

## **As India pursues a net zero future, its clean energy transition is rapidly underway**

*By Fatih Birol and Amitabh Kant*

India's announcement that it aims to reach net zero emissions by 2070 and to meet fifty percent of its electricity requirements from renewable energy sources by 2030 is a hugely significant moment for the global fight against climate change. India is pioneering a new model of economic development that could avoid the carbon-intensive approaches that many countries have pursued in the past – and provide a blueprint for other developing economies.

The scale of transformation in India is stunning. Its economic growth has been among the highest in the world over the past two decades, lifting of millions of people out of poverty. Every year, India adds a city the size of London to its urban population, involving vast construction of new buildings, factories and transportation networks. Coal and oil have so far served as bedrocks of India's industrial growth and modernisation, giving a rising number of Indian people access to modern energy services. This includes adding new electricity connections for 50 million citizens each year over the past decade.

The rapid growth in fossil energy consumption has also meant India's annual CO<sub>2</sub> emissions have risen to become the third highest in the world. However, India's CO<sub>2</sub> emissions per person put it near the bottom of the world's emitters, and they are lower still if you consider historical emissions per person. The same is true of energy consumption: the average household in India consumes a tenth as much electricity as the average household in the United States.

India's sheer size and its huge scope for growth means that its energy demand is set to grow by more than that of any other country in the coming decades. In a pathway to net zero emissions by 2070, we estimate that most of the growth in energy demand this decade would already have to be met with low-carbon energy sources. It therefore makes sense that Prime Minister Narendra Modi has announced more ambitious targets for 2030, including installing 500 gigawatts of renewable energy capacity, reducing the emissions intensity of its economy by 45%, and reducing a billion tonnes of CO<sub>2</sub>.

These targets are formidable, but the good news is that the clean energy transition in India is already well underway. It has overachieved its commitment made at COP 21- Paris Summit by already meeting 40% of its power capacity from non-fossil fuels- almost nine years ahead of its commitment and the share of solar and wind in India's energy mix have grown phenomenally. Owing to technological

developments, steady policy support and a vibrant private sector solar power plants are cheaper to build than coal ones. Renewable electricity is growing at a faster rate in India than any other major economy, with new capacity additions on track to double by 2026. The country is also one of the world's largest producers of modern bioenergy and has big ambitions to scale up its use across the economy. The IEA expects India to overtake Canada and China in the next few years to become the third largest ethanol market worldwide after the United States and Brazil.

However, even as it sets its sights on net zero, India faces a number of pressing near-term challenges. The sharp increase in commodity prices has made energy less affordable, and tight markets are increasing energy security risks for the world's third largest energy importer. There is still a lack of reliable electricity supply for many consumers. Continued reliance on traditional fuels for cooking causes unnecessary harm to many people's health. Financially ailing electricity distribution companies are impeding the urgent transformation of the sector. And high levels of pollution have left Indian cities with some of the poorest air quality in the world.

India already has a numerous policy measures in place that – if fully implemented – could address some of these challenges by accelerating the shift to cleaner and more efficient technologies. Subsidies for petrol and diesel were removed in the early 2010s, and subsidies for electric vehicles were introduced in 2019. India's robust energy efficiency programme has been successful in reducing energy use and emissions from buildings, transport and major industries. Government efforts to provide millions of households with fuel gas for cooking and heating are enabling a steady transition away from the use of traditional biomass such as burning wood. India is also laying the groundwork to scale up important emerging technologies such as hydrogen, battery storage, and low-carbon steel, cement and fertilisers.

A transition to clean energy is a huge economic opportunity. India is particularly well placed to become a global leader in renewable batteries and green hydrogen. These and other low-carbon technologies could create a market worth up to \$80 billion in India by 2030. Support from the international community is essential to help shift India's development onto a low-carbon path. To reach net zero emissions by 2070, the IEA estimates that \$160 billion per year is needed, on average, across India's energy economy between now and 2030. That's three times today's investment levels. Therefore, access of low cost long term capital is key to achieve net zero.

Achieving net zero is not just about reducing greenhouse gas emissions. India's energy transition needs to benefit its citizens, and well-designed policies can limit the potential trade-offs between affordability, security and sustainability. Green hydrogen will play a major role in achieving the net zero and decarbonising the hard-to-abate sectors. India aims to become a global hub for green hydrogen production and exports. India could easily create 5 million tonne green hydrogen demand thereby replacing

grey hydrogen in the refineries and fertiliser sector. This 5 million tonnes will result in abatement of 28 million tonnes of CO<sub>2</sub>. This proportion will grow as we fructify green hydrogen economy and will result in 400 million tonnes of CO<sub>2</sub> abatement by 2050.

As a large developing economy with over 1.3 billion people, India's climate adaptation and mitigation ambitions are not just transformational for India but for the entire planet. NITI Aayog and IEA are committed to work together to enable India to grow, industrialize and provide a better quality of life to its citizens without the need to carbonize.

*Fatih Birol is the Executive Director of the International Energy Agency, and Amitabh Kant is the CEO of NITI Aayog, the Indian government's public policy think-tank.*