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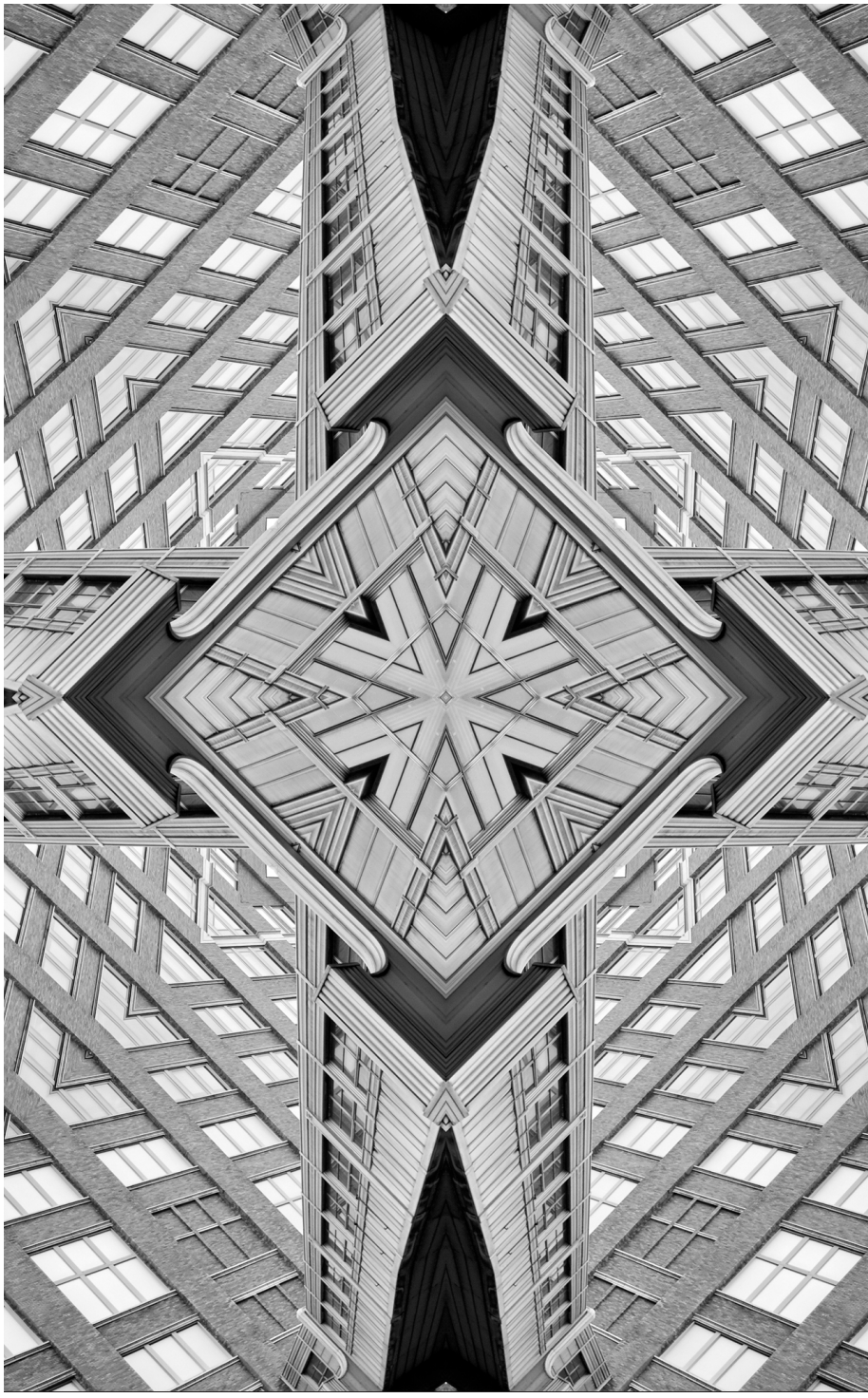

# Shaping a Just Transition to Clean Fuel-Based Energy Sources

**Rishi Kant**

## Abstract

The ongoing global energy crisis has highlighted countries' vulnerabilities to energy shocks due to an overdependence on fossil fuels. Clean energy sources are an ideal option for states looking to hedge against the risks associated with fossil fuels. Moreover, recent technological advances and falling costs have placed renewables at the centre of the global energy landscape. Developing countries are now on the cusp of a historic shift towards clean energy sources, but several challenges will need to be addressed urgently to ensure a smooth just transition.

