocks. The R&D study towards molecular replacement of hydrated and coal bed methane by carbon dioxide sequestration are being planned.

The paper presents and discusses CO<sub>2</sub> management strategies towards exploration and exploitation of unconventional fossil fuel resources with special reference to oil shale, gas hydrate and coal bed methane.