COP28 and India: Phased Phase-out or No Phase-out?

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Most high-income countries, particularly the United States, Australia, and the United Kingdom, have opposed the removal of 'fossil fuel phase-out' from the COP28 Global Stocktake (GST) text.

In reality, these countries are opposing a 'just and equitable phase-out', wherein they would be required to lead the way in phasing out fossil fuels. These countries still rely on fossil fuels to meet most of their primary energy demands and continue to expand their oil and gas production.

Anticipating a simultaneous phase-out of fossil fuels in the developing world alongside the developed world raises concerns about fairness and justice, particularly considering that the developing nations are still striving to attain sustainable development goals.

However, for a successful worldwide phase-out of fossil fuels, it is crucial for the developed world to agree on disparate timelines and make concrete commitments to enhance climate finance. Without such cooperation, any resistance to the proposed COP28 text lacks justification.

For a developing country like India, phasing out of fossil fuels is a substantial challenge, implying an increased dependency on renewable resources to meet the growing electricity demand.

Nonetheless, in the last decade, India has steadily transitioned towards clean energy. The country has the fourth largest installed capacity of wind and solar power globally. Further, to achieve the target of 500 GW of renewable energy (RE) capacity by 2030, India has ambitious plans to add 50 GW of RE capacity annually for the next 5 years. However, despite its remarkable accomplishment in the RE domain, around 70% of electricity in India comes from fossil fuel-based plants.

Uphill Drive for Fossil Fuel Phase Out

RE sources are weather-dependent and exhibit variabilities under different timescales (daily, seasonal, and inter-annual), unlike fossil fuel-based electricity, which can be controlled to meet power demands at any point in time. To ensure a round-the-clock supply of electricity, both wind and solar would require long-term daily and seasonal storage.

Overall, there is a need for flexibility in the electricity grid to accommodate large RE resources. Presently, this flexibility support is provided by fossil fuel-based plants and inherently flexible hydro-electric plants. However, with the gradual phasing out of fossil fuels, managing RE intermittency will become progressively challenging.

A Portfolio of Solutions

To phase out fossil fuel-based generation, various other flexibility options need to be implemented in a renewable-rich grid, all of which are quite expensive. While nuclear energy would play an important role, no single technology will be sufficient to maintain grid stability. We need a portfolio of solutions, including pumped hydro storage (PHS), bulk battery storage, and hydrogen storage, to address the challenge.

At present, India is home to only 4.7 GW of PHS capacity. Retrofitting existing hydro plants or installing new PHS plants would require time and investment. Further, the country has recently commenced its journey in the large-scale battery energy storage system (BESS) with a 1000 MWh pilot project.

Although India's energy-mix strategies include a policy push for hydrogen, including production-linked incentives, rendering the new technologies operational involves extensive resources in terms of time and finance. As per the International Energy Agency (IEA) report on Net Zero by 2050, the 'net zero' of transition in electricity generation is expected to cost more than USD 1.6 trillion globally every year till 2030.

In India, achieving net-zero emissions by 2070 would require an investment of USD 160 billion per year across the energy sector till 2030, three times the current investment levels. Low-cost long-term capital becomes the key enabler for India to achieve the transition by 2070.

Further, to support just transition, phasing out fossil fuel-based power would also require skill development and capacity building for existing employees in the fossil-fuel energy sector so that they can be absorbed into other sectors. The entire energy system mix must be redesigned to phase out fossil fuel-based sources gradually. It would be a resource-intensive activity in terms of technology, expertise, finance, and time.

Future of the Energy Landscape

While phasing out of fossil fuel-based electricity is inevitable for a net-zero future, the timeline depends on the availability of resources. Being a developing country, it would be difficult for India to assemble the resources for a fast phase-out of fossil-based electricity.

In January 2023, the Central Electricity Authority (CEA) suggested that no retirement or re-purposing of coal-based power stations will be done before 2030, considering the expected surge in energy demand as India develops. Despite promoting renewables, fossil fuels will remain the mainstay of India's electricity sector for the coming years.

Although carbon capture and storage (CCS) is a promising solution to continue the usage of fossil fuel sources, we must remember that most of the present storage technologies (including storage in depleted oil wells and forest sequestration that may lead to wildfires) are not permanent options.

The Intergovernmental Panel on Climate Change (IPCC) Special Report on CCS (2005) indicates that permanent and safe carbon storage options are limited. Depending on futuristic unsubstantiated technologies like CCS might derail us from the path to net zero.

There is a need for international support and collaboration on technology, finance, and expertise to handle this crucial challenge, with developed countries leading the way without hiding behind loopholes such as 'unabated' fossil fuel phase-out or 'transitioning away from fossil fuels'.

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