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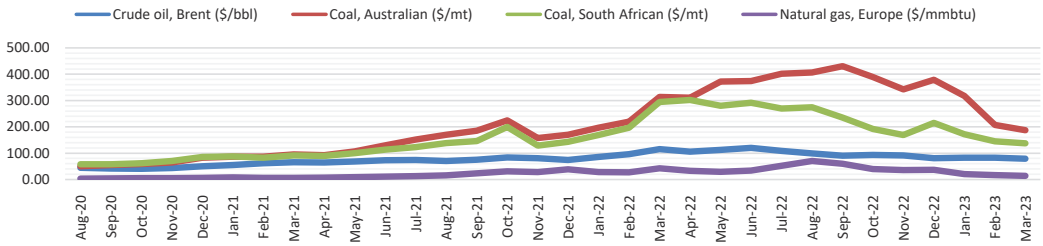
# Introduction

Energy availability and accessibility is correlated to a country's economic development, and is an essential input for many public services.[1] As such, securing affordable and reliable access to energy remains a central political and economic imperative for almost all governments. In 2022, a series of developments disrupted global energy markets, threatening the security of many countries and severely compromising their ability to meet the energy demands of their people.

The global energy market began to tighten in 2021 due to rising prices in the aftermath of the COVID-19 pandemic. The market became even more turbulent in 2022 due to demand- and supply-side factors. Disruptions in the oil and gas supply chains on account of the ongoing Russia and Ukraine war impacted supplies,[a] while energy prices came under pressure due to a sudden rise in demand resulting from abnormally high temperatures and associated heatwaves across the globe.[2] These factors inflated the international price of oil and natural gas. Consequently, many countries turned to coal to meet their energy needs,[3] while those already using coal intensified its exploitation, putting immense pressure on the coal market.[4] In response to these developments, the global prices of oil, coal, and gas peaked during the latter half of 2022, with coal prices breaching US$400 per unit (in Australia), Brent oil rising to US$120 per unit, and natural gas reaching a historic high of US$70 per unit (in Europe).[5]

## Figure 1: Global Prices of Coal, Oil, and Natural Gas (August 2020-March 2023)




*Source: World Bank data*[6]

a Russia is a major exporter of oil and gas. In 2021, Russian crude and condensate output reached 10.5 million barrels per day, comprising 14 percent of the world's total supply.

The increased cost of electricity due to a higher usage of fossil fuel-based sources imposed a heavy burden on low-income households (since they spend a larger share of their incomes on electricity and gas).[7] At the same time, widespread power outages in many countries due to disruptions in electricity supply threw lives out of gear. For instance, Bangladesh witnessed a countrywide blackout as many gas- and diesel-based power plants, responsible for approximately 85 percent of the country's electricity generation, were forced to shut down due to fuel shortages.[8] Some countries such as Algeria, Norway, and Azerbaijan introduced gas storage obligations and agreed on voluntary targets to cut gas and electricity demand by 15 percent.[9] India was also not immune to these developments, with many states resorting to 'load-shedding' due to increased demand and restricted supply of coal and gas.[10]

Increased prices and disrupted supply severely impacted those countries with a high dependence on fossil fuels, particularly its import, and led to a slowdown in global economic growth, forcing some countries and regions into recession.[11] Europe, for instance, faced a challenging situation due to its historic high dependence on imported gas from Russia to meet its energy requirements.[12] Developing countries with a high dependency on imported fossil fuels, such as India, also faced a challenge.[13]

The ongoing global energy crisis, which is compounded by the Ukraine war, is a manifestation of a bigger problem—the overdependence on finite fossil fuels and the vulnerabilities associated with the volatile markets that supply them. Fossil fuels account for over 80 percent of global energy requirements and over 64 percent of electricity generation worldwide.[14] Additionally, most countries (accounting for around 80 percent of the global population) are net importers of fossil fuels, and thus prone to adverse supply shocks resulting from various geopolitical and economic events.[15] India, for instance, is almost entirely dependent on oil and gas to meet the energy requirements of its transport sector and on coal to meet electricity demand (nearly 80 percent of power generation in India is through coal[16]). Such an overdependence on fossil fuels impacts countries adversely, in the form of air and water pollution and soil degradation, while also being a significant cause of climate change[b] Indeed, fossil fuels account for 75 percent of global greenhouse gas emissions and around 90 percent of carbon dioxide emissions.[17] Climate events, such as floods and droughts, cause immense human and economic loss. For instance, in 2018, India suffered nearly US$37.5 billion in financial losses due to climate events.[18] Additionally, as most countries are net importers of fossil fuels, the dependence on such sources and associated price volatility makes it difficult to manage their foreign exchange reserves.

b Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping gases.

