

# Round-up: A climate COPout?

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Climate economics has been the focus of Fathom's research this month, as all eyes turn to the COP26 summit to see whether the world's leaders can deliver enough in what has been billed as the world's last chance to limit global warming to 1.5°C above pre-industrial levels. Read on for a round-up of some of the economic insights Fathom sent to clients in October, with topics including:

6 October 2021: **Apportioning blame to the world's polluters**

13 October 2021: **Green talk is cheap**

20 October 2021: **Are governments really getting serious about climate change?**

27 October 2021: **Technology to the rescue?**

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## Apportioning blame to the world's polluters

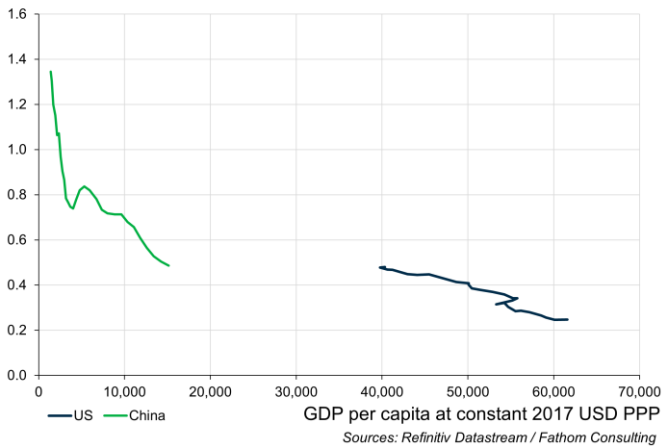
- China is the world's biggest polluter in terms of the volume of its emissions. It is also the world's most populous nation and, on same metrics, the world's largest economy. How might we judge whether China is contributing more than its fair share to the global stock of greenhouse gases?
- We know that a country's emissions per unit of GDP will tend to evolve as its economy develops, rising during the transition from agriculture to manufacturing, then declining during the transition from manufacturing to services. Our first chart compares China's emissions per unit of GDP between 1990 and 2018 with those of the US over the same period





## Emissions and per capita GDP, 1990-2018

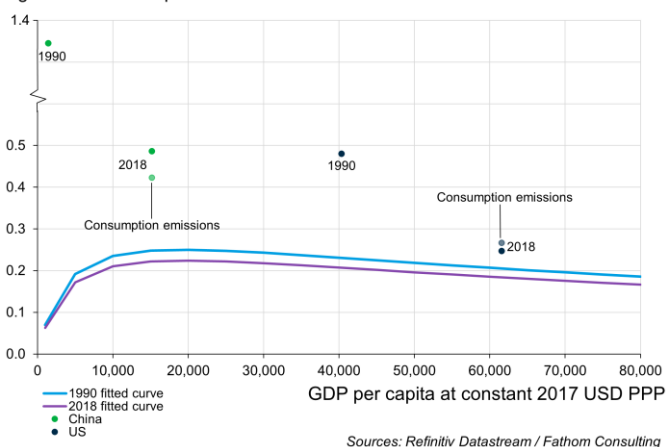
kg of CO2 emitted per USD of GDP at constant 2011 USD PPP



- China's economy remained substantially less developed in 2018 than that of the US in 1990, when measured on a purchasing power parity basis, and at constant prices. Nevertheless, its emissions per unit of GDP were broadly comparable. So China is not doing too badly, right? To draw that conclusion is to ignore the fact that, owing to technological advances, reducing emissions has become cheaper over time. Perhaps China should be doing more?
- Our second chart uses data from almost 200 countries to estimate average emissions per unit of GDP as a function both of GDP per capita, and time (on the basis that reducing emissions becomes cheaper, and easier with the passage of time). The light blue curve shows predicted emissions per capita as a function of a country's GDP per capita in 1990, while the purple curve plots the same concept for 2018

## Predicted and actual emissions

kg of CO2 emitted per USD of GDP at constant 2011 USD PPP



- On this basis, we find that both in 1990 and in 2018 China and the US were each emitting more CO2 than one might expect at their stage of economic development and level of technology, although both had taken steps in the right direction





