

Potential Implications of High Fossil Fuel Prices for Low- and Middle-Income Countries | A CCG Briefing

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KEY MESSAGES

- High fossil fuel prices are having impacts in most regions of the world due to the global nature of fossil fuel markets. Whilst Russian fossil fuel exports mainly go to Europe and China, Low- and Middle-Income Countries (LMICs) will still be affected.
- LMICs that are highly indebted and more dependent on fossil fuel imports are more likely to be vulnerable to the macroeconomic impacts of high prices.
- High fossil fuel prices do not automatically mean that investment in renewables will be more attractive. The macroeconomic impacts and financial health of utilities in LMICs will also have a large influence on the viability of investment in renewables.
- Whilst high prices and energy insecurity might encourage some LMICs to develop fossil fuel resources, it will be important to consider the financial viability of fossil fuels over the longer term and the risk of stranded assets due to increasingly binding climate change targets.



Introduction and context

The Russian invasion of Ukraine has already had wide-ranging impacts on energy markets and energy policy priorities, particularly in Europe. It has exacerbated the sharp rise in oil and gas prices in 2021 due to the recovery of some economies from the COVID-19 pandemic. The globally traded price of oil rose from less than US\$70 per barrel in early 2021 to over US\$100 following the invasion of Ukraine in late February 2022 (see Figure 1). Increases in the price of gas have been even more pronounced. UK wholesale gas prices were more than four times higher at the end of 2021 than at the start of the year [1]. European and Asian prices also increased sharply, reaching all-time highs [2].

High oil and gas prices are nothing new. Oil traded around the US\$100 per barrel mark for most of 2011–14, for example. However, the current shock may be more severe. The impacts of high prices come on top of a profound economic shock due to COVID-19, which has hit both the supply and demand side of the global economy hard. For the energy sector, these factors come at a critical point in the fight against climate change. The Glasgow Climate Pact agreed at COP26 included a pledge to reduce 'inefficient' fossil fuel subsidies for the first time, plus a commitment to 'phase down' the use of coal. Both objectives may be more difficult to achieve with spiralling gas prices.



“ Steep price increases have affected most regions of the world due to the global nature of fossil fuel markets. ”

Figure 1. Brent crude oil price (\$/barrel, April 2021 – April 2022) Source: BBC News [3]

This briefing explores the potential implications of high oil and gas prices for Low- and Middle-Income Countries (LMICs). It provides a preliminary assessment of potential macroeconomic impacts and of the possible effects on plans for low carbon investment to help meet SDG7. Since it is not yet clear how long high prices will last, this briefing does not identify specific policy recommendations.

What is Russia’s role in global energy markets?

Russia plays a major role in global fossil fuel markets, particularly for oil and gas. According to the BP Statistical Review of World Energy 2021, Russia had 6% of the world’s economically recoverable oil reserves in 2020 [4]. Russia also accounted for 12% of global oil production, and 7% of production of refined oil products such as petrol and diesel. 80–90% of Russian oil exports went to Europe and China in that year.

Russia’s role in global gas supplies is larger. In 2020, Russia had 20% of global gas reserves and accounted for 17% of global production.

Most of Russia’s gas exports are transported via pipelines to Europe, with a smaller amount being exported to China. Russia has also started to export Liquefied Natural Gas (LNG) via ship in recent years. Again, the majority of LNG exports are destined for Europe, which is by far the most dependent region on Russian gas. Europe’s determination to redirect its demand away from Russia will put pressure on other gas markets. Prices there will rise unless Russian supply finds new routes to market.

Russia also plays a role in global coal markets. It had 15% of global reserves, but only 5% of global production in 2020. Most coal exports are also destined for Europe and Asia (particularly China and Japan).

Russia’s direct exports of fossil fuels to LMICs are very small, if China is excluded. According to BP data, relatively small quantities of oil, oil products, and gas are exported to Africa and some Asian countries. In some cases, trade is in the other direction. For example, Nigeria exported almost 30 billion cubic metres (bcm) of LNG to Asia and Europe in 2020. This is only

6% of global LNG exports. However, this does not mean the impacts on LMICs are also small. On the contrary, steep price increases have affected most regions of the world due to the global nature of fossil fuel markets.

Russia's significant role in global oil and gas markets will continue unless more countries and regions join the EU and US – and develop plans to shift away from Russian supplies and/or away from oil and gas altogether. Even if they do, it will take time for these diversification strategies to be fully implemented. It is therefore very difficult to predict how long the current period of high prices will last.

