Oil and Gas

Questions and Facts

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1. What Are Hydrocarbons?

Hydrocarbons are molecules made of two elements: hydrogen and carbon. Hydrogen is the simplest atom in the universe, comprising approximately 75% of all visible matter. Carbon is the most structurally versatile element, capable of forming more bonds and more complex molecular architectures than any other element. A hydrocarbon is hydrogen bonded to carbon — the universe's most abundant element locked into the universe's most complex structural element.

Oil is composed of medium-to-long-chain hydrocarbons. Natural gas is composed of short-chain hydrocarbons, predominantly methane (CH_4) — one carbon atom bonded to four hydrogen atoms. Coal contains the longest and most complex hydrocarbon molecules.

The standard explanation is that these substances are "fossil fuels" — the compressed remains of ancient biological organisms, formed over millions of years in sedimentary basins. This is taught as established fact.

It is a theory.

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2. Where Else Do Hydrocarbons Exist?

Saturn's moon Titan has lakes, rivers, and seas of liquid methane and ethane on its surface. Cassini mission data confirmed this in 2007. Titan's hydrocarbon lakes contain hundreds of times more liquid hydrocarbons than all known oil and natural gas reserves on Earth. Its equatorial dunes hold more organic material than all of Earth's coal reserves. Titan has a complete hydrological cycle — evaporation, clouds, rain, rivers, lakes — but running on hydrocarbons instead of water.

No biological organism has ever existed on Titan. No ancient forests were compressed. No plankton died and settled into sedimentary layers. The hydrocarbons are there because hydrocarbons form through inorganic processes.

Methane has been detected in the atmospheres of Jupiter, Saturn, Uranus, and Neptune. Hydrocarbons have been found encapsulated in diamonds formed deep in Earth's mantle. Methane is present in mid-ocean ridge hydrothermal vents. Comets and asteroids contain hydrocarbons.

The question: If hydrocarbons form inorganically throughout the solar system, on planets and moons where no biology has ever existed, why does the standard model insist they can only form biologically on Earth?

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3. The Abiogenic Hypothesis

The idea that petroleum originates from deep within the Earth — not from dead organisms — is not new. It was first proposed by Georgius Agricola in the 16th century. Alexander von Humboldt advanced it in 1804. Dmitri Mendeleev — the inventor of the periodic table — argued for it in 1877. The French chemist Marcellin Berthelot supported it in the 19th century.

In the 20th century, the hypothesis was developed extensively by Russian and Ukrainian scientists, beginning with Nikolai Kudryavtsev in 1951. It became the working theory of Soviet petroleum geology for decades. Russian and Ukrainian researchers proposed that hydrocarbons are generated in the Earth's mantle under conditions of extreme heat and pressure, and migrate upward through deep faults into the crust, where they accumulate in reservoirs.

Thomas Gold, the Austrian-born astrophysicist (who also correctly predicted the pulsar mechanism), revived the hypothesis in the West from the late 1970s onward. His 1998 book *The Deep Hot Biosphere* argued that hydrocarbons are primordial — present since Earth's formation — and that they slowly migrate toward the surface through cracks in the crust. Gold pointed to a fact that remains unexplained by the fossil fuel model: commercial petroleum production at some sites releases immense amounts of helium gas. Helium is a primordial element, not a product of biological decomposition.

In 2009, researchers at KTH Royal Institute of Technology in Stockholm demonstrated experimentally that hydrocarbons can be synthesised under conditions matching those of the upper mantle, without any biological material. The experiment used iron oxide, calcium carbonate, and water under extreme heat and pressure, producing methane and hydrocarbons containing up to ten carbon atoms.

The Russian-Ukrainian theory proposes that the accumulation of oil and gas is part of the natural process of Earth's outgassing — the same process responsible for the creation of the hydrosphere, the atmosphere, and the biosphere.

The question: If the outgassing of hydrocarbons from the mantle created the conditions for Earth's oceans and atmosphere, doesn't this make oil and gas part of Earth's *original operating system* rather than a byproduct of dead biology?

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4. Anomalies in the Fossil Fuel Model

Several observations remain difficult to explain under the standard biogenic model.

Oil in the wrong rocks. Petroleum has been found in non-sedimentary rocks — granite, metamorphic rock, volcanic rock — where no biological material could have accumulated. The White Tiger field offshore Vietnam produces oil from granite basement rock, far below any sedimentary layer. The Dnieper-Donets Basin in Ukraine, considered geologically "sterile" by Western standards, became one of the Soviet Union's most productive oil regions at depths of 6-8 kilometres.

Oil below the "oil window." Standard petroleum geology defines a depth and temperature range (the "oil window") within which biological material can theoretically be converted to oil — roughly 2-4 kilometres depth. Below this, hydrocarbons are supposed to be destroyed by heat. Yet deep and ultra-deep petroleum deposits exist at temperatures far exceeding this range.

