

## Did COVID-19 accelerate the green transition? An international assessment of fiscal spending measures to support low-carbon technologies

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### Key messages

- In response to COVID-19, 51 OECD, EU and G20 countries allocated USD 1.29 trillion in fiscal spending measures to the development and deployment of low-carbon technologies.
- These measures will make a significant contribution to investment needs in several technologies and are projected to reduce the greenhouse gas emissions of OECD countries by 9% in 2030 and 11% in 2050. They should also reduce fossil fuel imports by 11% in the EU and by 9% in North America in 2030.
- These measures will boost the growth of clean sectors and could trigger significant reductions in the cost of important low-carbon technologies such as green hydrogen.
- The adoption of mature low-carbon technologies was allocated at least five times more funding than research, experimental development and demonstration (RD&D) of emerging technologies. However, RD&D investment is key: a dollar spent on RD&D induces six times more cumulative emissions reductions by 2050 than the same dollar invested to support technology adoption.
- Whereas the energy sector was expected to receive the largest share of spending (39%), the industry sector was only allocated 4%, despite that sector's major decarbonisation challenges.

### Low-carbon technologies received significant government funding from COVID-19 fiscal packages

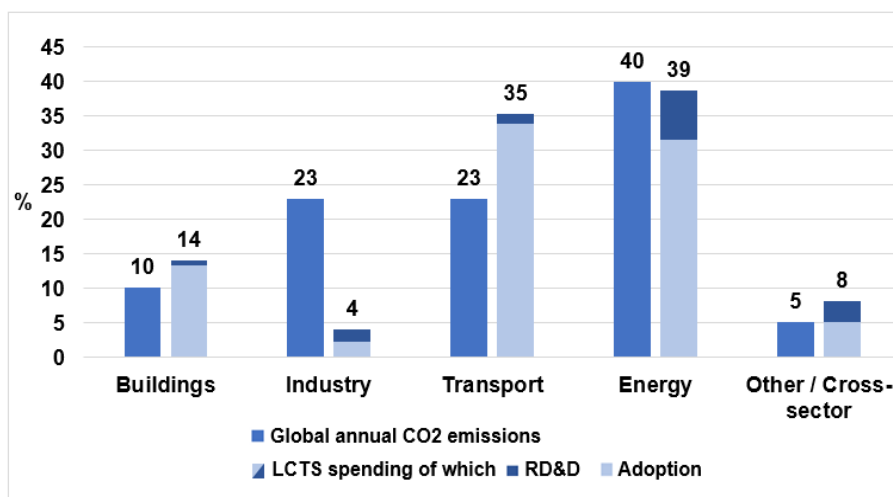
In response to COVID-19, governments around the world approved fiscal packages worth approximately USD 20 trillion. The OECD's new Low-Carbon Technology Support (LCTS) database shows that **countries around the world – members of the OECD, the European Union and the G20 – used these fiscal packages to announce USD 1.29 trillion for the development and deployment of low-carbon technologies.** 14 countries allocated over USD 10 billion to low-carbon technologies, led by the USA (USD 616 billion), Italy (USD 107 billion) and the UK (USD 76 billion). **On average, OECD countries committed to spend the equivalent of 2% of one year of their GDP on low-carbon technologies.**

## Spending measures prioritised the energy sector over the industry sector and the adoption of mature technologies over research and development

The sectors which received the largest share of funding are energy (39%) and transportation (35%). Much of the energy spending targets renewables (such as solar PV and wind power), while transportation spending prioritises the expansion and electrification of railways and low-emission vehicles. In contrast, only 4% of total funding was allocated to the industry sector. **Compared to other sectors, the share of funding for industry appears small relative to its high contribution to global annual greenhouse gas (GHG) emissions (23%)** (Figure 1), even though enhanced deployment of renewable electricity may indirectly enable further electrification in the industry sector. Given that the industry sector faces considerable challenges to reach net-zero emissions – including long-lived capital assets and exposure to competitive global markets – post-COVID fiscal packages seem to have missed an opportunity to provide support to industry commensurate with its emissions and decarbonisation challenges.

**Figure 1. Distribution of global energy-related greenhouse gas emissions and of low-carbon technology spending to different sectors (RD&D and adoption)**

Share of total global annual CO<sub>2</sub> emissions (2022) and share of total LCTS spending



Note: The category 'RD&D' includes spending measures which support research, experimental development, and technology demonstration considered to be at an effective developmental, pre-large-scale adoption stage. Post-COVID public investments not targeting any sectors or technologies (USD 8.5 bn) are excluded from this graph.

Source: OECD Low-Carbon Technology Support database (version May 2023), IEA Global energy-related CO<sub>2</sub> emissions by sector.

