

India at A Turning Point: Coal or Renewables-At Stake the Future of the Nation

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Abstract

Under the “Atmanirbhar Bharat Abhiyan”, the self-reliant India Scheme, the current BJP government wants to make India completely self-sufficient concerning energy requirements. To meet the growing energy needs of the nation, they plan to exploit coal deposits of India. This has major environmental implications as coal is one of the most pollutant forms of fossil fuel. This commentary article examines the pros and cons of such a decision. It considers all arguments and highlights why such a decision is short sighted and disastrous for the environment-nationally as well as globally.

Keywords: India scheme • Energy • Nation • Fossil fuel

Introduction

In May of this year, prime minister Narendra Modi announced the “Atmanirbhar Bharat Abhiyan”, the self-reliant India scheme. One of the goals under the scheme is to make India completely self reliant in its energy requirements.

An ambitious target was announced – to achieve local production of coal to 1 billion ton by 2024 thus ensuring complete self sufficiency in terms of energy requirements. The obvious choice was to rely on coal to power the energy hungry economy and to meet the needs of its 1.35 billion population [1]. India's Geological Resources of Coal is estimated to be around 319.02 Billion tonnes and a proven reserve of (108 Billion tons making it the fifth largest deposit of coal in the world) based on exploration carried out up to the maximum depth of 1200m by the GSI, CMPDI, SCCL and MECL etc.

It is no wonder the GOI is very keen on exploiting this abundant resource. Especially given the fact that India despite its reserves is the second largest importer of thermal coal (used to generate electricity) and metallurgical coal (high grade coal used to produce iron and steel) second only to China which accounts for 53% of total global consumption of coal in 2019 [2].

As of 2020 India is the third largest economy in the world based on PPP and one of the fastest growing economies in the world averaging 6.5%-7% p.a. in the last decade. It is also the third largest energy consumer. India's energy mix in 2018 was as follows:

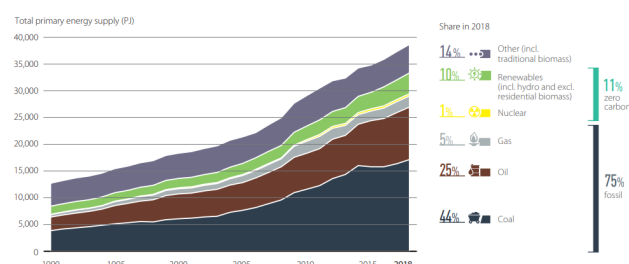


Figure 1. India's energy mix through the years.

The infograph shows the energy mix of India as of 2018. It includes energy used for electricity generation, heating, cooking, and transport fuels. India's energy reliance on coal has been steadily increasing since the 1970's when it was used to supply 20% of the energy needs to 44% of today's energy needs [3].

About Coal

Coal is one of the cheapest sources of fossil fuel. It is relatively inexpensive to mine coal and convert it into energy but it has dire environmental consequences. There are two ways coal can be mined on the surface of the ground or underground mines. The more popular method is the surface mine (strip mines) that remove the soil and rock above coal deposits. There are three types of surface mining (i) strip mining (ii) open pit mining and (iii) mountain top removal mining that literally involves removing the mountain top using explosives to extract the minerals lying underneath. Vast tracts of land measuring into hundreds of square kilometre are removed to mine the coal. It has grim environmental consequences for the

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surrounding ecosystem. Surface mining completely changes the topography of the landscape. All the aesthetic beauty of a place is lost. Valley fills are formed that can cover entire streams in the surrounding area stretching upto hundreds of miles. New streams cutting out of these valley fills contain pollutants that harm aquatic wildlife downstream [4]. The surrounding biosphere becomes inhabitable and desolate. Likewise underground mining results in precarious and dangerous surrounding. Mines can collapse and acidic water from the mines can contaminate surrounding streams and water bodies. Methane gas, one of the most potent of all greenhouse gases that occurs in coal deposits are released into the atmosphere. Then there is the resulting pollutions and emissions associated with transportation of coal.

Coal transportation can occur using the seas (lowest carbon footprint), road (highest carbon footprint) and the railways (medium carbon footprint). In India the preferred mode of coal transportation is the railways. Finally there is the emission from burning coal. But the worst part of using coals is that of all fossil fuels, coal emits the most carbon dioxide per unit of energy and this has major ramifications for global warming. While some of the other emissions from coal burning can be controlled by using installing equipment like the scrubbers and catalytic units, controlling CO₂ emissions poses a major challenge. This is compounded by the fact that 80% of India's coal plants use outdated and obsolete subcritical technologies and are highly inefficient and constitute as some of the most polluting power plants in the World. Such inefficiency has massive ramifications for the

environment. India is the third largest emitter of CO₂ next only to China and the US. It has been suggested by experts that India can significantly reduce its carbon emissions by adopting High Efficiency Low Emission (HELE) technologies such as supercritical and ultra-supercritical combustion technologies. In fact clean technology like Fluidised Bed Combustion (FBC) provide a "very flexible method of electricity production – most combustible material can be burnt including coal, biomass and general waste. FBC systems improve the environmental impact of coal-based electricity, reducing SO_x and NO_x emissions by 90%. It is the opinion of this author that at the very least if the Indian government has plans to continue using coal (and it does) to generate electricity, investments in these new cleaner technology is a must and should commence immediately. Indeed according to some experts investments in these cleaner technologies will outperform investments in renewables such as Solar Photovoltaic (SPV) power plants. Based on preliminary analysis it is found that CO₂ Avoidance Cost (CAC) of ultra-supercritical plants is much lower (Rs.875 to reduce a tonne of CO₂ emission) than Solar Photovoltaic (SPV) (averaging Rs. 2,624 to reduce a tonne of CO₂ emission) power plants [5].