Kudryavtsev's Rule. In many petroleum-bearing regions, hydrocarbons are found at every depth that has been drilled, not only within the predicted "oil window." If oil forms from specific biological deposits at specific depths, why is it distributed through the full vertical extent of the crust?

Reservoir behaviour. There have been numerous reports of oil fields not depleting at predicted rates, and in some cases apparently being resupplied from depth. The Eugene Island 330 field in the Gulf of Mexico, expected to be in decline by the 1990s, instead surged in output. Seismic imaging revealed oil migrating upward from deeper zones. The U.S. Department of Energy funded studies on this anomalous replenishment. Similar observations have been reported in the Middle East, in deep gas wells in Oklahoma, and elsewhere. The phenomenon remains debated, but the observations themselves are documented.

The question: If oil is the decomposed remains of ancient organisms trapped in specific sedimentary formations, why does it appear in granite, why does it exist below the temperature at which it should be destroyed, why does it occur at every depth drilled, and why do some reservoirs appear to be replenished from below?

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5. What Do Hydrocarbons Do Inside the Earth?

Regardless of their origin, hydrocarbons perform observable physical functions within the Earth's crust and mantle.

Pressure regulation. Sealed hydrocarbon reservoirs create pressurised zones that maintain crustal architecture. Gas pockets act as pressure buffers, absorbing and redistributing forces from mantle convection and tectonic stress. When oil and gas are extracted, reservoir pressure drops — this is why the industry reinjects gas and water to maintain pressure. The question of what happens to the wider crustal architecture when these pressure systems are depleted at industrial scale is rarely asked.

Fault lubrication. Fluids in fault zones — including hydrocarbons — reduce friction along fault planes. Research confirms that fluids play a critical role in seismic mechanics: they lubricate fault surfaces and alter effective stress on pre-existing faults. A Nature Communications study found evidence that methane-hydrogen fluid migration along tectonic discontinuities in subduction zones may trigger seismic activity through brittle failure of hard rocks. Gas anomalies have been consistently observed along fault zones in field observations and satellite data, with CO emissions correlating with earthquake magnitude and rupture extent.

The seismic consequence of extraction. The removal of hydrocarbons from the crust demonstrably affects seismic behaviour. Oklahoma experienced a surge in seismicity beginning in 2009, with its rate of magnitude 3+ earthquakes exceeding California's from 2014 through 2017. Scientists concluded these were induced by oil and gas operations. Wastewater injection into deep wells — a byproduct of extraction — has been conclusively linked to earthquakes. Faults that had been inactive for 300 million years in the Fort Worth Basin reactivated following oil and gas operations. Researchers concluded the recent earthquakes could not be explained by natural geological processes.

The inverse observation. An Italian study found that where methane reservoirs sit above seismic faults, those faults are less prone to generating destructive earthquakes. The researchers proposed that the presence of gas deposits may indicate structurally intact, unfractured zones. The gas and the stability may be related.

Thermal transport. Hydrocarbons migrate heat from Earth's deep interior toward the surface. Gold's deep gas hypothesis treats this as part of the planet's thermal regulation — a continuous, slow outgassing process carrying heat energy through the crust.

The question: If hydrocarbons regulate pressure, lubricate faults, modulate seismic activity, and transport heat within the crust, are they functional components of Earth's structural system? And if so, what are the long-term consequences of removing them at industrial scale?

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6. What Happens When You Burn a Hydrocarbon?

The chemistry of hydrocarbon combustion is simple and absolute. When a hydrocarbon (carbon + hydrogen) burns in the presence of oxygen, it produces exactly three things: carbon dioxide, water, and heat.

Hydrocarbon + $O_2 \rightarrow CO_2 + H_2O$ + energy

Methane: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
Propane: $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

The hydrogen atoms in the hydrocarbon bond with oxygen to form water. The carbon atoms bond with oxygen to form carbon dioxide. The energy stored in the carbon-hydrogen bonds is released as heat.

This means that every combustion event converts stored structural-energy material (hydrocarbon) into an information-carrying medium (water) and a gas (CO_2) that is then available to the atmosphere and biosphere.

Methane has the highest hydrogen-to-carbon ratio of any hydrocarbon (4:1). It therefore produces more water and less CO_2 per unit of energy than any other fossil fuel.

The question: If burning hydrocarbons converts them into water and CO_2, and water is the medium that carries dissolved minerals, maintains biological function, and supports protein folding at cellular scale — is combustion a destruction of resources, or a conversion of one functional medium into another?

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7. The Body Analogy

The human body contains both water-based systems and lipid (oil/fat) systems. They perform fundamentally different functions.

Water (approximately 60% of body mass): blood plasma, interstitial fluid, intracellular fluid, cerebrospinal fluid. These carry dissolved ions, hormones, nutrients, and electromagnetic charge patterns. They connect the entire body into a single coherent system. They maintain protein folding through structured (EZ) water at biological interfaces.