Figure 1 also shows that, across sectors, **the vast majority of spending supports the deployment and adoption of mature technologies. In contrast, development of early-stage technologies receives a much smaller share, with only 6.6% of spending going towards research, development and demonstration (RD&D)** and an additional 7.8% channelled towards the use of emerging technologies yet to fully proven at system-level scale as well as in the marketplace. Amongst emerging technologies, hydrogen is expected to receive the largest investment, followed by smart grids and carbon capture, utilisation and storage (CCUS).

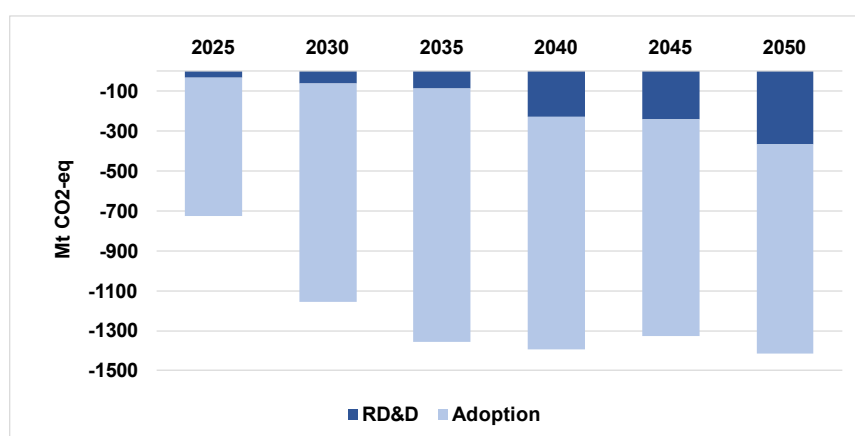
However, emerging technologies are expected to play a major role in reaching net-zero global emissions by 2050. According to the IEA, technologies which are currently at an early stage of development will need to account for more than half of global emissions reductions in 2050. Subsequent rounds of fiscal spending might need to direct a larger share of low-carbon investment towards RD&D.

## Green fiscal spending triggers emissions reductions, with the impact of RD&D investments increasing over time

A modelling exercise projected the impact of the post-COVID low-carbon fiscal spending ('Green Fiscal Push Scenario') relative to a Reference Scenario in which no such spending occurred. **In the Green Fiscal Push Scenario, GHG emissions in OECD and EU countries decrease by 1150 Mt CO<sub>2</sub>-eq in 2030 (9% reduction) and 1400 Mt CO<sub>2</sub>-eq in 2050 (11% reduction) compared to the Reference Scenario** (Figure 2). While this is progress, the emissions reductions triggered by the fiscal spending measures only account for 23% of the reductions required by 2030 to reach net-zero emissions by 2050.

### Figure 2. GHG emissions reductions in Green Fiscal Push Scenario, by RD&D vs. adoption support

Mt CO<sub>2</sub>-eq absolute change in Green Fiscal Push Scenario compared to Reference Scenario (OECD countries)



Source: OECD and E3M (2023)

Figure 2 also shows that the impact of RD&D support on emissions reductions increases over time: **in 2030, only 5% of emissions reductions are triggered by RD&D investment but in 2050 RD&D accounts for 26% of emissions reductions.** This is due to increases in the productivity of clean technology, significant cost reductions in, for example, batteries, hydrogen, wind power and solar PV, and the diffusion of knowledge spillovers across borders. **By 2050, a dollar spent on RD&D induces six times more cumulative emissions reductions than the same dollar invested to support adoption.**

The Green Fiscal Push Scenario is also projected to lead to a small aggregate increase in the GDP and employment of OECD and EU countries. Gross output increases considerably in sectors such as wind power equipment (51% increase in output by 2030) and solar PV (48%). The only sector that significantly contracts is fossil fuels (-9%). **Countries' reliance on fossil fuels decreases: in 2030, the value of fossil fuel imports in the EU is projected to decrease by 11% and in North America by 9%.**

## What can policymakers do?

- Government investments in low-carbon RD&D and emerging technologies are key to driving down the cost of clean technologies and contributing to significant emissions reductions, especially in the long run. More support for low-carbon RD&D is critically important.
- The energy-intensive industrial sector should be the target of a larger share of public investment in low-carbon technologies given the sector's major decarbonisation challenges.
- While government financial support is important, a broader policy mix should also include carbon pricing, standards and regulations, public infrastructure provision, public procurement, and skills, competition and entrepreneurship policies.

## Explore further

Aulie, F., et al. (2023), "Did COVID-19 accelerate the green transition? An international assessment of fiscal spending measures to support low-carbon technologies", OECD Science, Technology and Industry Policy Papers, No. 151, OECD Publishing, Paris, <https://doi.org/10.1787/5b486c18-en>.

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