



## Methane: Space Fuel

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The **Indian Space Research Organization (ISRO)** is developing **methane-powered rocket engines**.

- **Methane**, which can be **synthesised with water and carbon dioxide in space**, is often described as the **space fuel of the future**.
- ISRO currently prefers to use a fuel called **Unsymmetrical Di-Methyl Hydrazine**, along with Nitrogen tetroxide for oxidiser, in its liquid fuel engines, which are used in the lower stages of its rockets, **Polar Satellite Launch Vehicle (PSLV)** and **Geosynchronous Satellite Launch Vehicle (GSLV)**.
  - This fuel, like all hydrazine-based fuels, is said to be **highly toxic and cancer-causing**.
  - Globally, governments are keen on banning hydrazine.
- **Advantages of Methane over Hydrazine:**
  - Apart from being **non-toxic**, it has a **higher specific impulse** (which means one kg of the gas can lift one kg of mass for a longer time).
  - It is easy to store and does not leave a residue upon burning.
  - It is less bulky and can be **synthesised up in space**.
- **Disadvantage:** Methane-fired engines **need an igniter to start the fire** whereas **Hydrazine fuels are hypergolic**, which means they start burning on their own upon coming in contact with oxygen.

**Source: HBL**