Nuclear: A More Reliable Source of Energy

This article is based on "Nuclear Power: A Climate Response That Gets Short Shrift" which was published in Livemint on 17/10/2021. It talks about the issues associated with renewable energy sources and how nuclear energy can prove to be a more viable alternative for fossil fuels.

In the immediate past, the world was 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 increase production of renewable energy.

However, the current green **energy paradigm needs some serious examination** in terms of 24x7 availability of these renewable resources.

Notwithstanding that **Nuclear Power** may be the cheapest, greenest and safest source of energy currently known to man. Every time the word "nuclear" is uttered, it gets a **negative and often hysterical response** rather than a reasoned fact-based one.

In the Indian context, nuclear, despite being a cleaner fuel, remains outside the priority list of power sources in India; **India contributes only 1.72% of global nuclear installed capacity.**

Nuclear Energy

- **About:** Nuclear energy comes from splitting atoms in a reactor to heat water into steam, turn a turbine and generate electricity.
    - Inside **nuclear power plants**, nuclear reactors and their equipment contain and control the chain reactions, most commonly fuelled by **Uranium**-235, to produce heat through fission.
- **Emissions from Nuclear Power Generation**: Nuclear power is **zero-emission**. It has **no greenhouse gases** or air pollutants.
- **Land Usage**: According to US government data, a 1,000-megawatt nuclear plant **requires 360 times less land than a similar-capacity wind farm** and 75 times less land than solar plants.
- **Nuclear Over Renewables:**
    - **Renewables are Unstable Sources**: **Solar** and **wind energy** are intermittent and unstable. The power from these sources can only be generated when the sun shines or wind blows.
        - Even in the best case scenario, solar and wind farms do not and **can never generate power round the clock**, they **require fossil-fuel back-up.**
        - Currently, 24% of Britain's power comes from wind. But the country saw an unexpected "**windless summer**" this year, which is one of the reasons for the UK power crisis.
    - **Ecological Damage from Renewables:** Wind and solar projects can cause **ecological damage to the relatively pristine areas** where they are set up.
        - It is conservatively estimated that 500,000 birds are being killed every year by **collision with wind turbines** in the US.

    - **Nuclear as an Alternative**: In contrast to the intermittent nature of renewables like solar and wind, nuclear power can be used both to cover the electrical base load and for peak load operations.
        - Among the EU nations, Germany's household-sector electricity price is the highest in the EU: $0.37 per kilowatt-hour (KwH) whereas in France, it's $0.19.
        - **Power in France is much cheaper and cleaner** as the **country is mainly dependent on nuclear energy.**
            - In 2020, nuclear power made up 78% of the energy France generated, and renewables 19%. Fossil fuels accounted for only 3%.
- **Nuclear Energy and India:** India under the Prime Ministership of Dr Manmohan Singh signed the **Indo-US nuclear deal.**
    - However, due to the usual protests and short-term political thinking not much strict actions were taken in the direction and **only 3% of the power India generates is nuclear.**
    - In September 2021, the government announced that India would **triple its nuclear power capacity** in the next 10 years.

Issues Associated to Nuclear Energy

- **Lack of Public Funding:** Nuclear power has **never received the quantum of generous subsidy** the fossil fuel received in the past and renewable is receiving currently.
    - In **absence of public funding,** nuclear power will find it tough to compete against natural gas and renewables in the future.
- **Factors Pulling Nuclear Out of Competition**: Increasingly **poor economics of nuclear power** across the world, **skyrocketing construction costs,** made worse by the **post-Fukushima safety upgrades**, and **reliance on massive government subsidies** are making nuclear power uncompetitive.
- **Poor Financial Conditions of Investors**: The dire financial state of the foreign companies (**Toshiba-Westinghouse and Areva**) that were planning to build nuclear power plants in India is also the cause of failure of nuclear energy as a priority resource for India.
    - The very survival of these companies is at stake today as either they are **indebted to the State** or their **value has been degraded** due to competition.
- **Grassroots Resistance:** Reluctance towards new nuclear power plants in India resulted in considerable delay in commissioning the **Kudankulam plant** and forced the shifting of Westinghouse's first planned project from Gujarat to Andhra Pradesh.
- **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.

