

## Lab Grown Diamonds

The Ministry of Finance has prioritized laboratory-grown diamonds (LGD) in the 2023–2024 Union Budget. In this context, it is important to understand what are lab-grown diamonds? Are lab-grown diamonds real diamonds, etc. In this article, you can read all about lab-grown diamonds in India, from the [UPSC exam](#) perspective.

What are Lab-Grown Diamonds (LGDs)?

**Lab-grown diamonds are also known as synthetic diamonds.**

- These are synthetic diamonds having identical chemical and physical characteristics to diamonds found in nature.
- Scientists at a General Electric research facility in New York invented the first LGD in 1954.

**Use of Lab-Grown Diamonds:**

- Due to their superior thermal conductivity, pure synthetic diamonds are employed as heat spreaders for high-power laser diodes and high-power transistors in electronics.
- They are used as cutters and in other tools and machinery that need these characteristics.
- They are often employed in industrial settings because of their strength and hardness.

**How are they produced?**

- **Two basic processes**—the High-Pressure High Temperature (HPHT) approach and the Chemical Vapour Deposition (CVD) method—are used to produce lab-grown diamonds.
- In the HPHT process, pure graphite carbon and a seed diamond are subjected to temperatures and pressures that are over 1,500 degrees Celsius.
- The seed diamond is heated using the CVD process inside a sealed chamber that is filled with gas rich in carbon.

**Lab-grown Diamonds Significance**

- The manufacturing of lab-grown diamonds has a **lesser environmental impact than natural diamond extraction**.
- Open-pit mining produces a lot of waste and causes environmental damage, such as soil erosion and water and [air pollution](#).
- However, the manufacture of lab-grown diamonds can take place in a controlled setting, lowering the possibility of environmental harm.

## Diamond Industry in India

A brief about the diamond industry in India is given below.

- The largest diamond exporter in the world is India.
- **19% of all diamond exports worldwide come from India.**
- Only diamonds make up 50% of the country's total gem and jewellery exports.
- A significant location for the production of diamonds is Surat, Gujarat.
- The biggest market for cut and polished diamonds is the United States, closely followed by China.
- The established diamond industry in India, which performs these duties, is not likely to be impacted by the increase in the production of LGDs.
- Every year, the nation exports diamonds to nations like China, the United States, and the United Arab Emirates.

### Lab-Grown Diamonds & Indian Economy

- The Indian economy is significantly influenced by the gems and jewellery industry.
- It contributes roughly 7% to GDP and 10%–12% to all exports of goods from the nation.
- With 5 million skilled and semi-skilled workers employed, it is one of the leading sectors in terms of job creation.

### Lab-Grown Diamonds in India Challenges

There are challenges facing lab-grown diamonds in India.

- The availability of scientists to oversee the growth of LGDs.
- The second will be the resistance the market might put up.
- The electricity failure can change the structure of the diamond.