



# **Opportunities and challenges for clean energy innovation in light of the Covid-19 pandemic**

The International Energy Agency – May 2020

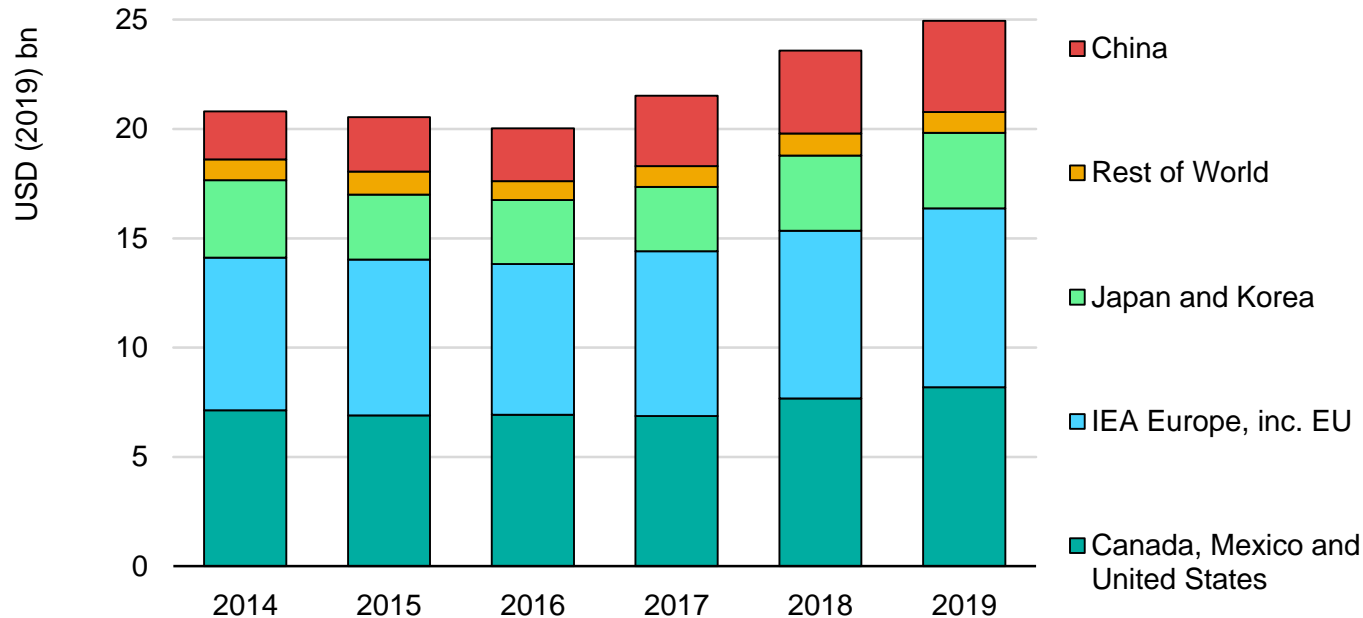
Informal input to strategic discussions under Mission Innovation

- **The Covid-19 pandemic is exerting unprecedented changes on economic and social activity worldwide, and it will have long-lasting effects.** In the near-term, developing new clean energy technologies will be harder as capital spending is hit and business risks rise. In the longer-term, the direction of economic recovery matters: it could successfully reorient the world towards more secure, sustainable energy if stimulus measures shrewdly target energy R&D and innovation.
- **This presentation highlights initial, under-embargo IEA findings** based on past experience, including latest data collected under the **Clean Energy Transitions Programme (CETP)**. Hopefully, it can facilitate evidence-based deliberations within and between governments.
- On 2 July 2020, the IEA will publish a **Special Report on Clean Energy Technology Innovation** in its Energy Technology Perspectives series. It will provide policy makers with quantitative insights of why energy innovation is so vital for clean energy transitions, and how sound policy responses to Covid-19 can help keep progress on track towards net-zero emissions and, in some cases, accelerate innovation.
- **This work is part of an integrated package of IEA analysis on economic stimulus** for energy efficiency, renewables, hydrogen and batteries, and a forthcoming IEA Special Report on reducing emissions while boosting the economy (to be published in June).

- 1. The latest information on trends in spending on R&D and energy innovation**
- 2. Expected near-term impacts of the crisis on energy innovation**
- 3. Lessons learned from prior experiences with stimulus measures to boost energy innovation**
- 4. Policy options to mitigate negative impacts and accelerate clean energy technologies that are well-suited to stimulus interventions**