# Transitioning to Renewables Sources of Energy

To hedge against the risks associated with a dependence on fossil fuels-based energy sources, a shift away from fossil fuel-dominated economies appears inevitable. As a result, renewable energy sources are increasingly becoming more prominent in broader policy discourse and in the energy market. Renewable-based primary energy (including biofuels but excluding hydropower) registered an annual growth rate of 15 percent in 2021 compared to 9 percent in 2020, a higher rate than for any other fuel.[19] Since 2012, renewables have added more new energy generation capacity than conventional sources.[20] In 2021, renewables were estimated to account for 38 percent of the global installed capacity and contributed to 81 percent of the global power addition. Of the global renewable addition of 257 GW in 2021, around 88 percent (226 GW) was attributed to solar- and wind-generated power.[21] By 2050, nearly 90 percent of the world's energy is estimated to be sourced from renewables.[22] At the same time, fossil fuel-based energy generation has declined, and a further slowdown is expected. As per the 2022 World Energy Outlook, based on prevailing policy settings, coal demand in energy generation will likely peak over the next few years, natural gas demand will plateau by the end of the decade, and oil demand will peak in the mid-2030s before falling slightly. Accordingly, the share of fossil fuels in the global energy mix will fall from the current 80 percent to less than 75 percent by 2030, and to just above 60 percent by 2050.[23]

Renewable energy is also gaining traction in India, with the country now the fourth most attractive renewable energy market globally.[24] By 2029-30, the share of renewable energy generation in India is estimated to increase from 18 percent to 44 percent, while that of thermal is expected to reduce from 78 percent to 52 percent.[25]

Importantly, a shift towards renewables will protect countries from the supply shocks associated with fossil fuel-based energy sources and reduce their import dependencies. This will provide countries with the needed policy space[c] and allow them to diversify their economies, while driving inclusive economic growth, new jobs, and poverty alleviation.

c National policy space can be defined as the combination of de jure policy sovereignty and de facto national policy autonomy.

# Transitioning to Renewables Sources of Energy

Recent developments in the renewables market have also provided a clear incentive to move towards the greater adoption of such energy sources. As the demand for renewable energy sources rises, associated technologies and energy storage costs have consistently declined. For instance, the exponential increase in solar power installed capacity is accompanied by substantial declines in the cost of solar modules.[26] The average cost of technologies associated with most renewable-based sources will decline in the coming years; for instance, the cost for stationary battery storage is expected to fall by more than 60 percent by 2030.[27]

> "India is now the fourth most attractive renewable energy market globally. By 2029-30, the share of renewable energy generation in India is estimated to increase from 18 percent to 44 percent, while that of thermal is expected to reduce from 78 percent to 52 percent."

# Challenges

While the transition towards clean energy sources needs to be diligently pursued, success will depend on how the present challenges, especially those faced by developing countries like India, are resolved during this adaptation phase. The important challenges are:

- **Mobilising capital**

While the decline in the cost of clean energy may appear resounding, there is still a long way to go, given that the world's energy requirements, especially those of developing countries, are also rising to provide electricity access to the yet-unconnected and due to increasing energy intensity to support their growing economies.[d,28] Moreover, many clean energy technologies, such as wind, solar PV, and electric vehicles, have relatively high upfront investment requirements. The shift towards such energy sources in developing countries will require low financing costs to accelerate a transition to renewables while keeping them affordable. However, most global capital and technologies currently associated with alternative green energy sources are concentrated in advanced economies. At the same time, clean energy investment in emerging and developing economies declined by 8 percent in 2020, to less than US$150 billion, with only a slight rebound in 2021.[29]

For a successful transition to clean energy sources, increased investments in enabling infrastructure and research and development are needed. This requires substantial capital mobilisation, which may be beyond the capacities of most developing countries. Additionally, international support to developing countries in this regard is also lacking. The commitment of US$100 billion per year in climate finance by developed countries is yet to be fulfilled,[30] while the transfer of advanced green technologies to developing countries has been low.[31] Given the rising demand for energy, it will be a challenge for developing countries to avoid the path dependency[e] associated with the use of the fossil fuels and support the transition process away from such energy sources without supportive international actions.

d Asian economies will be the world's fastest growing over the period 2022-2030 and so their energy demands will surge.

e Path dependency can be understood as past events or decisions constraining later events or decisions. It can be used to refer to outcomes at a single point in time or the long-run equilibria of a process.

