Right research and development investments are 'good bets' for both climate and economies, say researchers

May 9 2017

Credit: CC0 Public Domain

Investing in new ways of utility-scale electricity storage and capturing carbon to store underground should be a priority for governments aiming

to meet the greenhouse gas and 'green energy' targets set out in the Paris Agreement despite shrinking research and development budgets, suggests a new paper published today in *Nature Energy*.

Researchers analyzed a range of studies and expert reports on public energy R&D investments to uncover common threads and trends - pulling together the current state of knowledge on cost-effective investments across a range of energy technologies.

Laura Anadon from the University of Cambridge's Department of Politics and International Studies and colleagues from the universities of Bocconi and Massachusetts Amherst, say the new paper identifies those energy technologies that appear to be "good bets": technologies that become more cost-effective as either climate policy becomes more stringent or R&D budgets tighten.

They say the right tech investments will help economies by reducing energy costs - even creating new industries, in some cases - at the same time as reducing the emissions that are damaging the environment.

"Innovation is the driver of most economies, and can help us address environmental threats such as climate change and local air pollution while reducing the costs to taxpayers. But figuring out where to invest dollars or euros to best spur innovation is difficult," says Anadon.

Investing into research on new ways of storing electricity and capturing carbon to store underground should increase as both technologies provide "more flexibility in the energy system" say the research team. Utility scale electricity storage allows for the increased integration of renewable energy sources into current national grid systems - as renewables themselves can be affected by unforeseen "fluctuations".

Carbon capture and storage (CCS) also provides energy systems with

greater flexibility and "gives the world a little breathing room in addressing climate change," say the researchers. "CCS sucks carbon emissions out of the atmosphere, so it allows for the use of coal to continue while alternatives are developed. When used in conjunction with biomass energy, such as energy from trees or corn stover, it can suck emissions while generating electricity," say the researchers.

The researchers also found that funding solar power development as well as advanced batteries for use in environmentally friendly vehicles should also increase as R&D budgets decrease (although they note that investments in low-carbon R&D should increase).

"Solar power has huge potential, and cleaner vehicle technologies - particularly better batteries for electric vehicles - will allow us to reduce emissions from transportation, which now makes up a quarter of the US greenhouse gas emissions," says Erin Baker, coauthor from the University of Massachusetts, Amherst.

The researchers say their findings are extremely timely, as the second ministerial meeting of the Mission Innovation initiative will be held in Beijing next month to discuss the future focus of energy technology investment.

Mission Innovation is described as a global initiative comprising of 22 countries and the European Union, which aims to "dramatically accelerate clean energy innovation". As part of the initiative, launch at the Paris climate change conference in 2015, participating countries committed to doubling their clean energy R&D investments over five years.

"Climate change is a huge issue, but some governments are concerned that the cost of addressing it will be economic competitiveness. Investing in cutting-edge technologies that can cost-effectively reduce the health

and environmental toll of current energy technologies, while at the same time help the economy by reducing energy costs is a win-win situation," says coauthor Valentina Bossetti from Bocconi University.

Adds Cambridge's Laura Anadon: "Our work pulls together the research that can help Europe to continue to address climate change, meeting the pledges made by many of the current EU countries, including the UK, to double public energy R&D investment while increasing competitiveness through good bets on energy technologies."

"This research contains insights that can help the US to continue addressing climate change even if Department of Energy budgets are reduced under the Trump administration."

More information: Laura Díaz Anadón et al, Integrating uncertainty into public energy research and development decisions, *Nature Energy* (2017). DOI: 10.1038/nenergy.2017.71

Provided by University of Cambridge