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# What conventional and unconventional really mean in oil and gas

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There is some confusion in the oil and gas industry around the use of the terms conventional and unconventional with respect to oil and gas projects.

Unconventional typically describes oil or gas deposits that are produced using techniques other than a traditional oil or gas well, leading to the perception that unconventional is related to breakthroughs in technology and processing that enables the extraction of previously inaccessible hydrocarbons.

However, conventional and unconventional are in fact related to the accumulation of oil and gas with respect to geological conditions.



Oil and gas deposits form through the breakdown of organic matter and carbon rich substances such as plant and animal remains. These typically accumulate in lakes or inland seas during multiple cycles of basin fill and subsidence. The resulting organic rich sediments are then exposed to heat and pressure during burial and these break the organic material down into hydrocarbons. The geochemistry of the organic material and the deposition conditions then determine if the resulting hydrocarbons form coal, oil or gas.

If the conditions allow, the formation of hydrocarbons commences within the source rock. Hydrocarbons that mature into oil and gas may then migrate upward through the stratigraphy due to hydrodynamic influences, until they become trapped by a structural or stratigraphic feature such as an impermeable cap rock. The resulting accumulation of oil and/ or gas in this reservoir rock can then be extracted using traditional wells and are known as conventional deposits as illustrated in the figure below.

## Conventional vs unconventional deposit types

Any oil and gas that does not accumulate in a discrete accumulation due to a geological feature, is termed an unconventional deposit. These tend to be pervasive and over a larger area which may not have fully matured into accumulations of oil or gas. They include heavy oil, bitumen, tight gas, shale oil shale gas and oil shale.

Bitumen and oil shale are characterised by hydrocarbons that have not matured fully into oil or gas and where additional processing may be required prior to sale. Tight gas and shale oil shale gas are accumulations of oil and gas in a low permeability environment, where a specialised extraction technology may be required. An additional unconventional deposit is the formation of gas within a coal formation, for example, coalbed methane. The gas in coalbed methane deposits remains adsorbed into the coal matrix and hence cannot migrate and accumulate.

Conventional is therefore related to the discrete accumulation of oil and gas in relation to a structural or stratigraphic feature that is affected by hydrodynamic influences. Unconventional relates to hydrocarbon accumulations that lack maturity or accumulation in a reservoir due to hydrodynamic influences.

Therefore, while unconventional deposits typically require specialised extraction technology or significant processing prior to sale, unconventional is specifically related to the accumulation of oil and gas with respect to the geological conditions, and not the requisite processing techniques required to liberate the oil or gas.

**Source:** Venmyn Deloitte

## ABOUT THE AUTHOR

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