The cost of CO₂ avoided reflects the cost of reducing CO₂ emissions while producing the same amount of power from a reference plant. But we must also consider the cost of producing electricity. According to article published in The Economist, India is the least cost electricity producer from coal, solar and wind sources in the Asia Pacific region. It states that "it is the only country in the region where cost of producing solar power is almost 14% less than cost of electricity generated from coal. Likewise, India's levelised cost of onshore wind power generation, estimated at \$48.9 per MWh (Rs 3.36 per unit) is cheapest in the region." But the Indian Solar industry is at its infancy. Numerous problems are faced by the industry this raises the issue of national security should India be so dependent on

Chinese imports? Because there is no immediate solution to the problem. China is the world's leading supplier of solar photovoltaic cells and panels, supplying 2/3 of the global supply. China accounts for 95% of rare earth production globally. The rare earth minerals are essential input in developing electronic and solar products. However, the rapidly rising domestic demand in China itself raises supply issues in the near future. For example, China already has solar capacity of 208GW, the highest in the world.

India has 31GW solar capacity. China reached their 2020 solar target of 105GW in July 2017 three years earlier where as India in all likelihood will miss its own stated target of 100GW of solar capacity by 2022. Reverting back to the rare earth minerals, it is indeed highly likely that China will rigorously control the production of these minerals in the years to come. Well as it turns out rare earth is not all that rare. Deposits exist outside of China, including in India. However, mining and processing poses considerable challenge with extensive negative environmental impact. But there is a silver lining here as well. Alternatives to rare earth materials are being researched and Lund University, Sweden, has come up with iron-based dyes to be used in solar cells in the future. 'By using iron instead of other more expensive and rare metals, the production of solar cells and light catchers will become cheaper and more environmentally friendly.'

Conclusion

We are at a cross roads. The world is at a cross roads. Climate change is an undeniable fact. Its impact are becoming more and more obvious and severe. Consider this year alone across the globe more than 207 natural disasters were recorded in the first six months of this year. Of them, 92% of it was caused by severe weather. There was a 27% increase in natural disasters as compared to 2019 for the same time period. Deadly heatwaves have been recorded in India, Pakistan, and Europe, and extreme flooding in south-east Asia. Wildfires have ravaged hundreds of thousands of hectares of forest land in Western America, Europe and Australia. Water scarcity in South America, Africa and India has hit new levels. Abnormally heavy rains have resulted in devastating floods in Cameroon, India, Bangladesh, China, Nepal, Yemen, South Sudan and Europe and the list goes on and on. These extreme weathers are happening more frequently and their impacts are becoming more severe. The number of climate-related disasters has tripled in the last 30 years. More than 20 million people a year are forced from their homes by climate change. The United Nations Environment programme estimates that adapting to climate change and coping with damages will cost developing countries \$140-300 billion per year by 2030.

Given this backdrop, is it wise for any nation - to invest in fossil fuels, particularly coal - one of the biggest sources of pollution? Can we afford to look at short term economic gains over long term sustainability? There is a responsibility of each and every nation to act in their sovereign interest but also to consider the impact of their actions on their neighbours. This is the basic tenet of "Stockholm agreement." At this hour, at this time of crisis, nations must champion the right values, uphold the right ideals and set the right examples. Hence, as a nation, we should introspect, understand the root causes of our social and economic failures. Seeking economic solutions (GDP growth) to our current social problems alone will not address the problem at heart. The following are some of the most pressing problems facing India (i) population growth (ii) urbanization (iii)

environment pollution (iv) poverty (v) unemployment (vi) water crisis (vii) corruption (viii) communalism (ix) inadequate healthcare (x) lack of quality education. All these social and environmental problems are intertwined. Addressing these problems requires addressing and making changes and reforms in multiple fronts education, healthcare, politics, governance, environment etc. It requires the government to initiate and implement bold moves and major reforms in key areas. In that lies our true liberation and progress. Our governments must look beyond vote bank politics. And refrain from disastrous decisions resulting in short term gains. When investments in clean energy takes years to materialize, when policies and laws propelling clean energy take time and are difficult to pass and enact, when foreign nations including the world's leading economies are pursuing growth based largely on fossil fuels; it is easy to justify short term action. But this is where it is imperative for our leaders to look in all earnestness as to what is beneficial for the country in the long run. Conservation of national resources should be priority one along with defence of the country. In light of the Rafael scandal, many media persons have stated that national defence should be above political wrangling. Similarly, preservation and conservation of national resources should be above vote bank politics. We as a nation must give much needed priority to the conservation and protection of our cherished and fragile ecosystem for ourselves and for the generations to come.

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