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**The ‘carbon cost’  
of economic  
growth: New  
figures show  
Asia’s high CO<sub>2</sub>  
intensity**



**Nick Parsons**

Managing Director,  
Head of Research  
and ESG Policy

## Introduction

In 2021, ThomasLloyd introduced the concept of the “Carbon Cost of GDP”; the amount of CO<sub>2</sub> which is emitted for every trillion dollars of Gross Domestic Product (GDP). This allowed us to make meaningful comparisons across countries and to rank their emissions’ intensity with respect to economic output rather than to population which – in our view – gives a flawed picture of the true situation in China and India.

Our research showed that in 2019, whilst China and the United States were the largest emitters of CO<sub>2</sub> in absolute terms – with 10.2 and 5.3 million tons respectively – the figures looked very different when calculated per unit of GDP. Using data from the International Monetary Fund<sup>1</sup> and Global Carbon Atlas<sup>2</sup>, we showed that China emitted almost three times as much CO<sub>2</sub> per unit of GDP than the United States; 706 million tons (Mt) per trillion dollars of GDP versus 247 million tons.

Even so, China was ranked only in second place amongst the ten largest economies in the world. Its total of 706 million tons per trillion dollars of GDP was eclipsed by India with an enormous 880 million tons. Indeed, when we looked at the IMF’s eight largest ‘Emerging & Developing Economies’ in Asia, their average emissions of 617 million tons – ranging from 880 million in India down to 337 million in Bangladesh – were more than four times as high as the average of the four largest economies in Europe. Germany, the United Kingdom, France and Italy had an average of just 148 million tons. Staggeringly, India’s 880 million tons were 7.5 times higher than France’s 117 million.

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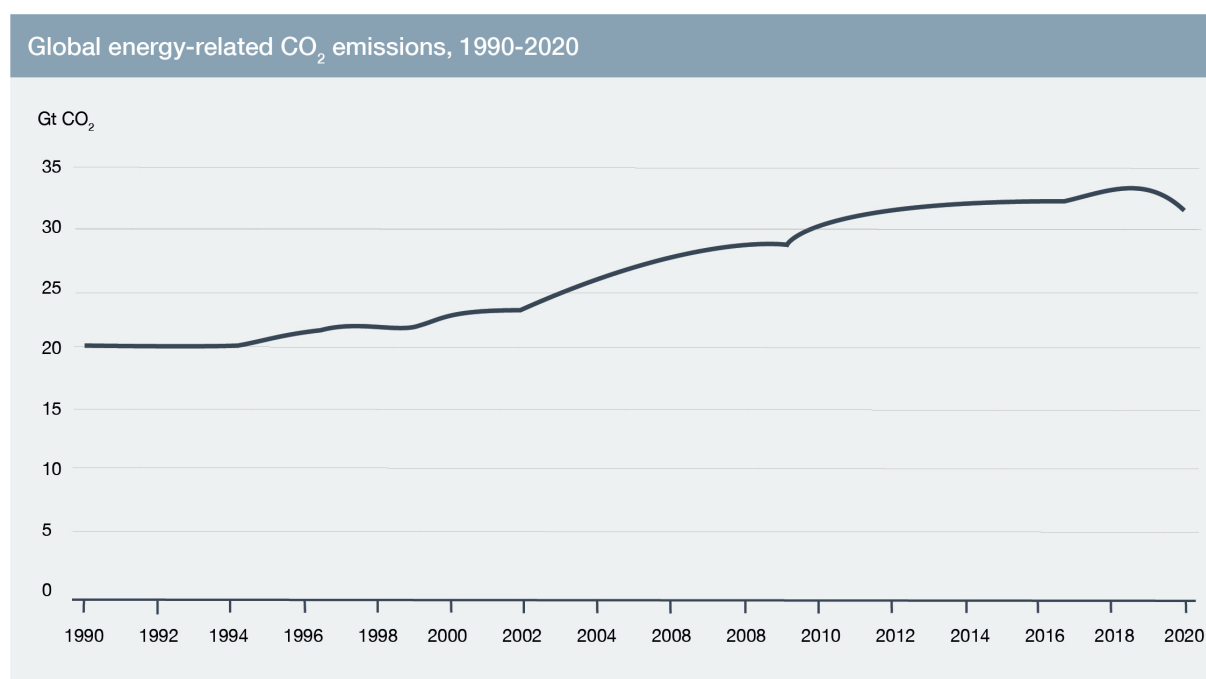
<sup>1</sup> International Monetary Fund, World Economic Outlook October 2020