# New data: government spending on clean energy R&D rose in 2019

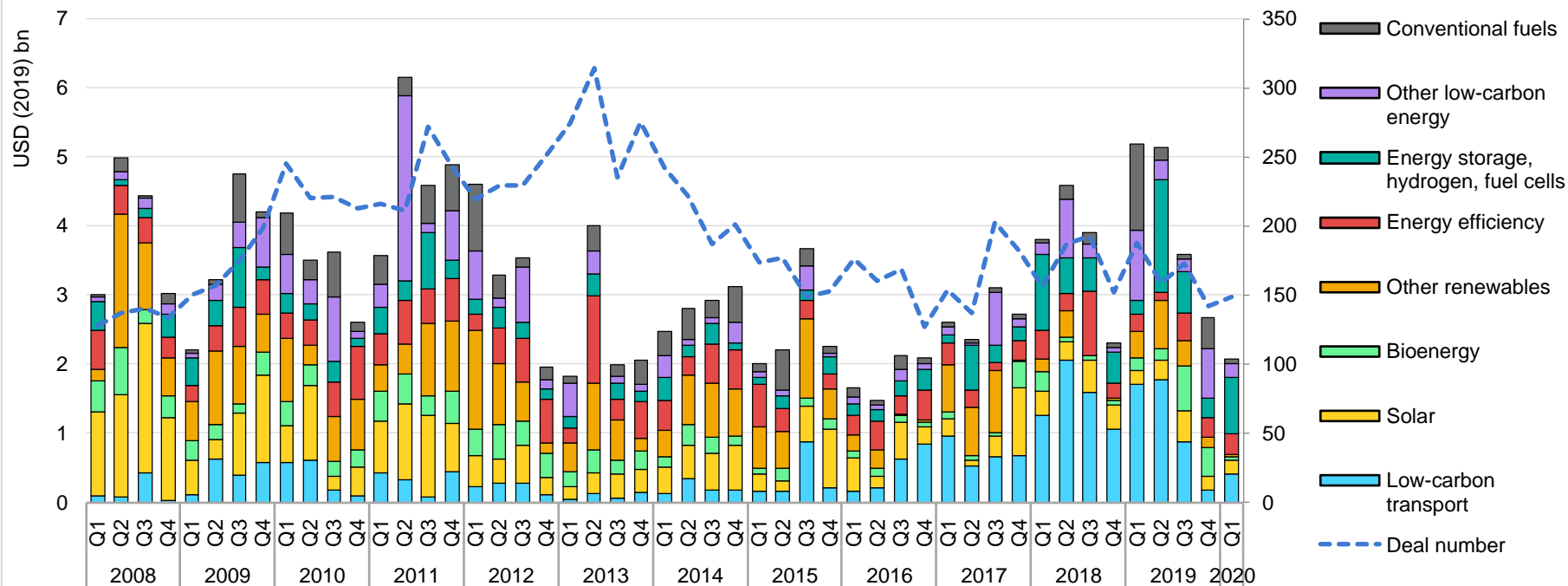
Global spending by governments on clean energy R&D and demonstration ([IEA RD&D budget reports](#), May 2020)



**Public spending on clean energy reached a new high in 2019 at about USD 25 billion, with notable growth in Europe, the United States and China.**

# Clean energy VC is booming & diversifying, but slowdown is evident

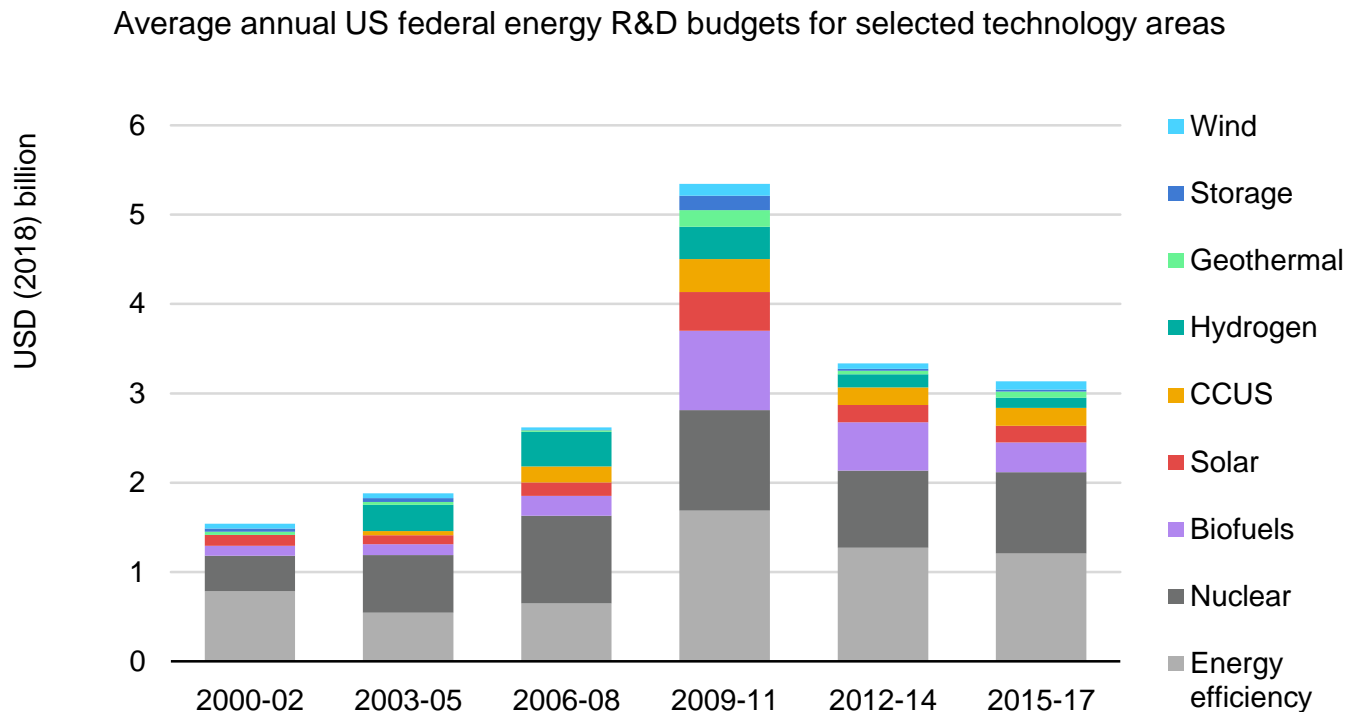
Value and number of global energy-related venture capital deals (early and late-stage) by year and by quarter