- However, it seems that China has more explaining to do than the US. In 2018, China's CO2 emissions per unit of GDP were more than double those of other countries in a similar position, while those of the US were around 30% higher
- China might object that, as a major global exporter, some of its emissions are made to satisfy the consumption choices of other nations. And it would have a point. If instead of measuring territorial emissions we measure the emissions embodied in what each nation consumes, we find that China is responsible for 13% fewer emissions than the headline territorial emissions data suggest, while the US is responsible for 8% more
- China will come under a lot of pressure to reduce its greenhouse gas emissions at the COP26 summit. And so it should. Not only is it the world's largest polluter, but Fathom's analysis also suggests it is emitting substantially more than one might expect, even allowing for a portion of this being carried out on behalf of other nations. But the US needs to act too. If we consider the pollution caused worldwide by what it consumes, we find that the US is responsible for close to 50% more CO2 emissions than other countries in a similar position

#### **Further reading:**

[The bumpy road to climate transition](#)

[China's climate targets: more ambition, please](#)

[COP26 unlikely to achieve its targets](#)

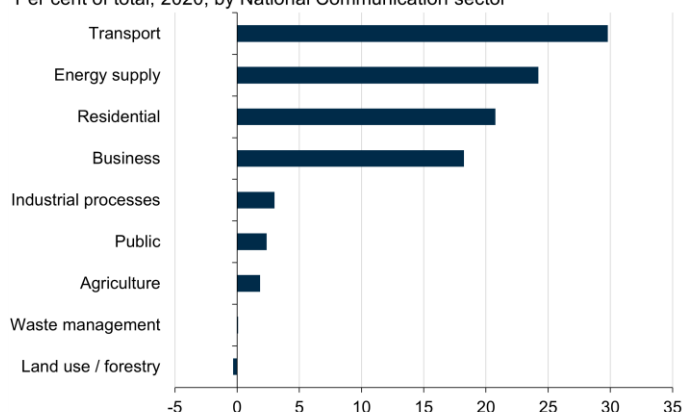
#### **Green talk is cheap**

- "[We] know what to do but we don't know how to get re-elected once we have done it," said former Eurogroup president Jean-Claude Juncker, speaking during the euro area's debt crisis. Something similar may be true about many governments' plans to reach net zero by 2050
- Transport is the largest source of UK territorial CO2 emissions, with private vehicles the biggest source within that

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### **UK CO2 emissions\***

Per cent of total, 2020, by National Communication sector



\*CO<sub>2</sub> emissions account for 79% of total UK greenhouse gas (GHG) emissions

Source: Gov.uk / Fathom Consulting



- However, since 2010, successive UK governments have opted not to increase fuel duty by inflation, effectively delivering an increasingly large subsidy to one of the UK's most polluting activities

## UK fuel duty receipts



- This has not only raised the UK's greenhouse gas emissions by as much as 5%,<sup>1</sup> but is costing the taxpayer more than £5 billion per year in lost revenue (broadly equal to one percentage point on the basic rate of income tax)
- Politicians fear the electoral consequences of higher living costs caused by action on climate, and this raises doubts about the political viability of carbon taxes to help make net zero targets a reality
- A forthcoming note will look at alternative incentives, such as the carrots that are available thanks to exponential technological progress

<sup>1</sup> <https://www.carbonbrief.org/analysis-fuel-duty-freeze-has-increased-uk-co2-emissions-by-up-to-5-per-cent>



