

EDITORIAL

A Pressing Problem

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As hundreds of residents are evacuated from the Himalayan pilgrimage town of Joshimath, the realities of the scale of impact of extreme disasters associated with a changing climate and other uncertainties loom large in India. Globally, scientists have proven beyond belief that these disastrous events are caused by human action, that is, they are anthropogenic in nature. They agree that the anthropogenic emission of greenhouse gases, especially since the Industrial Revolution, originates from the energy sector: the mining and burning of coal, generation of thermal power, vehicular emissions, and other emissions, such as those from industries. One way to deal with the growing incidence of climate-related extreme events is to reduce fossil-fuel consumption and gradually move to a decarbonised world. This is why nations across the world have committed to reducing carbon emissions to achieve carbon neutrality by 2050 at the Conference of Parties (CoP) 21, held in Paris in 2015, and CoP 26, held in Glasgow in 2022. While the review of Ruth Gamble's book directly addresses the Himalayan problem, all the other book reviews in this issue address the question of climate change.

Humanity's commitment to reducing carbon emissions to tackle climate change has culminated in focused action to realize an 'energy transition', which is perhaps better described as 'transitions', due to their multifaceted and highly contextual nature—some countries may transition earlier and others later, some countries may adopt gas as 'a transition fuel', some countries may even move straight to renewable energy sources as living standards improve and households stop using biomass. Broadly speaking,

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transitions are marked by a shift from an energy mix that is heavily reliant on fossil fuels to one that produces very limited or zero carbon emissions. For this reason, energy transitions are also commonly known as decarbonization. There is no questioning that transitions have occurred before, as humans moved in the eighteenth century to the intensive and extensive use of fossil fuels; the current transitions, however, mark a crucial moment in the history of human civilization, as they will fundamentally change many of the ways human society has functioned over the last two or three centuries. The transitions are occurring in parallel with a great leap in artificial intelligence technologies, which together are leading to what is being called the ‘Fourth Revolution’ in human civilizational history.

Decarbonization will occur as consumption becomes electrified, replacing energy generated using fossil fuels with that generated using renewable sources, which will also make other sectors such as transport cleaner and improve energy efficiency through the digitalization of networks. Progress in transitioning to cleaner energy sources varies exponentially between countries and regions across the world, primarily due to three main reasons: first, the availability and affordability of alternative and renewable energy sources; second, the extent of technological disruption of coal operations and value chains; and third, national clean air policies. Although fossil fuels still contribute to about 80 per cent of global energy usage, energy transitions of different types are already underway. There is a growing recognition of climate change imperatives by state and non-state actors as well as individuals. The ‘push of market forces’, that is, cheaper alternatives being presented in different contexts, including North Sea gas in the UK, oil shale in the US, and solar and wind in Australia, is driving the transition in many parts. Lastly, as noted, state policies, such as the concerted efforts put forth by the European Union, are playing a key role in the demise of coal.

The manifestations of energy transitions are also manifold. To understand their full scope, researchers will need to cross over their disciplinary boundaries, and policymakers and planners must work together with them to realize the full potential of these transitions. For example, to comprehend and trigger changes in energy use, we will need to understand what causes behavioural change and shifts in consumer preferences; how mobilities are influenced by both market forces and state policies, what new infrastructures will appear and how they will change our landscapes, and

finally, how new communication networks driven by artificial intelligence will control energy production, distribution, and regulation.

To fully understand the implications of energy transitions, scientific knowledge must move beyond its isolated existence and break free from its ivory tower to move closer to the social sciences to embrace interdisciplinary research. To think about it: the Industrial Revolution not only ushered in new socio-technical worlds, but it also created new politics: trade unions came into existence in the coal mines, human society changed, power became centralized and decentralized in previously unforeseen ways, and control over coal came to signify great riches. Similarly, the ushering in of petroleum radically changed the way we moved goods and human beings. It is up to us, researchers, to ensure that the transition away from these fossil fuels opens up new democratic possibilities in the decarbonised world, in particular, for countries such as India, which are part of the Global South.

Two pieces in this issue are placed in this context. Rakesh Kacker and Nidhi Srivastava discuss the elements and possible constraints of a smooth energy transition in India in their commentary. Mrinal Saikia and Ratul Mahanta, in their original research paper, show how to measure vulnerability to climate change in char areas, that is, river islands. The special section in this issue presents different aspects of the rehabilitation of degraded ecosystems and carries four original submissions. An additional piece that deals with char areas is by Gorky Chakrabarty. It complements the other paper on chars with its different disciplinary approach. Even though about 70 per cent of the country's electricity comes from coal and much of its imports constitute petroleum products, India is fully committed to reducing its reliance on fossil fuels. Interdisciplinary research on ecology, the economy, and society will play a critical role in ushering in a new democratic future in which no more incidents such as that at Joshimath will occur.