

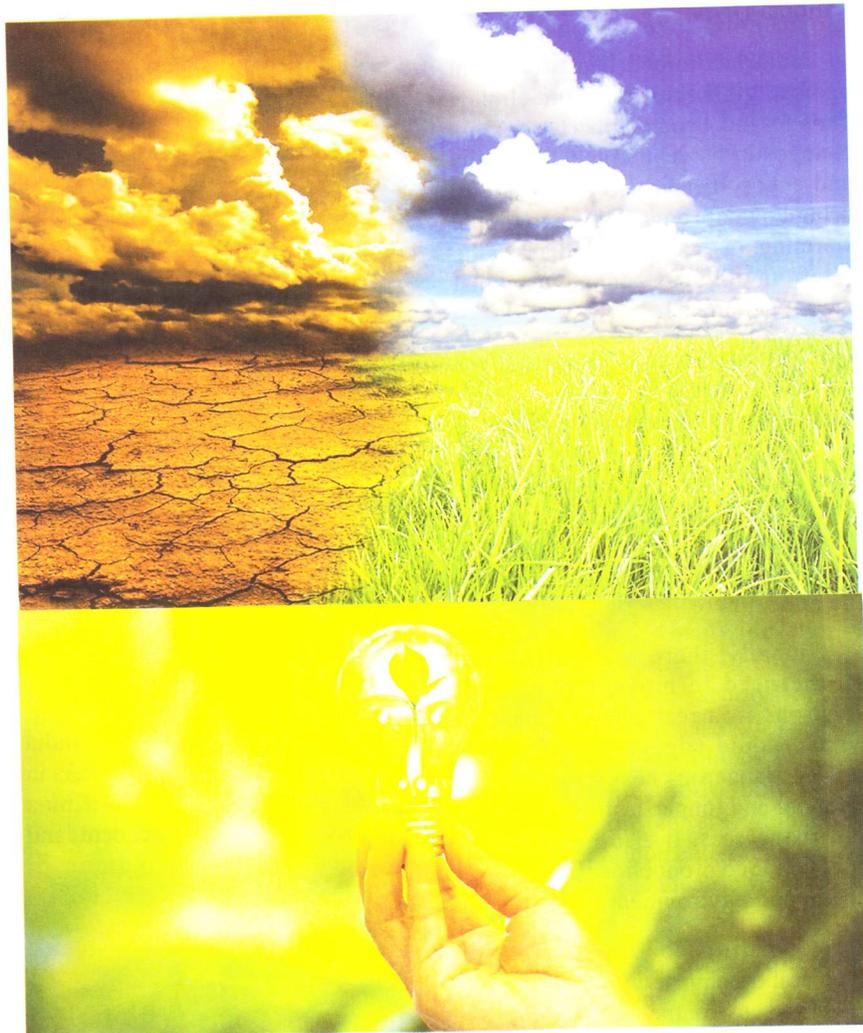
Tapping Sustainable Energy Alternatives

N Bhadran Nair

What is sustainable development? Sustainable development is “development that meets the needs of the present without compromising the ability of future generations,” which otherwise means “economic development that is conducted without depletion of natural resources.”

India, which became a sovereign nation, had to develop its agricultural resources and national infrastructure to meet sustenance of approximately 330 million people and take the country on a development trajectory. Until the 1970s, sustainable development had never attracted the imagination of the global community. At the 1972 UN Conference in Stockholm, the world body raised concerns for preserving

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and enhancing the environment and its biodiversity to ensure human rights for a healthy and productive world. The developing countries, including India, argued that their priority was development, whereas the developed countries made a case to bring environmental protection and conservation in the forefront of global agenda.

Ancient Indians had practised to live in harmony with nature – worship of nature and its creations has its roots in this doctrine. However, over the ages, we have plundered our natural resources, with scant regards to its sustainability. We forgot the dictum of our forefathers that the present generation is only a custodian of the natural resources

and has the responsibility to pass it on without depleting it, to our future generations.

As India raced to catch up with the developed world, it was caught in a vortex to bring development and energy security for self-sufficiency. At the same time, it could seamlessly join the environment bandwagon, as protection of nature was in our national DNA.

India has joined hands to 'fight against' global warming and climate change and brought in responsible changes in its development doctrine and energy generation and usage to bring down its contribution to global warming. In fact, today, India is at the forefront of global campaign against these phenomena.

India's energy requirement is being met primarily from conventional sources, like coal and oil. But with worldwide concern over the impact of fossil fuel on climate and global warming, India decided to tap alternatives that contribute less carbon emissions to the atmosphere.

Globally, there is a realisation on the need to move fast to find solutions to arrest climate change, which would trigger more intense storms, dangerous heat waves, more frequent and longer-lasting droughts and rising seas. It also has a direct effect on food production, livelihood, health and environment.

