

Beyond Fossil Fuels: Technological Carbon Cycle for a Sustainable Future

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Energy

Capacity for doing work,
generating heat, electricity etc.

Outlook

Sun is essentially the source of all of our energy. No energy shortage is foreseeable, but we need better capture, storage and use.

Sources

Fossil fuels (coal, oil, gas)
Hydro, geothermal
Solar, wind etc.
Atomic

Fossil Fuels

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graph TD; A[Fossil Fuels] --> B[Coal, Oil, Natural Gas, Tar-Sand, Shale, Bitumen]; B --> C[They are mixtures of hydrocarbons, i.e. compounds of elements carbon and hydrogen. When oxidized (combustion) they form carbon dioxide (CO2) contributing to global warming. They are not renewable in nature on the human time-scale.];
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Carbon Conundrum

Environmental effect

Excessive CO₂ production contributes to global warming

Burning of fossil fuels, living organisms

Natural and industrial sources (natural gas production, geothermal wells, varied industries)

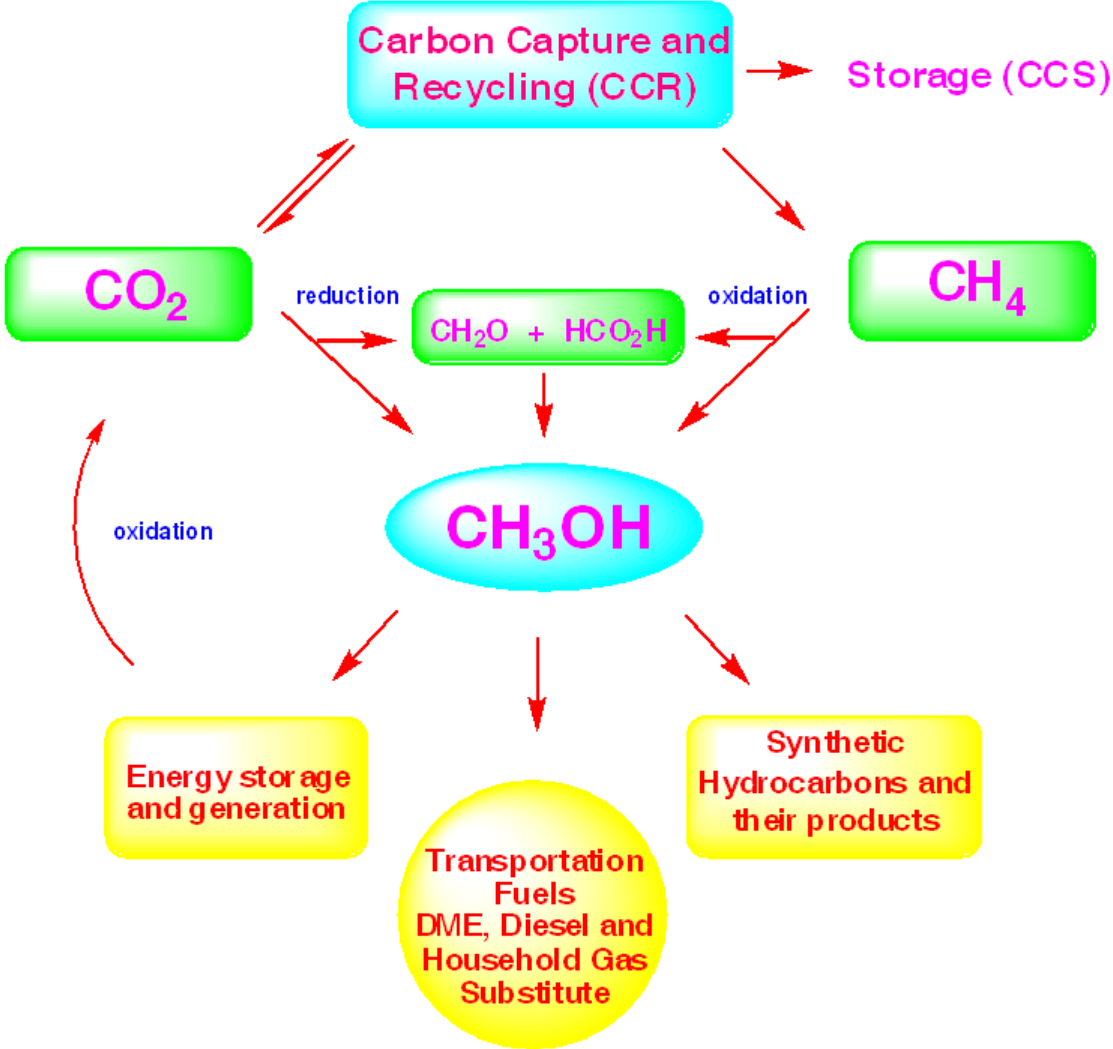
Essential element for terrestrial life

Nature's carbon cycle (photosynthesis)

Limited fossil fuel resources are increasingly depleted

