Balancing technological innovation and behavioral change in low-carbon transitions

Keynote Panelist for the "Transitioning to new energy systems: What impact will it have on society and on our lives?" Seminar, The Academy of Europe (Academia Europaea), United Kingdom and Ireland, October 11, 2021

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The case for behavioral change in demand or practices

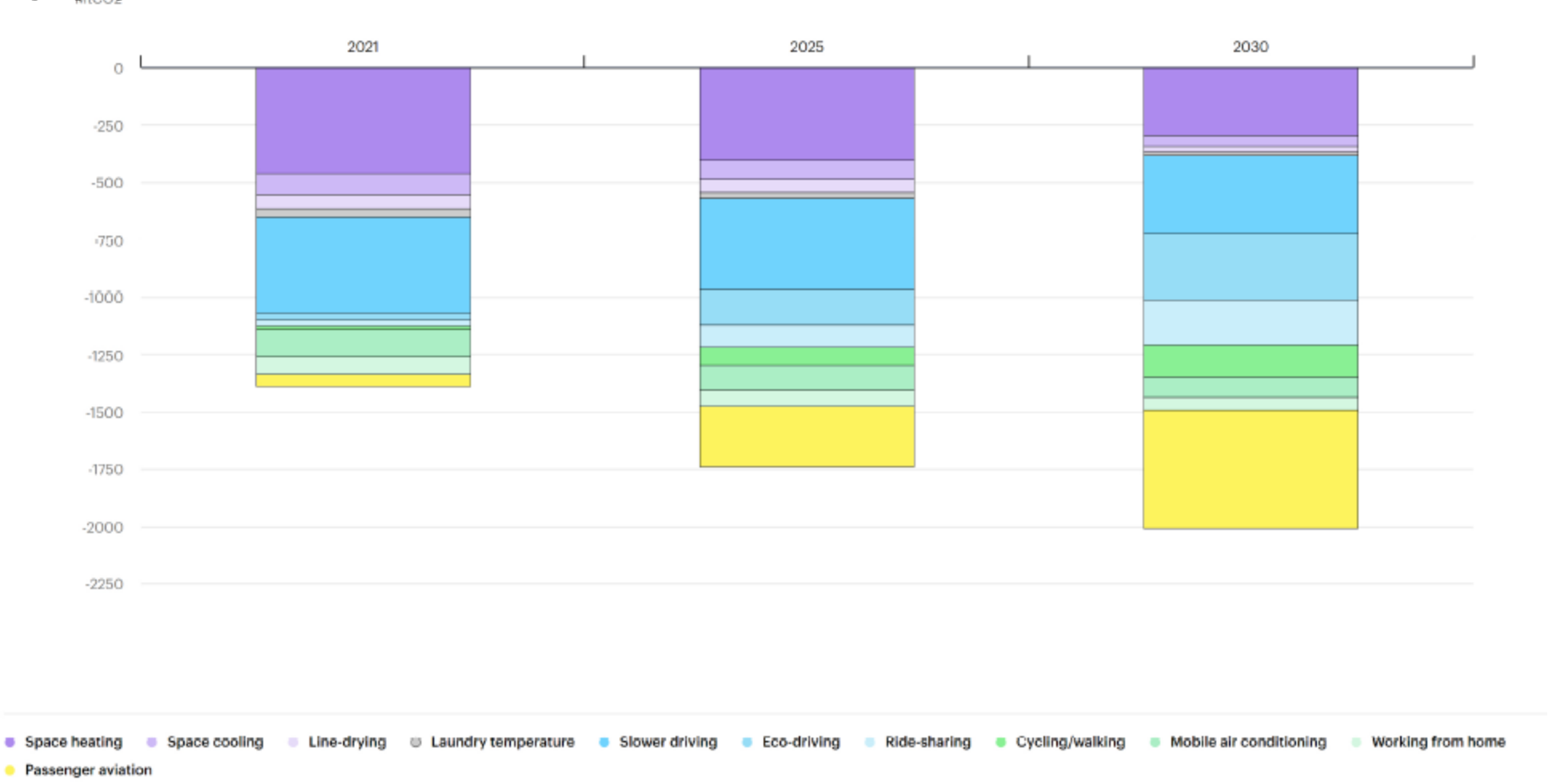


Figure 11. The large carbon emissions reductions to be achieved by behavioural change in the near-term (2021–2030)
(IEA, 2021)[57]