<sup>2</sup> <http://www.globalcarbonatlas.org/en/CO2-emissions>

## Updated figures now available

Updated figures are now available for CO<sub>2</sub> emissions in 2020; a period marked by the social and economic scarring of the COVID pandemic, during which the IMF now estimates world GDP to have fallen from US\$ 87.4bn to US\$ 84.9bn; a 2.8% annual drop<sup>3</sup>. The International Energy Agency estimates the drop in energy-related

CO<sub>2</sub> emissions at -5.8% in 2020<sup>4</sup>, whilst Global Carbon Atlas puts the total emissions at 34.8 billion tons after 36.4 billion tons in 2019. This clearly demonstrable link between economic activity and CO<sub>2</sub> emissions provides a useful context for us now to update our calculations on the 'Carbon Cost of GDP'.



Source: IEA, Global energy-related CO<sub>2</sub> emissions, 1990-2020, IEA, Paris

## Who are the largest carbon emitters?

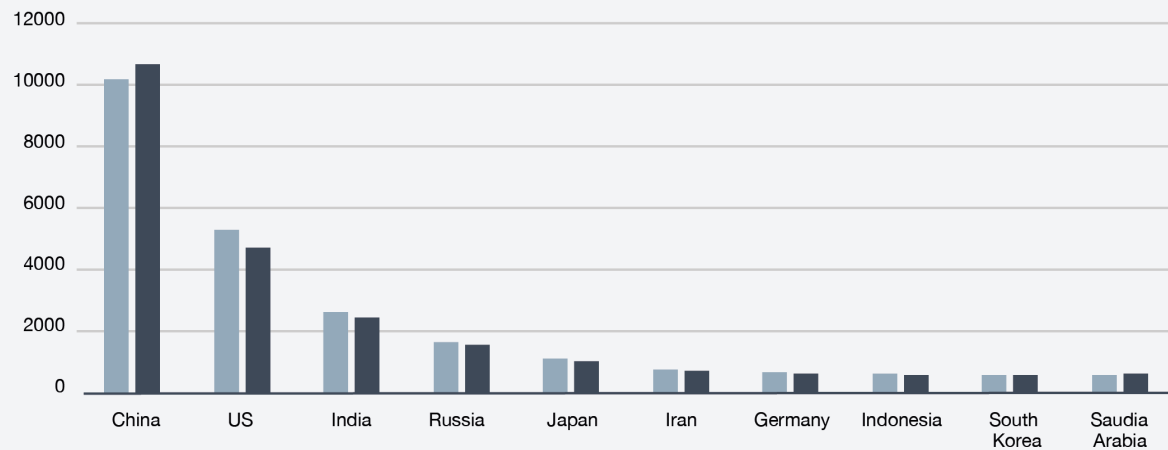
Using the latest available country data for 2020, China actually increased its emissions of CO<sub>2</sub> from 10,175 Mt to 10,668 Mt; now more than twice the amount of the United States which fell from 5,285 Mt to 4,713 Mt. India remains in 3<sup>rd</sup> place with 2,442 Mt and we note there is no change in the ranking of any of the top ten countries. Again, it is no surprise that the world's

biggest five economies ranked by GDP should be amongst the top emitters of CO<sub>2</sub>, but it is not a perfect read-across and, as we show later, there remains significant variation between the major economic powers. We should note also, that Russia and Iran who do not even make the list of top 10 economies, still feature in the emissions table in 4<sup>th</sup> and 6<sup>th</sup> places respectively.

