

Crisis of Helium in India

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In News: India imports the majority of helium for its domestic needs. However, the U.S appears to cut off exports of helium from 2021. Hence, the Indian industry may have to find an alternative.

About Helium

- Helium (He) is an inert gas of Group 18 (noble gases) of the periodic table.
- The second lightest element (only hydrogen is lighter), helium is a colorless, odorless, and tasteless gas that becomes liquid at $-268.9\text{ }^{\circ}\text{C}$ ($-452\text{ }^{\circ}\text{F}$).
- The boiling and freezing points of helium are lower than those of any other known substance.
- Helium is the only element that cannot be solidified by sufficient cooling at normal atmospheric pressure; it is necessary to apply pressure of 25 atmospheres at a temperature of 1 K ($-272\text{ }^{\circ}\text{C}$, or $-458\text{ }^{\circ}\text{F}$) to convert it to its solid form.

Abundance of Helium

- Helium constitutes about 23 percent of the mass of the universe and is thus second in abundance to hydrogen in the cosmos. Helium is concentrated in stars, where it is synthesized from hydrogen by nuclear fusion.
- Although helium occurs in Earth's atmosphere only to the extent of 1 part in 200,000 (0.0005 percent) and small amounts occur in radioactive minerals, meteoric iron, and mineral springs, great volumes of helium are found as a component (up to 7.6 percent) in natural gases in the United States (especially in Texas, New Mexico, Kansas, Oklahoma, Arizona, and Utah).
- Smaller supplies have been discovered in Algeria, Australia, Poland, Qatar, and Russia. Ordinary air

contains about 5 parts per million of helium, and Earth's crust is only about 8 parts per billion.

Uses of Helium

- Helium is used as a cooling medium for the Large Hadron Collider (LHC), and the superconducting magnets in MRI scanners and NMR spectrometers.
- It is also used to keep satellite instruments cool and was used to cool the liquid oxygen and hydrogen that powered the Apollo space vehicles.
- Because of its low-density helium is often used to fill decorative balloons, weather balloons and airships.
- Because it is very unreactive, helium is used to provide an inert protective atmosphere for making fibre optics and semiconductors, and for arc welding.
- Helium is also used to detect leaks, such as in car air-conditioning systems, and because it diffuses quickly it is used to inflate car airbags after impact.
- A mixture of 80% helium and 20% oxygen is used as an artificial atmosphere for deep-sea divers and others working under pressurized conditions.
- Helium-neon gas lasers are used to scan barcodes in supermarket checkouts.
- A new use for helium is a helium-ion microscope that gives better image resolution than a scanning electron microscope.

Why does India need Helium?

- India imports helium worth Rs 55,000 crores from the U.S. to meet its needs, Every year.
- Used in medicine, scientific research, for blimp inflation, party balloons as well as having welding applications.
- Many other applications as well mainly in magnetic resonance imaging (MRI) scans, in rockets and in nuclear reactors.