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Since climate change is the defining issue of the present times, the world body has taken the initiative

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to reduce emissions of greenhouse gases through better transport, food and energy-use to bring in improved health, particularly reduced air pollution.

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Emissions in India were estimated to have grown by 6.3 per cent in 2018, pushed by strong annual economic growth of around 8 per cent, according to recent projections by the Global Carbon Project. India was among the four major emitters in 2017 (7 per cent) along with China (27 per cent), the US (15 per cent) and

the European Union (10 per cent). The rest of the world contributed 41 per cent.

Coal is still the mainstay of Indian economy. Though global coal use is lower than its historical high, it is expected to grow in India, driven by growth in energy consumption. Its GDP and industrial production would continue to drive electricity demand and the expected electricity generation.

India has now embarked on a mission to bring down the share of fossil fuel in its energy basket, by tapping non-conventional sources. India being the founding nation of International Solar Alliance, has the leverage to switch over to cleaner energies and clean-up its smog-choked cities.

The National Solar Mission promotes ecologically sustainable growth, while addressing the country's energy security challenge and contribute to global effort to meet climate change.

India has set an ambitious renewable capacity expansion programme, with a projected growth of achieving 40 per cent of its total power generation from non-fossil fuel sources by 2030, to meet NDC target. The target would place India among the world leaders in renewable energy use.



If India develops its alternative and sustainable sources of energy, the country does not require crude imports. It has the alternative sources in abundance as crude substitution, according to scientists involved in energy research.

Crude import is a key factor in India's current account deficit (CAD), which currently is 49 billion dollars or 1.9 per cent of the Gross Domestic Product (GDP). The increasing CAD is a cause of concern for the country and if it crosses the threshold of 3 per cent of the GDP, it would badly affect the economic stability.

Besides, India's import is hugely affected by the geopolitical situation, like the threat of sanctions by the United States on imports from Iran, the second biggest supplier of crude to India.

Another technology that has been unveiled by Indian scientists is for conversion of sewage into biofuels. A sewage treatment plant (STP) launched in Delhi would convert 10 lakh litres of sewage into three tonnes of biofuel per day.

India has a huge potential for producing liquid and gaseous fuels from biomass. A strategy for gradual reduction of import dependency has been initiated, as the country would continue to remain vulnerable to international situations. The strategy targets to reduce import dependency by 10 per cent by 2022.

Besides biofuels, India has the potential to generate green energy from Solar, Wind, Geothermal, Ocean Thermal Energy, which are all non-carbon options and can help reduce carbon imports by demand substitution. Also hybrids are expected to emerge in the energy sector like Wind-Solar and Wind-Solar-Biofuels.

Road transport sector accounts for 6.7 per cent of India's Gross Domestic Product (GDP). Currently, diesel alone meets an estimated

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72 per cent of transportation fuel demand followed by petrol at 23 per cent and balance by other fuels such as CNG, LPG etc. for which the demand has been steadily rising.

The domestic crude oil production is able to meet only less than one fifth of the demand, while the rest is met from imported crude. India's energy security will remain vulnerable until alternative fuels to substitute/supplement petro-based fuels are developed based on indigenously produced renewable feedstock.

Though non-conventional sources of energy are not entirely without impact on environment, in comparison, it is the better option, being the lesser evil. Fossil fuels—coal, oil, and natural gas—do substantially more harm than renewable energy sources by most measures, including air and water pollution, damage to public health, wildlife and habitat loss, water use, land use and global warming emissions.

The extraction and utilization of coal have created a massive impact on environment with far reaching consequences. Nearly 65 per cent of India's electricity is generated from thermal power, for which the feedstock is invariably coal mined in India. Power generation through

the Boiler-Turbine route results in atmospheric pollution due to the release of particulate matter, carbon dioxide, sulphur and nitrous oxides.

The other major energy source is oil. Oil pollution is an inescapable fact of life in the 21st century, when the teeming millions depend on oil for various modes of transport. The process of extraction of oil, transportation and storage of oil cause enormous loss to the natural and human environment. India has set a target to phase out petrol and diesel driven vehicles by 2030.

Indian automotive sector is among the fastest growing industries in the world. By 2020, it is expected, the annual demand for passenger vehicles, commercial vehicles and two wheelers in the country will be 46.7 million, turning India into the third largest vehicle market in the world.

As per International Energy Agency (IEA) estimates, globally, transportation sector accounts for 30 per cent of worldwide energy consumption and is the second largest source of carbon dioxide emission contributing to 20 per cent of greenhouse gas. India's National Mission for Electric Mobility seeks to mitigate the adverse impact of economic development, by completely switching over to electric vehicles by 2030.

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(E-mail:nbnair9@gmail.com)