Nature's carbon cycle takes a long time. Technological CO₂ recycling via **Methanol Economy** is developed

Technological Carbon Cycle





Significance of Methanol Economy

Key of technological carbon cycle

- **Renders carbon fuels environmentally neutral and regenerable**
- **Replaces fossil fuels with inexhaustible universal availability**
- **Fuels for internal combustion, electric and diesel engines, electricity generators, fuel cells**
- **Substitute household and heating gas**
- **Efficient energy storage, transportation and generation**
- **Source material for olefins (ethylene, propylene) and derived synthetic hydrocarbons and their products**
- **Synthetic protein production**

Technological Carbon Capture and Recycling (CCR)

Basis of Methanol Economy

Renders carbon containing fuels and products environmetally neutral

Provides sustainable, universally available regenerative carbon source via carbon dioxide recycling using any energy source (alternates with emphasis on solar and atomic) and hydrogen of water

Replaces diminishing fossil fuels freeing humaninty from dependence on coal, oil and natural gas

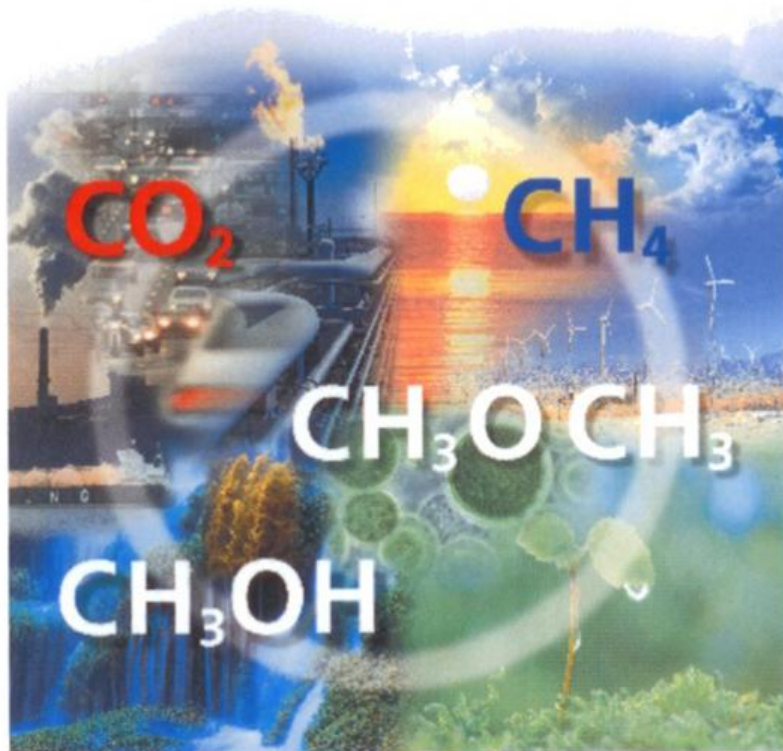
Essential difference from temporary, costly and potentially dangerous carbon capture and storage (CCS) subterrain or under water

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