Way Forward

- **Utilising the Available Resources:** The estimated natural deposits of Uranium are about 70,000 tonnes and Thorium are about 3, 60,000 tonnes in the country.
    - Hence, India imports much of the uranium it uses. However, it is both expensive and geopolitically tricky.
    - Instead of spending large amounts in imports of uranium, it shall **invest ambitiously in projects that convert thorium to fissile uranium** and produce power.
- **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.
    - Complete phasing out of nuclear power generation for the fear of nuclear accident would be a wrong move.
        - If nuclear energy is generated adhering to the highest standards of safety, there is less possibility of catastrophic accidents.
    - 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

- The global energy crisis should spur a rational relook at an energy source as clear as nuclear which needlessly seen as a hot potato.
    - We must make the right choices between various low-carbon technologies, all of which have some social and environmental impact.
- To meet rising energy demands, nuclear power is one of the better solutions. Considering lower capacity utilisation of renewables, rising fossil fuel prices and ever soaring pollution problems, the potential of nuclear power must be fully exploited.

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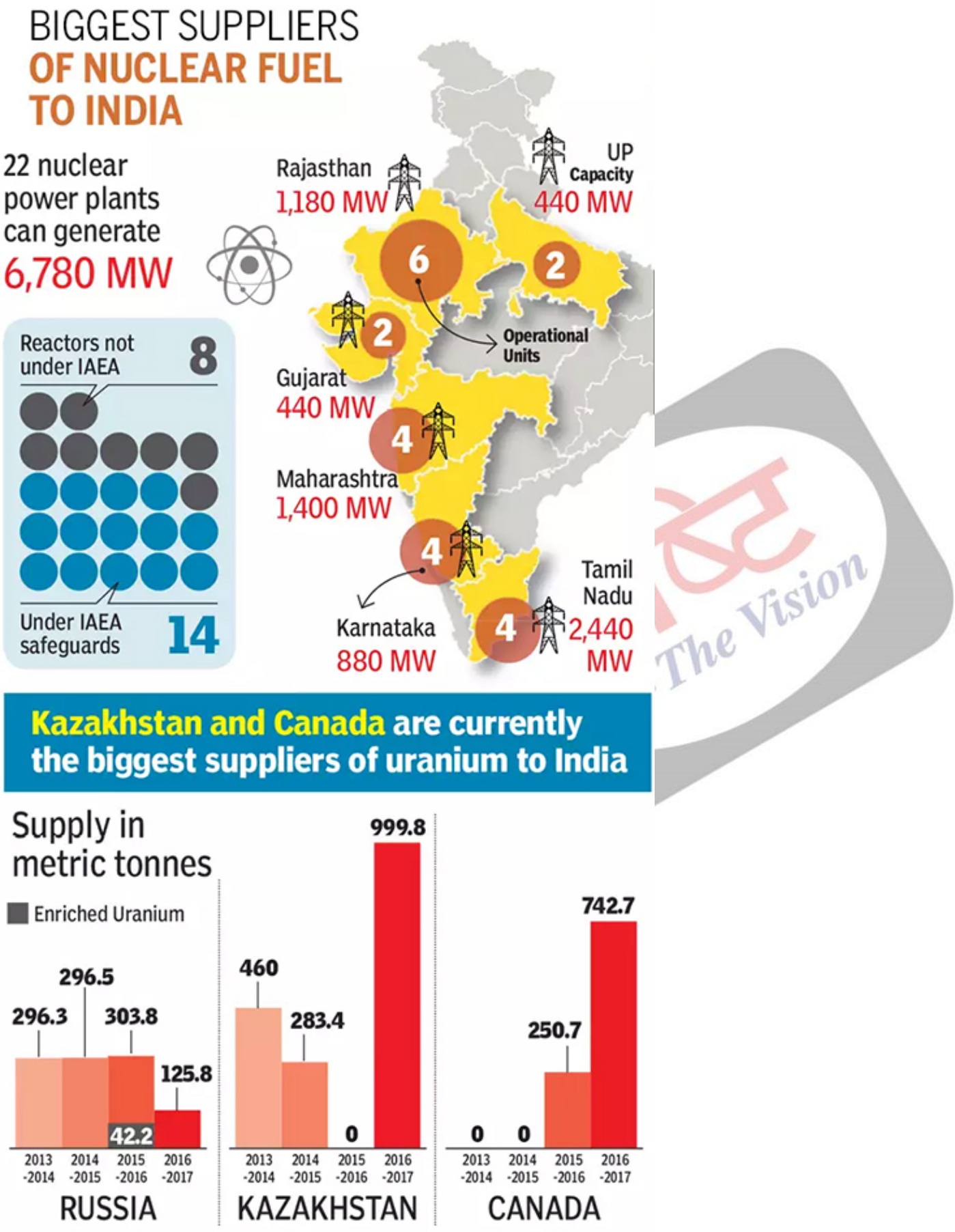

Drishti Mains Question

“The global energy crisis should spur a rational relook at an energy source as clear as nuclear which needlessly seen as a hot potato”. Comment.