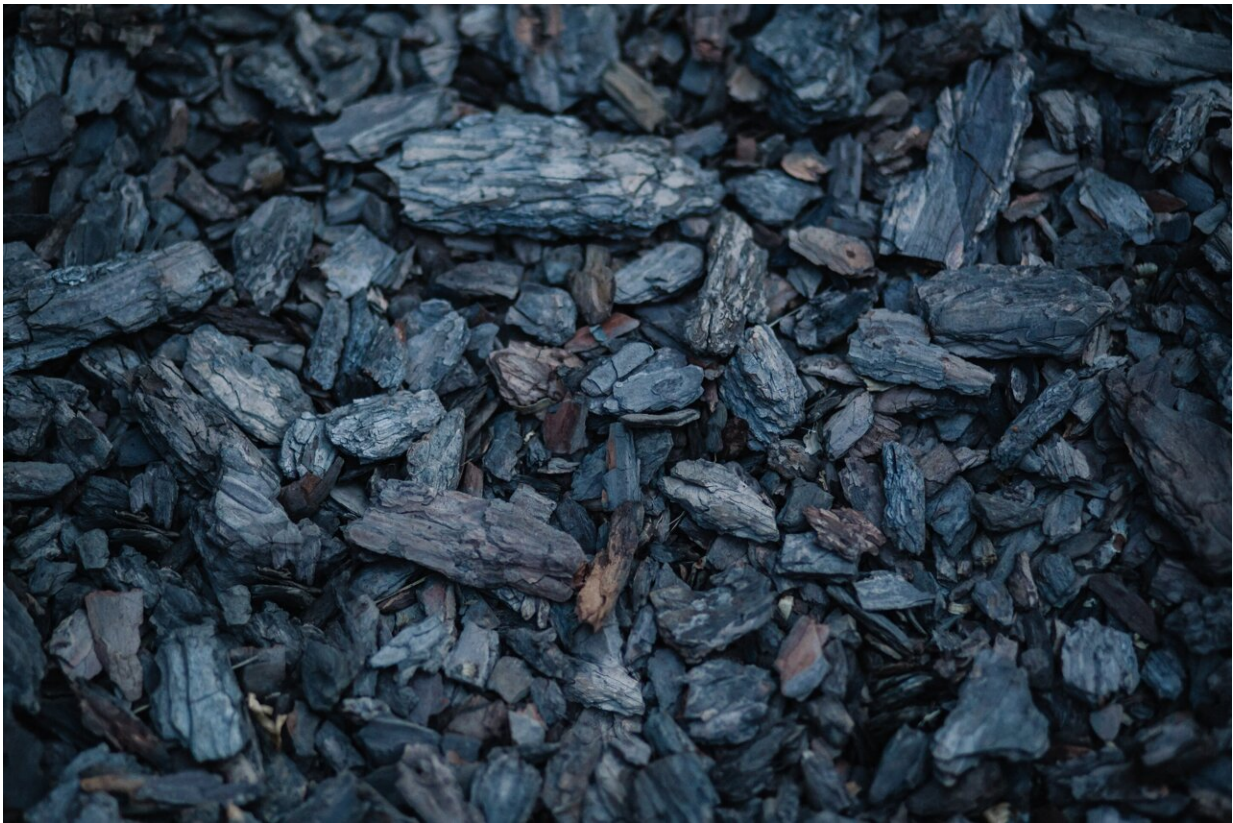


The next 20 are years crucial in determining the future of coal

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Decisions made now will determine whether economies win or lose money as the coal industry changes over the next couple of decades.

Countries including Australia and Indonesia could lose billions of dollars if they continue to invest in new [coal mines](#) and exports as the world moves away from fossil fuels.

These are the conclusions of a new analysis led by a team from Imperial College London and including researchers from Queen Mary University of London and Deloitte, which is published today in the journal *Joule*.

The team combined data on [coal resources](#) and demand in an economic model of trade and prices. They modelled the risk of 'stranded assets' for [coal](#) investment under different decarbonisation scenarios: business as usual, where investment in coal mining and consumptions continues as it does today, and a sustainable pathway where coal consumption is reduced in line with keeping global heating to well below 2°C.

Following the sustainable pathway results in a third of today's coal mines becoming stranded assets by 2040. This means these assets become economically unviable before their operating lifetime ends, and have to be scrapped. This will cause coal-producing nations such as Australia and Indonesia to lose vital export revenues and jobs as international trade shrinks. For example, Australia could lose \$25 billion per year in this scenario, and globally 2.2 million jobs could be at risk.

However, these losses are avoidable, say the authors, if [financial institutions](#) and governments prepare for the change. This could include divesting early from coal to prevent locking in future development, and by funding the retraining of coal workers.

Lead researcher Dr. Iain Staffell, from the Centre for Environmental Policy at Imperial: "This is not to say that not all new coal investments—such as the deep mine planned Cumbria—will be unprofitable, but investors must carefully assess the financial as well as reputational and environmental risks when pursuing new coal mining

projects."

For many world regions there are great economic benefits to phasing out coal. China, Europe and India would save money under the sustainable pathway, as they face reduced costs from importing less coal. Europe, for example, could gain \$20 billion per year as coal is phased out.

Overall, the researchers estimate the sustainable pathway gives a global net saving of \$10 billion per year by 2040 from reduced coal transportation costs, on top of the economic savings from reduced air pollution and health consequences.

Importantly, the authors say that under the business-as-usual scenario many more economies are likely to be losers: the longer the world waits to phase out coal, the more extreme the measures to reduce carbon emissions will need to be, leading to more stranded assets and job losses in the long run.

Dr. Staffell said: "Businesses have a limited window of opportunity to get out in front of the sweeping changes that face the coal industry. We must build the human and financial resilience so that workers do not lose out, and make the transition to a coal-free world easier.

"The financial and job losses are small on a global scale, but they will be heavily concentrated in mining regions, meaning some developing economies, like Indonesia, will disproportionately suffer if the transition isn't managed carefully. When economic and job losses start to happen it will be too late—we need to start preparing for these changes now."

The mining and consumption of coal is being rapidly phased out in many Western nations, but global coal consumption is rising, especially in Asia, which is home to three-quarters of all new coal power plant capacity.

China opened many new coal mines in the 2000s, which have a lifetime of about 30 years. The decisions countries like China and India make in the coming years around whether they continue to mine and consume coal will have a huge impact on the global trajectory, say the team.

Similarly, India's energy consumption is booming, and if new coal capacity is built to meet demand rather than renewables, the world will be locked into more decades of coal trade and consumption, negatively affecting both the climate and the global economy.

First author Thomas Auger undertook the analysis as part of his MSc in Environmental Technology in the Centre for Environmental Policy at Imperial in partnership with Deloitte, which provided him access to coal market data. He said: "The wealth of knowledge from the combination of academia and industry provided us with an unprecedented opportunity to analyse not just the global situation over the next 20 years, but also how individual countries would fare.

"Our analysis shows there will be big winners and losers from this transition, but the future is not set in stone. The more governments anticipate the green transition, the more its impacts in terms of economic stability and disruption to people's livelihoods would be minimised."

More information: The future of coal investment, trade and stranded assets, *Joule* (2021).

[www.cell.com/joule/fulltext/S2542-4351\(21\)00243-9](https://www.cell.com/joule/fulltext/S2542-4351(21)00243-9)

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