<sup>3</sup> International Monetary Fund, World Economic Outlook October 2021

<sup>4</sup> IEA (2021), Global Energy Review: CO<sub>2</sub> Emissions in 2020, IEA, Paris | <https://www.iea.org/articles/global-energy-review-co2-emissions-in-2020>

Top ten CO<sub>2</sub> emissions (million tons) by country 2019 and 2020

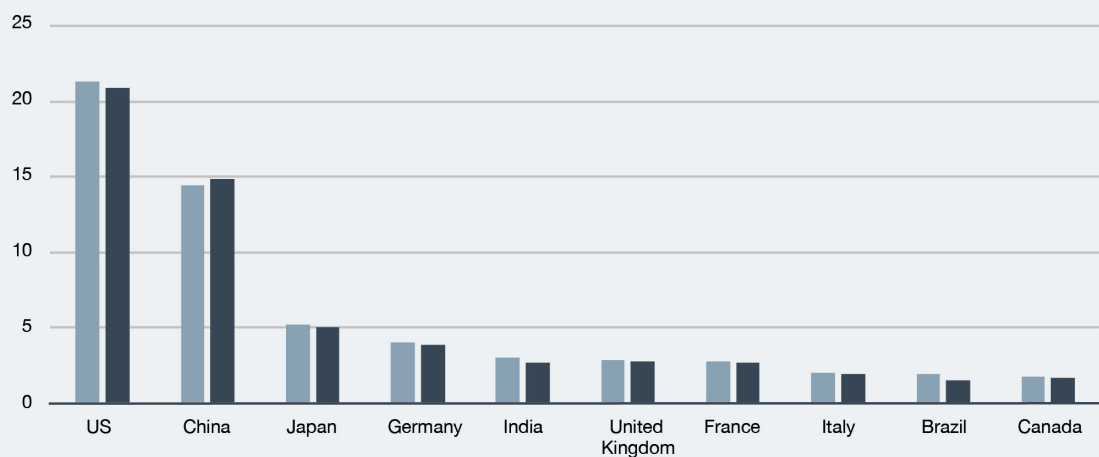


## Measuring the ‘carbon cost’ of GDP

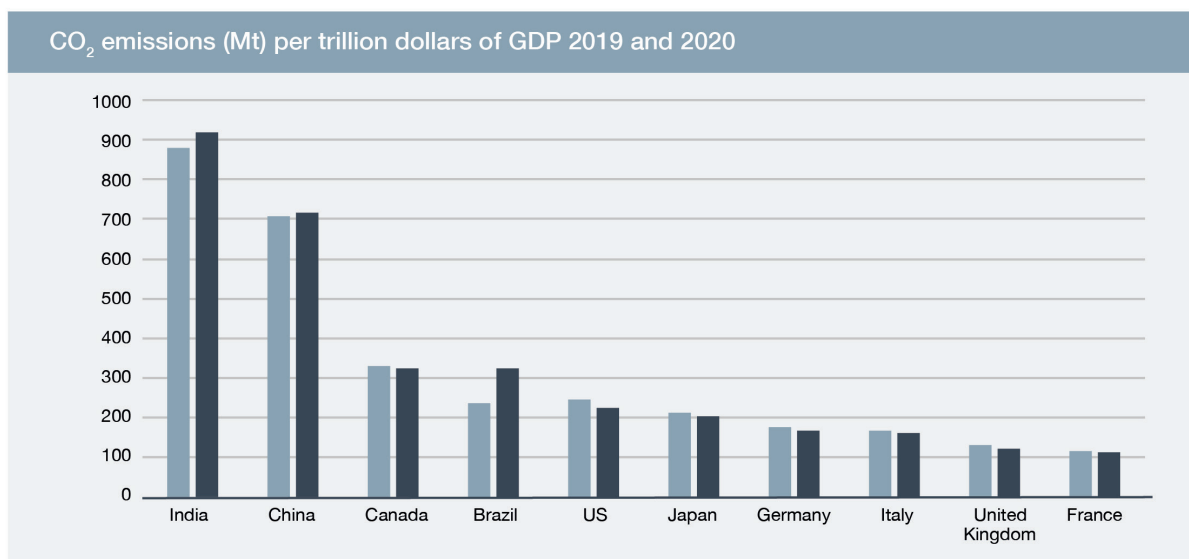
Our next step is to make explicit the ‘carbon cost’ of economic output across the world’s major economies. We do this first by ranking the ten

largest by GDP then calculating the amount of CO<sub>2</sub> emissions (Mt) per trillion dollars of GDP.

