



## Mains Practice Question

**Q.** Energy is the most fundamental requirement of every society or nation as it progresses through the ladder of development. In the light of the statement discuss the role of nuclear energy. (250 Words)

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### Approach

- Start with briefly explaining the significance of energy for the development of a society or nation.
- Discuss the role of nuclear energy for the development of India.
- While discussing the challenges of nuclear energy, suggest some measures to deal with the issue.

### Introduction

In recent times, the world has been dealing with a power and energy crisis. While the factors that caused this emergency differ country to country, the upshot has been a clamour to reduce dependence on fossil fuels and look for viable alternatives.

In this context, Nuclear Energy has a lot to offer. On one side, it may be the cheapest, greenest and safest source of energy currently known to man. On the other, it has also been responsible for some of the worst disasters in the history of mankind

### Body

#### Role of Nuclear Energy in the development of the Indian society -

- **Availability of Thorium:** India is the leader of the new resource of nuclear fuel called Thorium, which is considered to be the nuclear fuel of the future.
  - With the availability of Thorium, India has the potential to be the first nation to realise the dream of a fossil fuel-free nation.
- **Cuts Import Bills:** Nuclear energy will also relieve the nation of about \$100 billion annually which we spend on importing petroleum and coal.
- **Stable and Reliable Source:** The greenest sources of power are definitely solar and wind. But solar and wind power, despite all their advantages, are not stable and are dependent excessively on weather and sunshine conditions.
  - Nuclear power, on the other hand, provides a relatively clean, high-density source of reliable energy with an international presence.
- **Cheaper to Run:** Nuclear power plants are cheaper to run than their coal or gas rivals. It has been estimated that even factoring in costs such as managing radioactive fuel and disposal nuclear plants cost between 33 to 50% of a coal plant and 20 to 25% of a gas combined-cycle plant.

#### Challenges to Adoption of Nuclear Energy -

- **Capital Intensive:** Nuclear power plants are capital intensive and recent nuclear builds have

suffered major cost overruns. An illustrative example is the V.C. Summer nuclear project in South Carolina (U.S.) where costs rose so sharply that the project was abandoned — after an expenditure of over \$9 billion.

- **Acquisition of Land:** Land acquisition and selection of location for Nuclear Power Plant (NPP) is also a major problem in the country.
  - NPP's like Kudankulam in Tamil Nadu and Kovvada in Andhra Pradesh have met with several delays due to the land acquisition related challenges.
- **Deployment at Insufficient Scale:** It might not be the appropriate choice for mitigating India's carbon emissions since it cannot be deployed at the necessary scale.
- **Nuclear Waste:** Another side effect of nuclear power is the amount of nuclear waste it produces. Nuclear waste can have drastically bad effects on life, causing cancerous growths, for instance, or causing genetic problems for many generations of animals and plants.
  - In a densely populated country such as India, land is at a premium and emergency health care is far from uniformly available.

### Measures that can Be taken -

- **Subsidy on Nuclear Electricity:** Electricity from the nuclear reactors would cost at least ₹ 15 per unit excluding transmission costs, whereas the recent low bids for solar power stand at ₹2.14 per unit and ₹2.34 for solar-wind hybrid projects.
  - If nuclear electricity is to be sold at a competitive rate, it would have to be greatly subsidised by the Indian government, which operates all nuclear plants through the Nuclear Power Corporation of India.
- **Addressing the Pre-Project Issues:** The government must address issues related to the pre-project activities such as land acquisition at new sites, clearances from various ministries especially from the environment ministry and finding timely foreign collaborators.
  - In addition, continuous efforts must be made to bring down the capital cost of nuclear power plants.
- **Addressing Safety Concerns:** Safety which is a major concern should be addressed on priority basis.
  - In this regard, setting up a Nuclear Safety Regulatory Authority at the earliest would be helpful to the nuclear power programmes in the country.
- **Technological Support:** Reprocessing and enrichment capacity also require boost in India. For this India needs advanced technology to fully utilise the spent fuel and for enhancing its enrichment capacity.

### Conclusion

India is blessed with the rare, and very important, nuclear fuel of the future – Thorium. It cannot afford to lose the opportunity to emerge as the energy capital of the world, which coupled with the largest youth power, will be India's answer to emerge as the leading economy of the world.