

Efforts to mitigate climate change must target energy efficiency

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Much more must be done to develop energy efficient cars, buildings and domestic appliances to address climate change – according to new research from the Tyndall Centre for Climate Change Research at the University of East Anglia.

A report published today in *Nature* [Climate Change](#) shows that twice as much effort is being spent on developing [energy](#) supply technologies - such as new power stations - than is spent on improving the efficiency with which energy is used.

The research shows that efficient end-use technologies have the potential to contribute large [emission reductions](#) and provide higher social returns on investment - so the imbalance in current innovation efforts must be redressed to mitigate climate change.

Dr Charlie Wilson, of the Tyndall Centre for Climate Change Research at UEA and an affiliated researcher with the International Institute for Applied Systems Analysis (IIASA), led the study with an international team of scientists from Austria and the USA.

They found that innovation efforts directed by public institutions, policies, and resources allocated overwhelmingly favour energy supply technologies. But this is at the expense of efficiency in energy end-use where the potential gains are higher.

Dr Wilson said: "About two-thirds of all public innovation efforts are

directed toward energy supply technologies. It is vital that innovations in renewable energy supply continue, but the imbalance in spending needs to be redressed urgently to mitigate climate change. Evidence strongly suggests that energy end-use and efficiency currently stand as the most effective ways to mitigate climate change."

The new study assesses energy technology innovation systematically and quantifies the relative emphasis placed on energy supply technologies versus the end-use of energy.

The researchers considered three desirable outcomes of energy innovation - the potential for [greenhouse gas emission](#) reductions, broader social, environmental and energy security benefits, and the potential for technological improvements.

They found that efficiency in energy end-use outperforms supply technologies in all three areas. They occupy a greater share of energy system investments and capacity, and engage higher levels of private sector activity, they offer higher potential cost reductions, and they provide higher social returns and higher emission reduction potentials.

But the study shows a disproportionately high focus of effort invested in innovation in energy supply technologies – right across the energy research and development sector.

Study co-author Prof Arnulf Grubler, of the International Institute for Applied Systems Analysis (IIASA) and Yale University, said:

"Efficiency gets short shrift in both public energy research and development, and in private market investments alike.

"In contrast, improvements in technologies like domestic appliances and more energy-efficient transport are underrepresented given their potential for mitigating climate change."

According to the International Energy Agency, the total public sector research and development spend for all energy end-use and efficiency innovations from 1974 was around \$38 billion.

"This is less than the \$41 billion spent on nuclear fusion alone - a single, and highly uncertain energy supply option which is still to make any contribution to a low carbon future," added Prof Grubler.

Meanwhile subsidies for fossil fuels, estimated at around \$500 billion, dwarf innovation investments of around \$160billion into non-fossil fuel energy.

Dr Wilson said: "Directed innovation efforts are trying to push energy supply technologies to mitigate climate change into a market that's already heavily occupied by subsidised incumbents.

"The multitude of small-scale innovations that improve end-use efficiency often go unnoticed because they don't have the glamour of solar panels and wind turbines, and they don't benefit from the well-established institutions, powerful market interests, and political influence that support supply technologies such as fossil fuels, nuclear, and wind and solar power. Yet end-use efficiency innovations have more potential and provide higher social returns on investments."

Provided by University of East Anglia

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