Ten largest countries ranked by GDP 2019 and 2020 (US\$ tn)



Source: International Monetary Fund



Source: IMF, Global Carbon Atlas, ThomasLloyd calculations

The results of this updated analysis are again striking. Of the ten largest economies in the world, not only does India still have the highest 'carbon cost' per unit of GDP, but this number actually increased from 880 Mt per trillion dollars of GDP in 2019 to 918 Mt in 2020. Yes, there was a 174 Mt (6.6%) drop in total emissions but the Indian economy shrank by US\$ 311bn (10.4%) over the period. Emissions per unit of

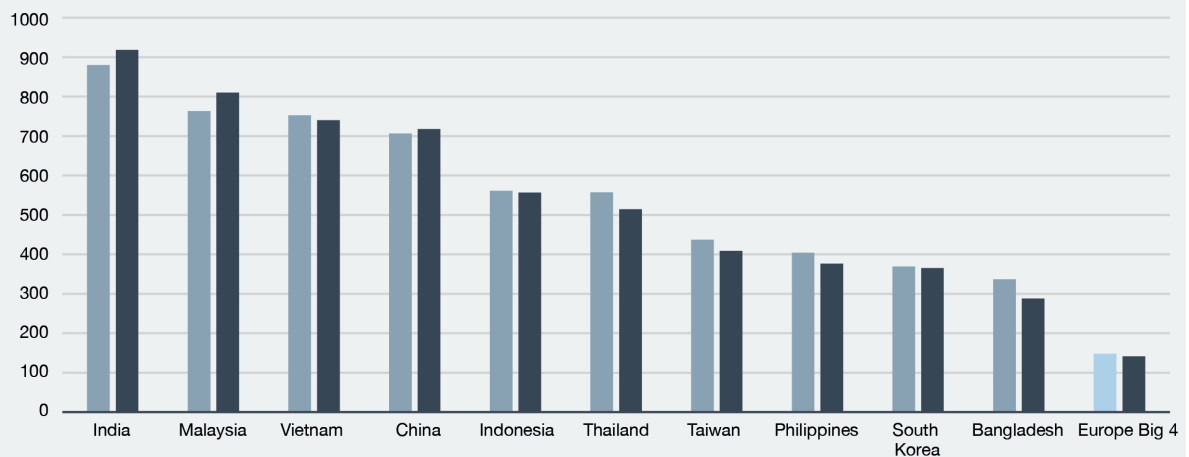
GDP therefore rose. A similar, but even more pronounced phenomenon was seen in Brazil, where plunging GDP in 2020 pushed the country up to fourth place in the table. Canada remained in third spot, whilst the four largest European economies again took the bottom four positions in this table, with France emitting just 112 Mt of CO<sub>2</sub> per trillion dollars of GDP.

## Asia's 'carbon cost' of GDP

We again repeat the exercise for the eight largest 'Emerging & Developing Economies' in Asia. Once more, every single one of these Asian economies has a 'carbon cost' per trillion dollars of GDP greater than any major country in Western Europe and seven of them have a carbon cost at least double that of the largest

nation in Europe. At the worst end of the scale, India has a carbon cost of 918 Mt per trillion dollars of GDP, whilst Malaysia has moved into second place with 810 Mt. For six of these countries, the carbon cost is greater than 500 Mt.