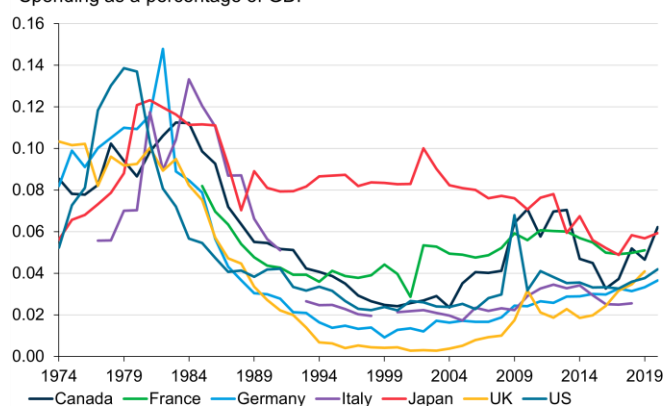


## Are governments really getting serious about climate change?

- One of the few things on which economists can agree is that the social returns to R&D spending far outweigh the private returns, generating a strong prima facie case for government intervention
- Moreover, in a recent empirical study, researchers found that government spending on R&D actually 'crowds in' private spending — by spending more on R&D the government encourages the private sector to spend more too<sup>2</sup>
- Reducing CO<sub>2</sub> emissions to meet the Paris climate goals will require substantial investment in new technology
- With governments around the world striving to display their green credentials, one might imagine that government financing of emission-reducing R&D would be booming
- However, as our chart shows, in most major economies government spending on energy technology R&D as a share of GDP is running at around one-third of the level seen in the aftermath of the two oil shocks
- With government R&D spending offering something close to a free lunch, government commitments to achieving net zero by 2050 should be taken with a pinch or two of salt unless and until the sums of money devoted to energy technology R&D begin to rise materially

### Energy technology R&D spending by G7 governments\*

Spending as a percentage of GDP



\*Includes spending on products for demonstration to prove commercial viability

Source: International Energy Agency / Fathom Consulting

<sup>2</sup> See Moretti, E., Steinwender, C. and Van Reenen, J. (2019), 'The Intellectual Spoils of War? Defense R&D, Productivity and International Spillovers', [NBER working paper no. 26483](#).



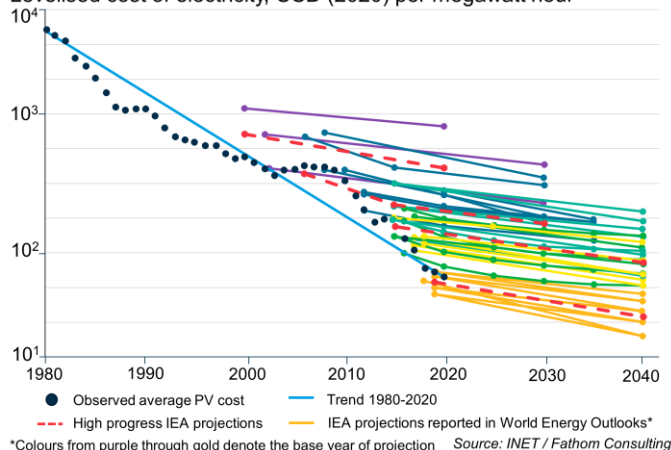


## Technology to the rescue?

- Despite its pledge to reach net zero by 2050, the UK government has effectively been subsidising fossil fuel consumption by keeping petrol and diesel duty frozen for more than a decade; while public R&D spending on climate among the G7 remains pitifully low
- Moreover, UN estimates suggest even if all existing commitments by countries around the world were met, that could be consistent with 2.7°C of global warming by 2100 — which is a lot more than the “well below” 2°C that the Paris agreement called for
- Amid the pessimism, the rapidly declining cost of renewable energy offers some hope that technological progress could save the day
- The chart below, which was originally produced by Way *et al.*, shows that the cost of solar energy has consistently been much lower than the persistently pessimistic estimates made by climate experts

### Historical solar PV cost forecasts

Levelised cost of electricity, USD (2020) per megawatt hour



- Something similar is true for many other types of alternative energy, leading the researchers to conclude that decarbonisation efforts will end up saving “many trillions of dollars – even without accounting for climate damages”<sup>3</sup>
- This is not a call for complacency. Governments can and should do more to incentivise this transition, and richer countries should ensure that alternative energy technologies can be rolled out in emerging economies
- The lack of detail and credible plans from many governments towards net zero commitments suggests that they are implicitly betting on technology to save the day. It’s a risky bet, but they may end up getting away with it

**Chart authors: Andrew Brigden, Kevin Loane**

<sup>3</sup> See Doyne Farmer, J., Ives, M., Mealy, P. and Way, R. (2021), ‘Empirically grounded technology forecasts and the energy transition’, [INET Oxford Working Paper no. 2021-01](#).



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