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Biofuels: Empowering the economy & conserving the environment

It cannot be denied that the road to a nation's development and prosperity opens up when the economy is able to create copious wealth. The challenge is to walk on a tight rope – while fulfilling rising energy demand, conserving the environment. While fossil fuels have accelerated the progress of human civilisation, it has caused irrevocable damage to the environment. No wonder, bio-fuels are seen as a promising and complementary energy resource. Here are some observations on how Praj's Bio-Mobility Platform of biofuels is positively impacting the environment and the economy.

Notwithstanding the adversities of the pandemic, India is projected to report close to double digit GDP growth this year, as per studies by renowned institutions. This is possible thanks to huge domestic consumption, though exports are likely to remain subdued!

Energy scenario

The energy requirement of an economy is directly proportional to its population and the momentum of development. Electricity and fuels are the two predominant forms of energy that shall define the course of India's growth. How well we are able to balance the two ends of demand and supply of energy shall define the success of India's economy. Let us look at the present energy scenario and India's readiness to fulfill future energy needs.

The present per capita energy consumption in India is 1,208-kWh, vis-à-vis the global average of 3,200-kWh. In view of the increasing energy demand owing to infrastructure development, rapid industrialisation and urbanisation, India's energy requirement is set to grow further. The country clocked



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a steady annual rise of 3.5% in energy demand in the first two decades of this millennium, and energy consumption doubled in this period. As a country on the fast track of development, it is not surprising that experts forecast a steeper annual growth rate of 4.5% in energy demand to 2035.

At the same time, India's population is expected to grow from the present 1.35-bn to 1.7-bn by 2045. In a quarter of a century, India will surpass China to become the most populous country in the world. Quite predictably, a large proportion of this population will settle in urban areas. The likely trajectory over the period from 2020 to 2045 indicates that the urban population will increase from 30% to 40% in these 25 years.

Energy mix

Today India's energy portfolio is dominated by fossil fuels, that too majorly imports. It makes sense, therefore, to explore possibilities of finding indigenous sources, to reduce the excessive dependency on imported sources. The Govt. of India (GoI) has made concerted efforts to harness renewable energy sources in its overall energy mix and India has taken notable strides in harnessing solar, wind and bio-energy.

While the industrial sector remains the largest consumer of energy, the transportation sector (surface, air and water) is the second largest energy consumer and greenhouse gas (GHG) emitter.

Needs of the transportation sector

The transportation sector plays very important role in mobility of people and goods and is regarded as a barometer of the economy. Aligned with the economic growth forecast, energy demand in the transportation sector is expected to rise significantly in the future.

India also needs to strike a fine balance between rising energy needs and the deteriorating environmental situation. While fulfilling the increased energy demands for rapid economic progress, India has to honour its Nationally Determined Contributions (NDCs) to reduce GHG emissions as committed in the COP-21 Paris Climate Change summit. While efficient methods of use can ease the stress on resources, it cannot slow down the rate of increase in demand for energy. Decarbonizing the transportation sector with the help of latest mobility technologies has emerged as promising solution in this regard.

Role for biofuels

The government has been trying to maximize the share of renewable energy in India's transportation fuel energy mix, which is currently dominated by fossil fuels. Among all, biofuels have emerged as a front-runner to meet these requirements.

Biofuels are low carbon transpor-

tation fuels produced by processing bio-based feedstocks. Being captive in nature, biofuels facilitate energy security and reduce dependence on imported fossil fuels. Biofuels, both in gaseous and liquid form, are environment friendly, as they trigger a carbon-neutral cycle upon combustion. In the social context, collection of agriculture waste as feedstock creates employment in rural areas, and is an alternate sustainable revenue stream for farmers, which boosts the rural economy. Rural entrepreneurship gets a fillip in the effort to build a robust ecosystem to facilitate supply chains for feedstock, bio-aggregations and transportation.

Biofuels are complementary to fossil fuels and utilise the existing infrastructure and ecosystem of the internal combustion engine (ICE)-dominated automotive industry. Ethanol, produced from sugary, starchy and cellulosic feedstock, is a widely used biofuel in India.

Ethanol blending programme

To reduce India's dependency on imported crude oil, GoI has already institutionalised policies for promoting ethanol blending in petrol. Before the introduction of the National Biofuels Policy, 2018, India was mixing 2% bioethanol in petrol and only 0.1% of biodiesel in diesel. In a recent landmark development, the GoI advanced the ethanol blending target of 20% by

five years to 2025, from earlier deadline of 2030. Besides associated socio-environmental benefits, this single step can help bridge the current account deficit caused by crude oil imports. It will also ease the pressure on the exchange rate of the Indian Rupee in the international market and help in improving the foreign exchange position of the country. A stronger strategic plan and integrated implementation efforts will lead to fulfilment of these objectives.

Compressed Biogas (CBG)

Alongside ethanol, Compressed Biogas (CBG) is fast-emerging as a promising gaseous form of biofuel for the transport sector. CBG offers similar socio-economic and environmental benefits like ethanol. Produced from bio-based feedstocks, CBG is an indigenous renewable source of energy, which helps to curb import of natural gas. CBG plants, being decentralised, help build a self-sustaining circular economy in rural parts of India. Identifying the potential benefits of CBG, GoI has institutionalised a very progressive policy initiative – SATAT (Sustainable Alternative Towards Affordable Transportation) – to promote CBG production and usage in the transportation sector.

Praj's Bio-Mobility platform

Praj's *Bio-Mobility* platform envisions the use of bio-based feedstock for the production of low-carbon renewable

transportation fuels for all modes of transport. The prospect of *Bio-Mobility* is pivoted on the recent progress of sustainable use of biomass feedstock, as they are environmentally friendly, available abundantly and captive in nature.

Bio-Mobility platform comprises of established solutions such as first generation bio-ethanol, and fast emerging advanced biofuel solutions such as second generation bio-ethanol, sustainable aviation fuel (SAF), compressed bio-gas (CBG), marine bio-fuels, bio-diesel etc. With adoption of *Bio-Mobility* platform for transportation, we can create winners in the social, economic and environmental areas. This includes entrepreneurship and employment opportunities for farming community, boosting rural economy, minimizing air pollution and curbing GHG emissions. It also aligns with the government's vision of doubling farmer's income and contributing towards India's *AatmaNirbhar Bharat Abhiyan*.

In a nutshell, volatility in international crude oil market is driving prices of petrol and diesel. This is adversely affecting not just family budgets, but also the nation's economy. Time couldn't be more opportune to promote and expedite the usage of environment friendly captive source – biofuels – in a definitive step towards India's goal of a US\$5 trillion economy.

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