Asian economies CO<sub>2</sub> emissions (Mt) per trillion dollars of GDP 2019 and 2020

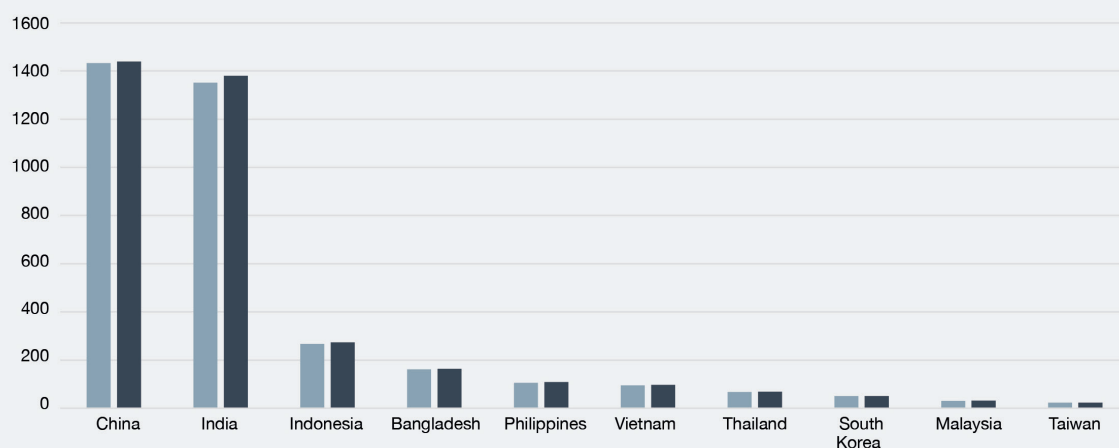


Source: IMF, Global Carbon Atlas, ThomasLloyd calculations

This would matter less if these were countries with small populations, where the results could be seen to be less relevant on a global scale. But they are not. Five of the countries each have

a population greater than 100 million – two of them have more than a billion – and all eight in aggregate have a total population of 3.56 billion; almost half the total of the entire planet.

Asian countries' population 2019 and 2020



Source: United Nations Population Division



## COP 26 highlighted urgent problem of CO<sub>2</sub> emissions and climate change

The problems of CO<sub>2</sub> emissions and their impact on climate change and the environment have moved rapidly up the social and political agenda. As we saw at the COP 26 meeting in Glasgow in November 2021, for many people they are the most urgent problems facing the world today.

The updated figures presented here show that the problem of CO<sub>2</sub> emissions remains largely an Asia phenomenon and it is this – and the very

high cost of carbon per unit of GDP – which must be addressed. Of the world's total of 36,441 Mt of CO<sub>2</sub> emissions in 2019, the eight Asian countries analysed here accounted for 14,470 Mt; 40% of the global figure. In 2020 and despite severe economic slowdown in many nations in the region, their total emissions actually rose to 14,714 Mt with an average 'carbon cost of GDP' more than four times that of the average of the four largest countries in Europe.

## Significant investment opportunity in Asia


The updated figures presented here underscore the compelling case for investment in infrastructure and renewable energy in the Asia-Pacific region. Demographic change and rapid urbanisation are driving the demand for electricity which must increasingly be met by technologies which help reduce and mitigate climate change. By virtue of their geography, countries with the highest 'carbon cost of GDP' are also best placed for a supply response which harnesses their plentiful solar irradiation.

At ThomasLloyd, we are committed to helping deliver the energy transition in Asia whilst recognising that not every country can or will proceed at the same pace and some will require significant support from the richer industrialised nations. As a developer and financier of sustainable real infrastructure assets, we play

a significant role in economic transformation; producing renewable energy to serve the needs of a rapidly growing population across the region. We are confident that our approach is the right one and just a few weeks after the COP 26 meeting, we successfully launched the ThomasLloyd Energy Impact Trust on the London Stock Exchange; the first such fund focusing exclusively on the large and fast growing countries in Asia.

Our philosophy of realising sustainable value clearly resonates with investors and the figures presented here again show the challenge and opportunity in the region. Our fervent hope for 2022 is that the goodwill and positive energy created at COP 26 will be translated into the required direct capital investment.





This is  
what real  
climate  
action  
looks like

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