



Making rural India energy self-reliant

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Abstract

The growing demand of energy is putting pressure on oil and natural gas. High consumption levels and high crude process is one of the current major problems faced by the world population. New sources of energy generation are explored that would eventually allow the diversification of the present energy matrix, which has an almost 90% dependence on fossil fuels. Rise in fossil fuels demand, import cost, population explosion and energy wise unsecured future give signal to find, develop and execute energy solutions. Bioenergy derived from biological sources seems one of the promising renewable energies. Rising fossil fuel prices is a major concern for India therefore alternative energy sources are to be explored.

.Ayurvet Research Foundation's 5 F (Fodder, Feed, Food, Fuel, Fertilizer) program has demonstrated the sustainable integration of agriculture and livestock for production of Biogas – CBG, biofertilizers from cow dung, crop residues which is used as replacement of fossil fuel.

Key words : Crude oil, Bioenergy, ARF, Clean energy, Crop residues, Biogas, Compressed biogas, Biofertilizers,

Introduction

India is likely to become a \$5 trillion economy by the financial year 2025-26 or 2026-27 is a matter of debate. Its CAD (Current account Deficit) is increasing due to boom in crude oil which is hovering around \$ 100/ barrel and expecting to touch \$ 150/ barrel in near future due to continued Russia Ukraine war and other contributing factors. High oil prices can put at risk a transition to carbon-free energy. This will severely threaten the Paris Agreement's goal to limit global temperature rise to 1.5 degree Celsius over the pre-industrial era. The strengthening of the dollar index is impacting the rupee, increasing the cost of imports, including oil. India imports more than 80% of its oil requirements. Current elevated crude prices aggravated the currency impact on the economy due to higher import bills.

Challenges related to energy shortages are increasingly frequent both at the local and global scale due to population growth and the desire for a higher standard of living. The growing demand for oil and natural gas caused by high consumption levels is one of the current major problems faced by the world population. Therefore, new forms of energy generation must be investigated that would eventually allow the diversification of the present energy matrix, which has an almost 90% dependence on fossil fuels the world over.

Rise in fossil fuels demand, import cost, population explosion and energy wise unsecured future give signal to find, develop and execute energy solutions. Bioenergy is the energy derived from biological sources and seems one of the promising renewable energies. Out of world's total primary energy 13% is renewable energy and bioenergy is contributing 77% of all renewable energies. The share and potential of bioenergy is higher among all the renewable energies in India.

Biofuels are capable of minimizing the oil import and pollution; therefore these can be the best alternatives in securing the energy needs of India. Though conventionally Indian population is dependent on biofuels such as cow-dung cake, wood etc but there are problem associated such as ease of use, availability

throughout the year, health problems, operating issues, energy gain, by-products or waste generated and pollution. Promising sustainable energy is needed for development and future security of India. Nation's wealth, growth, status and population's needs are power dependent.

Rising fuel prices is a major concern for India therefore alternative energy sources are to be found out and bioenergy shows potential in contributing future global energy supply (1).

Ayurvet Research Foundation (ARF), a public charitable trust is working with objectives to promote sustainable agriculture and animal husbandry practices and to develop farmer friendly technologies and their dissemination in a manner that the target population can gain its proposed benefit. Its 5 F (Fodder, Feed, Food, Fuel, Fertilizer) program has demonstrated the sustainable integration of agriculture and livestock for production of Biogas – CBG, biofertilizers from cow dung, crop residues which is used as replacement of fossil fuel.

In most countries, biogas is primarily used for producing electricity and heat. However, biogas can also be used for other purposes, such as for producing vehicle fuels. Biogas is in many countries increasingly being upgraded to compressed biomethane (CBG), as a renewable version of compressed natural gas (CNG) for use in especially cars and buses. During the last few years, there has been an increased interest in liquefied biomethane (LBG) for use in heavier transports instead of liquefied natural gas (LNG). There are also other options available. Apart from CBG and LBG, biogas can also be used to produce syngas, which in turn can be used to produce renewable versions of fuels such as hydrogen, methanol or DME (2).

India is among one of the fastest-growing economies in the world and its energy consumption is slated to increase rapidly. In 2018, The Government of India announced the National Policy on Biofuels with an aim to increase the usage of biofuels in the energy and transportation sectors. Biofuels in India are of strategic importance as they augur well with the ongoing initiatives such as Make in India, *Atmanirbhar Bharat* and offer great opportunity to integrate with the ambitious targets of doubling of farmers' income, reduction of fuel imports, rural employment generation, waste to wealth creation and most importantly sustainable development, etc.

Impact on Agriculture, Economy and Environment

CBG is a highly purified biogas comprising of over 90% methane with high calorific value, making it a perfect green renewable automotive fuel. It produces 20-60 percent less emissions in comparison to fossil fuels. It can not only help in ensuring a cleaner environment, but it can also reduce our dependence on imported Liquid Natural Gas, hence saving the forex reserves. Generated from the bio-waste sources like agricultural residue, cattle dung, filtercake (a by-product of the sugar manufacturing process from the sugarcane and commonly termed as press mud). CBG can also assist the farmers in a big way, by enhancing their income, enhance infrastructure development leading to rural development, job creation among others – making it a classic case of sustainable development.

Gaps to Fulfil

The Government is proactively working towards increasing the production of CBG under the SATAT (Sustainable Alternative Towards Affordable Transportation) initiative which envisages target production of 15 million Metric Ton (MMT) of CBG by 2023-24, from 5000 Plants. However, the biofuels program in India has been largely impacted due to the sustained and quantum non-availability of domestic feedstock for biofuel production which needs to be addressed.

The Government could plan and allocate necessary resources for the development of a trading market for CBG certificates which will be used towards carbon abatement as part of national carbon accounting standards (carbon scores for CBG). Reinstatement of subsidy at least for the first 200 projects, realistic pricing and reduction in GST on plant & equipment required to make CBG, could be some of the major steps to further boost the production of this biofuel in India.

Improved Accessibility & Future Potential

CBG is also being considered to produce Green Hydrogen and could be used as a replacement for Piped Natural Gas for domestic use. As an automotive fuel, both CBG and CNG can be sold from the same stations without any appreciable difference between the two fuels.

It can be integrated with City Gas Distribution (CGD) networks to boost supplies to domestic and retail users in existing and upcoming markets. Besides retailing from OMC fuel stations, it can be injected into CGD pipelines for efficient distribution and optimized access of a cleaner and more affordable fuel.

CBG holds a huge potential and its adoption as future fuel can help reduce our import dependency and position as a sustainable circular economy. In addition to above, the bio-manure generated after the production of CBG can be a valuable fertilizer/manure can be gainfully utilized for promoting natural farming and improving soils & productivity.

Conclusion

What is considered as waste today can be transformed into energy in the near future! Every bit of biomass can be used to produce bio-gas and bio-manure. This will go a long way in making India energy self-reliant, help combat global warming and mitigate climate change.

References

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