What is the impact of high energy prices on LMICs?

There is statistical evidence that there is a causal relationship between adequate provision of energy and economic growth. Modern forms of energy are a key driver of economic development [5]. A lack of access to electricity, in particular, can act as a fundamental constraint on economic growth [6].

Economic production is about converting labour, capital, and resources into economically useful outputs. Achieving this requires energy, so if access to efficient energy sources is constrained economic output and productivity will suffer.

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This basic fact was brought home during the oil price shocks of the 1970s, which resulted in a prolonged global productivity slowdown [7]. Over time, persistently higher energy prices will encourage substitution away from energy and lead to a (welcome) reduction in the energy intensity of an economy. This may dampen the initial shock of high energy prices, but is unlikely to reverse its effects completely.

Energy constraints and price shocks are felt particularly acutely in Low-Income Countries. As economies grow, energy availability per capita tends to improve, in line with increased incomes. At the same time, the energy intensity of their economies (or energy use per unit of GDP) plateaus and eventually starts to fall. This is because growing economies diversify into activities that are often less energy-intensive, such as services.

The benefits of loosening energy constraints (and by implication reducing the impact of supply shocks) are immense and well-documented. Access to modern energy frees up resources that can be redeployed for income generation. This may, for example, mean less time spent by women in the collection of firewood. Reliable energy increases the efficiency of production processes from manufacturing to food distribution and consumer services.

Access to energy also improves connectivity and market access. For example, high fuel prices have been identified as a key driver of trade-related transaction costs in Africa. A World Bank study on the impacts of oil price rises in the late 2000s estimates that reducing fuel prices by 20% could lead to a reduction of trade-related transaction costs on the continent by 9–12% [8]. An equivalent increase would have the reverse effect.

Which countries might be most at risk?

Not all countries are equally vulnerable to price shocks. Resource-rich nations like Azerbaijan, Kazakhstan, and Nigeria are likely to benefit. But for most other LMICs, the impacts could be severe. For example, the International Energy Agency has recently summarized some of the immediate impacts of high gas prices in emerging economies [9]. These include power cuts, reductions in industrial production, and steep increases in the costs fertilizers. In those countries where consumer prices are regulated, industrial consumers have faced significant price rises to subsidize household consumers. For example, industrial prices increased by 28% in Egypt and 43% in Pakistan in 2021.

The impact of a shock – whether environmental, social, or economic in nature – is often expressed as a function of a country’s exposure and vulnerability to the threat of concern [10]. In the case of an energy price shock, dependence on fuel imports may serve as a proxy for energy price exposure, while the level of external debt can be used as an indicator of vulnerability to

price shocks. Both measures are readily available from the World Bank’s World Development Indicators [11]. They paint an indicative picture of potential energy price risks across different countries (see Figure 2).

Fuel imports account for maybe 5% to 30% of merchandise imports in Low and Lower-Middle Income Countries. The countries with the highest import shares, and therefore the highest potential exposure to fuel price shocks, are India (IND), Zimbabwe (ZWE), Mauritania (MRT), Mali (MLI), Pakistan (PAK), Burkina Faso (BFA), and Senegal (SEN), where fuel accounts for over a quarter of merchandise imports.

The most vulnerable countries to a price shock are Mongolia (MNG), Mozambique (MOZ), Zambia (ZMB), the Kyrgyz Republic (KGZ), Tunisia (TUN), Nicaragua (NIC), Lao PDR (LAO), and Cape Verde (CPV), all of which have external debt to Gross National Income ratios close to or in excess of 100%.

Among high-exposure countries, Zimbabwe, Mauritania, and Senegal also have notable vulnerability (debt ratios of around 65%), while