Lipids (fats and oils): cell membrane architecture (the lipid bilayer), myelin sheaths insulating nerve fibres, adipose tissue for energy storage and structural padding, synovial fluid lubricating joints. These provide structure, insulation, energy storage, and mechanical function. They do not carry the body's organisational information — they provide the physical architecture within which the information system operates.

Earth's water system: oceans, rivers, lakes, groundwater, atmospheric moisture, interstitial water in rock. Carries dissolved minerals, supports biological function, participates in the electromagnetic environment.

Earth's hydrocarbon system: oil, gas, coal, distributed through the crust and mantle. Provides structural pressure, fault lubrication, thermal transport, energy storage.

The question: Is the relationship between water and hydrocarbons within the Earth analogous to the relationship between water and lipids within the body — two complementary systems, one carrying information and one providing structure?

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8. The Origin Question

The standard model says: ancient organisms died, were buried in sediment, compressed over millions of years, and transformed into oil and gas. Biology produced hydrocarbons. Life came first.

The abiogenic model says: hydrocarbons are primordial or are continuously generated in the mantle through inorganic processes. They migrate upward through the crust. The outgassing of these hydrocarbons contributed to the creation of the atmosphere and hydrosphere. Hydrocarbons came first. The conditions for life followed.

On Titan, hydrocarbons exist in vast quantities with no biology. On Earth, hydrocarbons exist in non-biological rocks, below the biological formation window, at every depth drilled, and in some cases appear to be replenished from below. Hydrocarbons exist on comets, asteroids, and gas giants.

Thomas Gold observed: it seemed absurd to see petroleum hydrocarbons on other planets where there was obviously never any vegetation, yet insist that on Earth they must be biological in origin.

A Russian research team found that the petroleum generation process in reservoir conditions occurs rapidly in the presence of discrete geomagnetic fields, driven by spin magnetic effects and spin catalysis — electromagnetic processes, not biological decomposition.

The question: Does the evidence support the claim that biology produced hydrocarbons? Or does it support the possibility that the electromagnetic and chemical processes of the Earth produced hydrocarbons, which then — along with water and atmosphere — created the conditions in which biology became possible?

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9. Summary of Facts

1. Hydrocarbons are composed of hydrogen (75% of visible matter) and carbon (most structurally complex element)
2. Hydrocarbons exist throughout the solar system where no biology has ever existed
3. Titan alone contains hundreds of times more hydrocarbons than all of Earth's known reserves
4. The abiogenic hypothesis has been proposed by major scientists since the 16th century and was the working model of Soviet petroleum geology for decades
5. Laboratory experiments have synthesised hydrocarbons under mantle conditions without biological material

6. Oil has been found in granite, metamorphic rock, and below the theoretical formation depth
7. Some oil fields show evidence of replenishment from deeper sources
8. Hydrocarbons regulate pressure, lubricate faults, transport heat, and modulate seismic activity within the crust
9. Removal of hydrocarbons has reactivated faults dormant for 300 million years
10. Methane reservoirs above faults correlate with reduced seismic risk
11. Burning any hydrocarbon produces exactly three things: water, carbon dioxide, and energy
12. Hydrocarbon outgassing from the mantle is proposed to have contributed to the creation of Earth's oceans and atmosphere
13. Electromagnetic fields (spin catalysis) have been shown to drive hydrocarbon formation in reservoir conditions
14. Gas anomalies along fault zones correlate with seismic activity in both field observations and satellite data
15. The "fossil fuel" designation remains the prevailing term despite the existence of hydrocarbons throughout the solar system

10. Summary of Questions

1. If hydrocarbons form inorganically throughout the solar system, why must they be biological on Earth?
2. If hydrocarbon outgassing created Earth's oceans and atmosphere, did hydrocarbons enable life rather than derive from it?
3. If oil exists in granite, below the oil window, and at every depth drilled, is the biogenic model sufficient?
4. If hydrocarbons regulate pressure, lubricate faults, and modulate seismicity, are they functional components of Earth's structural system?
5. If removing hydrocarbons reactivates dormant faults, what are the long-term structural consequences of industrial extraction?
6. If burning hydrocarbons converts structural-energy material into water and CO_2, is this a destruction or a transformation?
7. Is the relationship between water and hydrocarbons in the Earth analogous to water and lipids in the body?
8. If electromagnetic fields drive hydrocarbon formation, what does this imply about the role of the electromagnetic environment in Earth's deep chemistry?
9. Why does the standard model insist on a biological origin for a substance that exists abundantly in purely inorganic environments?
10. What would change — in science, in energy policy, in our understanding of the planet — if the origin question were answered differently?

This document presents established facts and open questions. It does not assert conclusions. The reader is invited to follow the evidence.

Document version: v1.0, February 2026 **Status:** Questions and facts — no conjecture