- **Ensuring a just transition**

In addition to managing the issues associated with mobilising investment/capital, countries also face the challenge of ensuring that the transition to clean energy sources is just.[f] The basic idea of a just transition is to ensure decent work opportunities and social support for the people likely to lose their livelihood in the process of transitioning to low-carbon and renewables-based economies.[32] Around 32 million people are employed in the fossil fuel industry globally, with coal mining providing around 4.7 million jobs,[33] and a more significant proportion being indirectly dependent on fossil fuels for their incomes. Such job dependency is more pronounced in developing countries, with many jobs held across generations and people lacking social security and other skill for re-employment. For instance, 40 percent of India's 736 districts are dependent on the coal sector for revenue or jobs, mostly in the states of Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana and Tamil Nadu.[34,35] Currently, most clean energy-based economic opportunities are concentrated in developed countries (such as those in North America and Europe, although China is an exception) and require high to medium skill.[36] As such, developing countries will incur significant losses in the transition process unless gainful re-employment opportunities are generated.

There is also a risk of destabilising local economies in the transition process. Many regions and their economies, especially in developing countries, depend on incomes derived from fossil fuel-based employment, such as mining, power generation, transmission, and distribution and storage. In many regions, governments are also dependent on the revenue generated from fossil fuels to enhance infrastructure (such as schools, hospitals, and transportation and communication facilities) that enable local communities to expand and diversify their livelihood options.[37] As such, any abrupt transition may severely hamper government fiscal capacity and solvency. This risk is imminent for countries such as Iraq, Nigeria, Russia, Saudi Arabia, United Arab Emirates, and Venezuela, which heavily depend on fossil fuel export-based revenues.[38] A fall in such revenue may adversely affect these countries' existing social expenditure and subsidies programmes. Besides, any attempt to raise revenues through alternative sources (such as tax or cutting down on the existing fossil fuel subsidies[g]) may find stiff resistance from citizens and can fuel social unrest.[39] Such far-reaching effects of the transition are yet to be considered comprehensively in any international forum or setting.

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f Fair and right

g Global fossil fuel subsidies in 2020 totalled 6.8 percent of GDP (US$5.9 trillion), and are expected to increase to 7.4 percent of GDP in 2025. For more information, see: Ian Parry, Simon Black, and Nate Vernon, "Still Not Getting Energy Prices Right: A Global and Country Update of Fossil Fuel Subsidies", WP/21/236, IMF Working Paper, September, 2021, https://www.imf.org/en/Publications/WP/Issues/2021/09/23/Still-Not-Getting-Energy-Prices-Right-A-Global-and-Country-Update-of-Fossil-Fuel-Subsidies-466004

# Conclusion

The continuous dependence on fossil fuels perpetuates energy security risks. As such, reducing the reliance on fossil fuels is in the global collective interest. Clean energy is an attractive option for countries looking to hedge against the risks emanating from a dependence on fossil fuels. However, the most fundamental aspect of energy security is providing access.[40] In 2022, nearly 775 million people worldwide, mostly in developing countries, were said to be without electricity, primarily due to high fuel prices, inflation, and underinvestment in the sector.[41] Therefore, the transition to clean energy cannot bypass the primary issue of access to electricity.

The energy transition will have profound geopolitical ramifications and deep and long-term impacts on local communities and economies. This increases the risk of marginalisation and the social dislocation of those dependent on fossil fuels, directly or indirectly. The drying-up of fossil fuel-based revenues may also lead to a redrawing of the social contract between citizens and states. The introduction of taxes and other avenues of revenue to make up for the loss from fossil fuel-based revenues may increase discontent among the masses and result in a social crisis. Developing countries are the most vulnerable in this regard, and face the dual challenge of meeting the rising energy demand and managing the potential aftermath of disruptions associated with a transition to clean energy.

Technological advances and falling costs have spurred a growth in renewables. The successful assimilation of such energy sources in developing countries will require access to affordable finance and international support to enable a 'just transition' through on-the-job retraining programmes, infrastructure investments, and so on, which is currently beyond the fiscal capacities of many of the developing countries.[42,43].

**Rishi Kant** *is an Indian Economic Service officer, posted as Joint Director in the Department of Agriculture and Farmers Welfare, Government of India.*

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**20, Rouse Avenue Institutional Area,**
**New Delhi - 110 002, INDIA**
**Ph. :** +91-11-35332000. **Fax :** +91-11-35332005
**E-mail:** contactus@orfonline.org
**Website:** www.orfonline.org