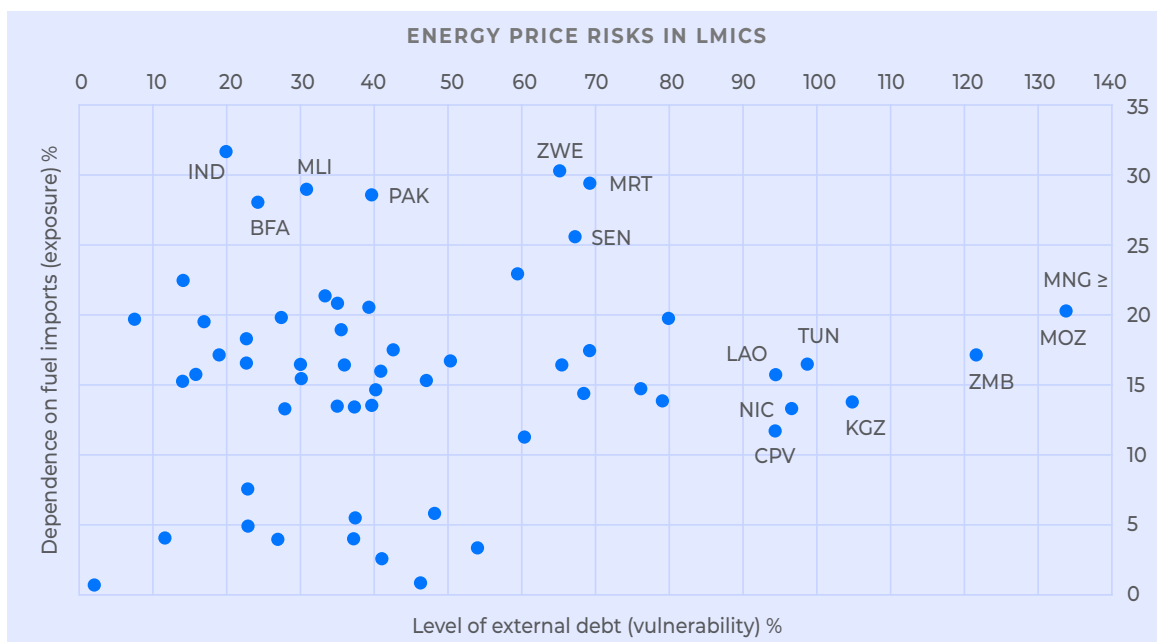


Figure 2. Exposure to Energy Price Risks in LMICs. Source: World Bank World Development Indicators [11]

Mongolia, Mozambique, and Zambia combine high vulnerability scores with notable exposure (fuel share in imports of around 20%). These would then be, perhaps, the countries facing the highest overall risk from the current energy crisis.

The case of Mozambique is particularly salient, given the country's abundant, but not yet exploited fossil fuel reserves. The dilemma is tangible. On the one hand, exploiting these reserves could significantly reduce energy price risks. On the other hand, the relief will come too late for the current crisis and, as the recent IPCC assessment makes clear [12], there are severe constraints on further fossil fuel development if climate risks are to be curtailed. Mozambique may be investing in assets that will ultimately be stranded if climate policies are implemented as planned.

Implications for meeting SDG7

High fossil fuel prices have mixed implications for meeting the targets associated with the 7th Sustainable Development Goal (SDG7). Progress towards universal access to electricity and clean cooking by 2030 has already been affected by the COVID-19 pandemic. According to the IEA, progress with energy access stalled between 2019 and 2021 [13]. There was an increase in the number of people without electricity access in Africa in 2020 for the first time since 2013. For cooking, 2.5 billion people still lack access to clean fuels and technologies. As with electricity, the pandemic stopped the slow progress that was being made to increase access levels.

In principle, high fossil fuel prices should provide a greater incentive for investment in renewable forms of electricity generation as part of efforts to increase electricity access rates. However, the twin shock of COVID-19 and the war in Ukraine is also impacting renewable energy. High prices and the ongoing impacts of the COVID-19 pandemic

“The increase in fossil fuel prices in 2021 is a further source of financial stress.”

is affecting the general investment environment in many countries. This includes the ability of electricity utilities to invest in new capacity and the ability of national governments to provide finance for such investment. The prospect of higher inflation is causing monetary authorities worldwide to increase interest rates. In due course, this will translate into higher costs of capital, a key factor in the cost of renewable energy, which is capital intensive but cheap to run.

Electricity utilities in Africa were already under considerable financial pressure before COVID-19. Only 40% of vertically integrated utilities had sufficient revenues to cover their operating and debt service costs [14]. The pandemic plus the increase in fossil fuel prices that followed in 2021 have exacerbated some of the pressures they are under. Reduced GDP, electricity demand, and revenue due to lockdowns decreased utility cash flow. This could lead to higher levels of longer-term debt in some cases. The increase in fossil fuel prices in 2021 is a further source of financial stress. Some utilities will not be able to pass through increased fuel costs to consumers due to pressure to keep prices low. The implication is that the need for subsidies will increase, with negative impacts on utility and public finances.