**In 2020 Q1, much less VC activity was recorded relative to Q1s in 2018-19. High-value fundraising rounds (growth- and late-stage) are particularly affected.**

- 1. Public energy R&D will be under pressure.** While budgets are likely fixed for 2020, there may be pressure to cut them once they need renewing to help balance public finances. In Europe, for example, R&D budgets significantly decreased in 2011-13, **three years after the financial crisis**, particularly in countries with the deepest recessions ([EC, 2013](#)). Energy is already a low share of total R&D in most countries, and risks further losing out to health R&D. However, in the midst of the 2008-09 financial crisis, several major countries turned to R&D policy as a way to foster less reliance on the financial sector. Some of these countries also took the opportunity to introduce new types of innovation instruments, such as guarantees, loans or support for venture capital.
- 2. Corporate R&D will be cut.** Following the slight decline in 2019, companies across the board are likely to reduce R&D spending in 2020 and 2021 in response to lower revenue. Large-scale demonstrations, often funded from CAPEX budgets which are set to fall by more than R&D budgets, may be delayed. Extrapolating from the 2009 experience suggests that many energy-related companies could reduce R&D spending in 2021 by over 10% if their revenue falls more than 20%. A survey of car companies reported an anticipated drop in advanced research spending of 12% in 2021 ([IHS Markit, 2020](#)). A subsequent ramp-up is likely to depend on government stimulus measures, and there is some evidence that recessions can create opportunities for companies to reorient to disruptive technologies ([Archibugi, 2018](#)).

# Chart of 2009 stimulus impact on R&D funding for select tech



**The American Recovery and Reinvestment Act of 2009 (ARRA) significantly boosted R&D funds, the biggest absolute increase compared to 2006-08 was for efficiency (USD 1 billion/year), while storage rose by 4000%.**

# Policy options to mitigate negative impacts and accelerate clean energy technologies that are ready for scale-up

## Takeaway:

The three purposes of policy responses are (1) mitigate negative impacts of the crisis; (2) deliver economic recovery; and (3) tilt recovery towards secure, sustainable growth. These require different toolkits, and clean energy innovation opportunities can be found in all three.



# Overall, there is likely to be clear value in including clean energy innovation in Covid-19 policy responses

However, the near-term benefits of such measures will depend strongly on the length and depth of the downturn. A return to normal activity as soon as 2021 would dampen the stimulus impact of any innovation spending.

The main benefits, on the other hand, will accrue in the medium- to-long-term, by helping to keep the world on a pathway towards sustainable energy and avoid retrenchment to higher-carbon growth.

Policy makers will need to make a strong case for their proposals, based on, for example, the exceptional opportunity to accelerate whole strategic innovation value chains at once, and on the new risks to the climate and energy security of “doing nothing”.

## Related IEA references and links

- IEA [Covid-19, Innovation and Energy Technology Perspectives](#) web portals
- [Now is the time to plan the economic recovery the world needs](#) (27 April)
- [How clean energy transitions can help kick-start economies](#) (23 April)
- [What the 2008 financial crisis can teach us about designing stimulus packages today](#) (19 April)
- [Energy efficiency can boost economies quickly, with long-lasting benefits](#) (8 April)
- [The coronavirus pandemic could derail renewable energy's progress. Governments can help](#) (4 April)

## Sources for graphs and figures

- **Page 6:** [IEA RD&D budget reports](#) (May 2020)
- **Page 7-8:** OECD database
- **Page 9:** IEA analysis (2020) based on Cleantech Group i3 database, featured in upcoming *World Energy Investments 2020*
- **Page 12:** IEA analysis (2020) based on data extracted for listed companies from Bloomberg
- **Page 16:** IEA analysis (2020) based on official submissions