For clean cooking the intermediate transition to liquefied petroleum gas (LPG) will be more costly in some countries, at least in the short term – either for households or for national governments in cases where end-user subsidies are in place to keep retail prices low. This could lead to more emphasis on other forms of clean cooking such as electric stoves.



IMAGE: SERGEY PESTEREV / UNSPLASH

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Conclusions

Whilst Europe has been at the centre of responses to high fossil fuel prices and the Russian invasion of Ukraine, the impacts extend well beyond Europe’s borders. The global nature of fossil fuel markets means that high prices are affecting all regions of the world. The macroeconomic effects on Low- and Middle-Income Countries (LMICs) of a prolonged period of high prices could be particularly severe. Those countries that have high levels of debt and a high level of dependency on fossil fuel imports are more likely to be vulnerable to these effects.

Whilst many countries are increasing efforts to shift away from fossil fuels, high prices do not automatically mean that investment in renewables will be more attractive in LMICs. The wider macroeconomic impacts such as high

inflation could increase the costs of financing capital intensive technologies such as wind and solar. High prices and greater energy insecurity could also encourage some LMICs to develop their own fossil fuel resources. It will therefore be essential for governments and international donors to consider the financial viability of new fossil fuel development over the longer term – including the risk that assets will be stranded due to climate change policies.

Further research is required to understand the impacts of an extended period of high fossil fuel prices on LMICs in more detail. This research could also explore the consequences of a shift away from Russian fossil fuels in Europe and other regions, and impacts on energy security in specific LMICs.

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References

- Ofgem. 2022. Wholesale market indicators. <https://www.ofgem.gov.uk/energy-data-and-research/data-portal/wholesale-market-indicators> (accessed on 14 April 2022).
- IEA (International Energy Agency). 2022. Gas Market Report Q1-2022 Available online: <https://www.iea.org/reports/gas-market-report-q1-2022> (accessed on 20 April 2022).
- BBC (British Broadcasting Corporation). 2022. Market Data – Oil. <https://www.bbc.co.uk/news/topics/cmjppj223708t/oil> (accessed on 4 April 2022).
- BP (British Petroleum). 2021. BP Statistical Review of World Energy 2021. 70th edn. <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html> (accessed on 14 April 2022).
- D Stern, P Burke, and S Bruns. 2016. The Impact of Electricity on Economic Development: A Macroeconomic Perspective. Energy and Economic Growth State of Knowledge Paper 1.1. <https://www.energyeconomicgrowth.org/index.php/publication/impact-electricity-economic-development-macroeconomic-perspective> (accessed on 14 April 2022).
- N McCulloch and D Zileviciute. 2016. Is Electricity Supply a Binding Constraint on Economic Growth in Developing Countries. Energy and Economic Growth State-of-Knowledge Paper 1.3. <https://www.energyeconomicgrowth.org/publication/electricity-supply-binding-constraint-economic-growth-developing-countries> (accessed on 14 April 2022).
- W Nordhaus. 2004. Retrospective on the 1970s Productivity Slowdown. National Bureau of Economic Research Working Paper 10950. DOI: 10.3386/w10950.
- World Bank and DFID (Department for International Development). 2011. Measures to reduce the Economic and social Impact of High Fuel Prices. <https://documents1.worldbank.org/curated/en/429111468002402640/pdf/NonAsciiFileName0.pdf>.
- International Energy Agency (IEA), (2022). Gas Market Report Q1-2022 Available online at <https://www.iea.org/reports/gas-market-report-q1-2022> (accessed on 20 April 2022).
- OD Cardona et al. (2012) Determinants of risk: exposure and vulnerability. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 65–108. Available online: <https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/> (accessed 14 April 2022).
- World Bank. 2022. World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators> (accessed 14 April 2022).
- IPCC (Intergovernmental Panel on Climate Change). 2022. Climate Change 2022: Mitigation of Climate Change. <https://www.ipcc.ch/report/ar6/wg3/> (accessed 14 April 2022).
- IEA (International Energy Agency). 2021. World Energy Outlook 2021. Paris: IEA. Available online: <https://www.iea.org/reports/world-energy-outlook-2021> (accessed 21 April 2022).
- A Balabanyan, Y Semikolenova, D Hankinson, S Nash, and C Parcels. 2021. African Utilities during COVID-19: Challenges and Impacts. ESMAP Papers. Washington, DC: World Bank. Available online: <https://openknowledge.worldbank.org/handle/10986/36179> (accessed 21 April 2022).