The case for behavioral change in demand or practices

UKERC
UK Energy Research Centre

Centre on Innovation and Energy Demand

Policy briefing

A UKERC/CIED Policy Briefing



Unlocking Britain's First Fuel: The potential for energy savings in UK housing

Dr Jan Rosenow, (University of Sussex)
Professor Nick Eyre, (University of Oxford)
Professor Steve Sorrell, (University of Sussex)
Pedro Guertler, (E3G)

Key findings

- Since 2004, improved energy efficiency has helped reduce the UK's total household energy consumption by one fifth, **saving the average dual fuel household £490** in 2015.
- Technically, **one half of the energy currently used in UK housing could be saved** by investing in a mix of current technologies encompassing improved energy efficiency, heat pumps and heat networks.
- Cost-effective investments to 2035 could **save around one quarter of the energy currently used,** an average saving of £270 per household per year at current energy prices.
- This saving is approximately **equivalent to the output of six nuclear power stations the size of Hinkley Point C.**
- Using Treasury guidance for policy appraisal, this investment has an estimated **net present value of £7.5 billion.**
- Experimental appraisal undertaken for this briefing estimates that the value of additional benefits from these investments – including improved health, additional economic activity and benefits to the electricity system – **could be up to £47 billion.**

The case for technological innovation

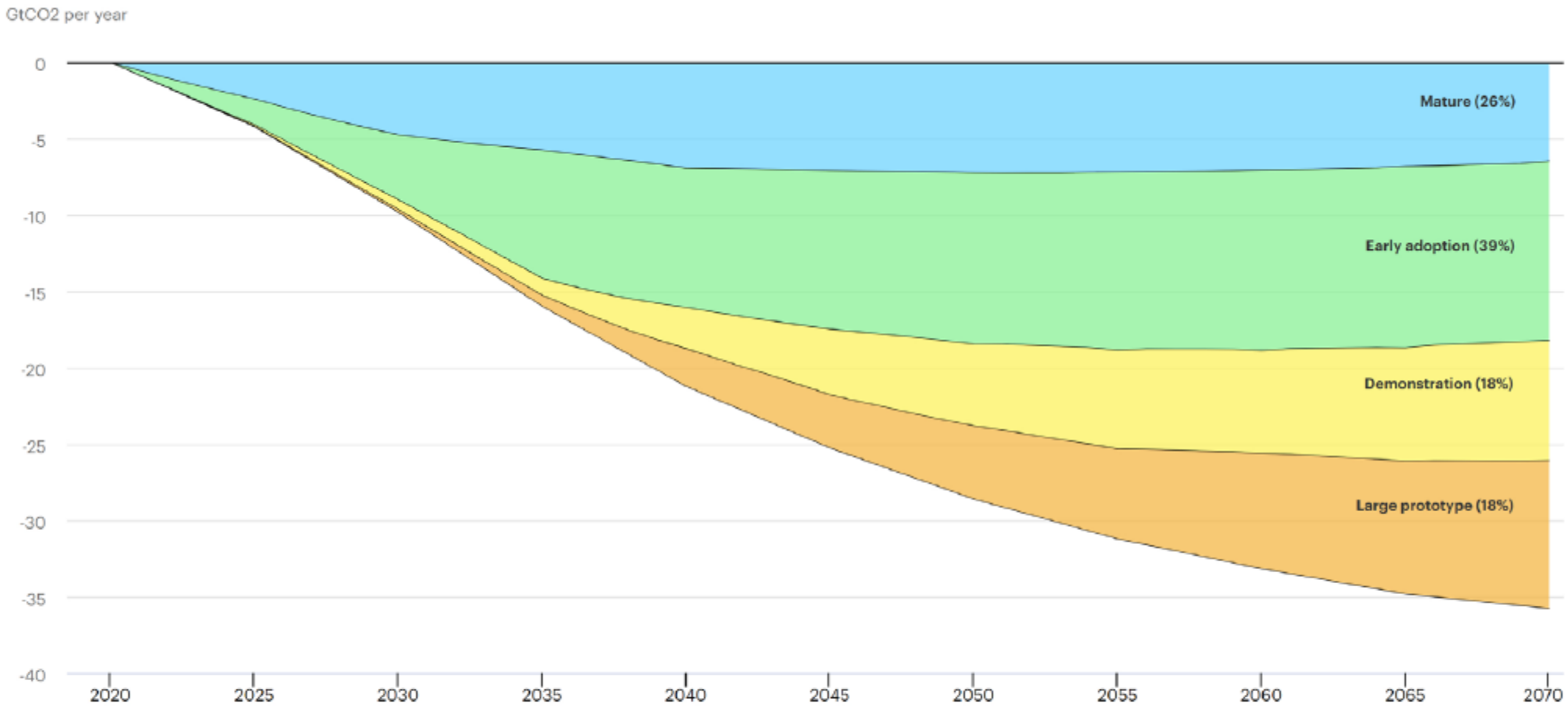
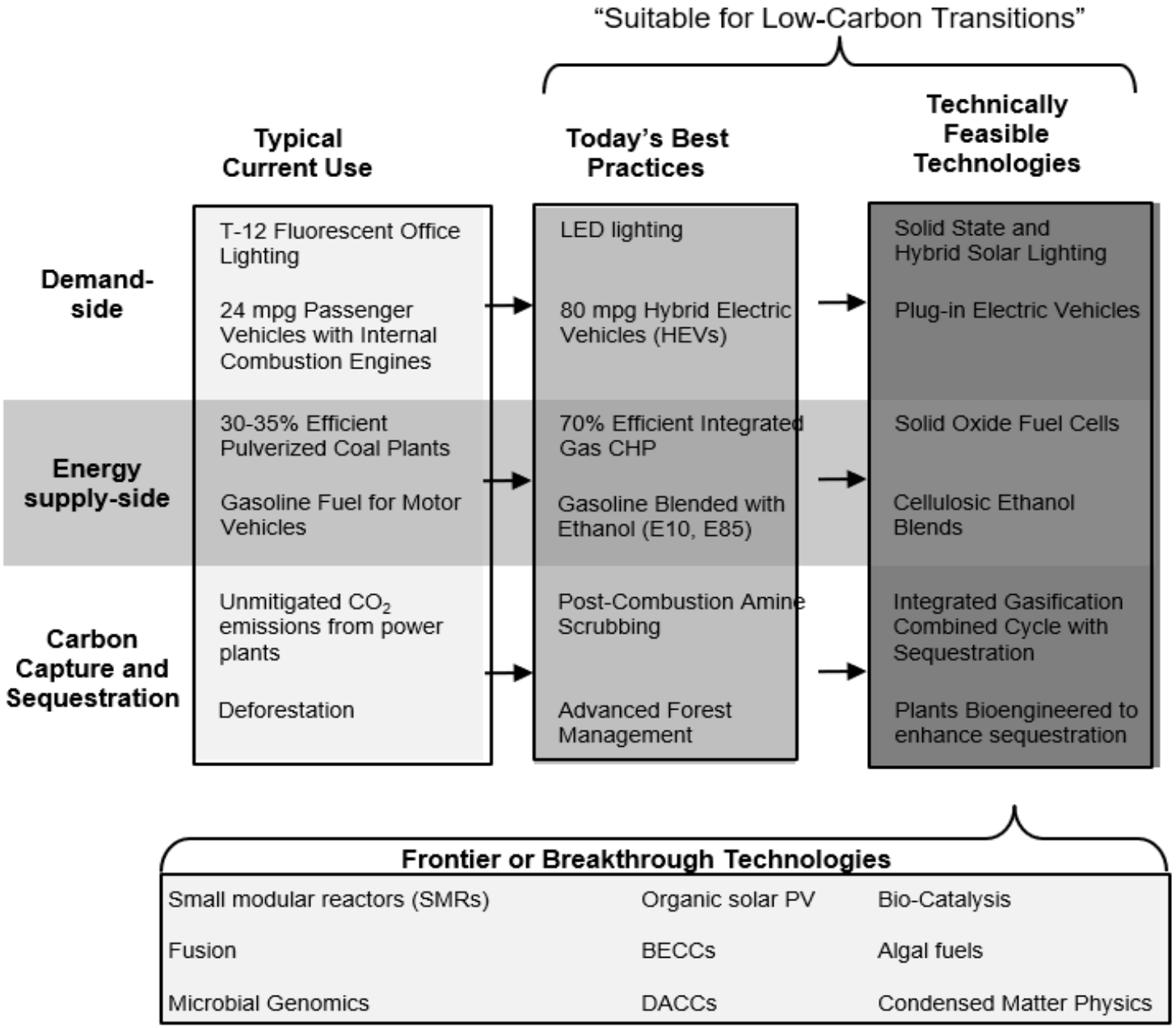


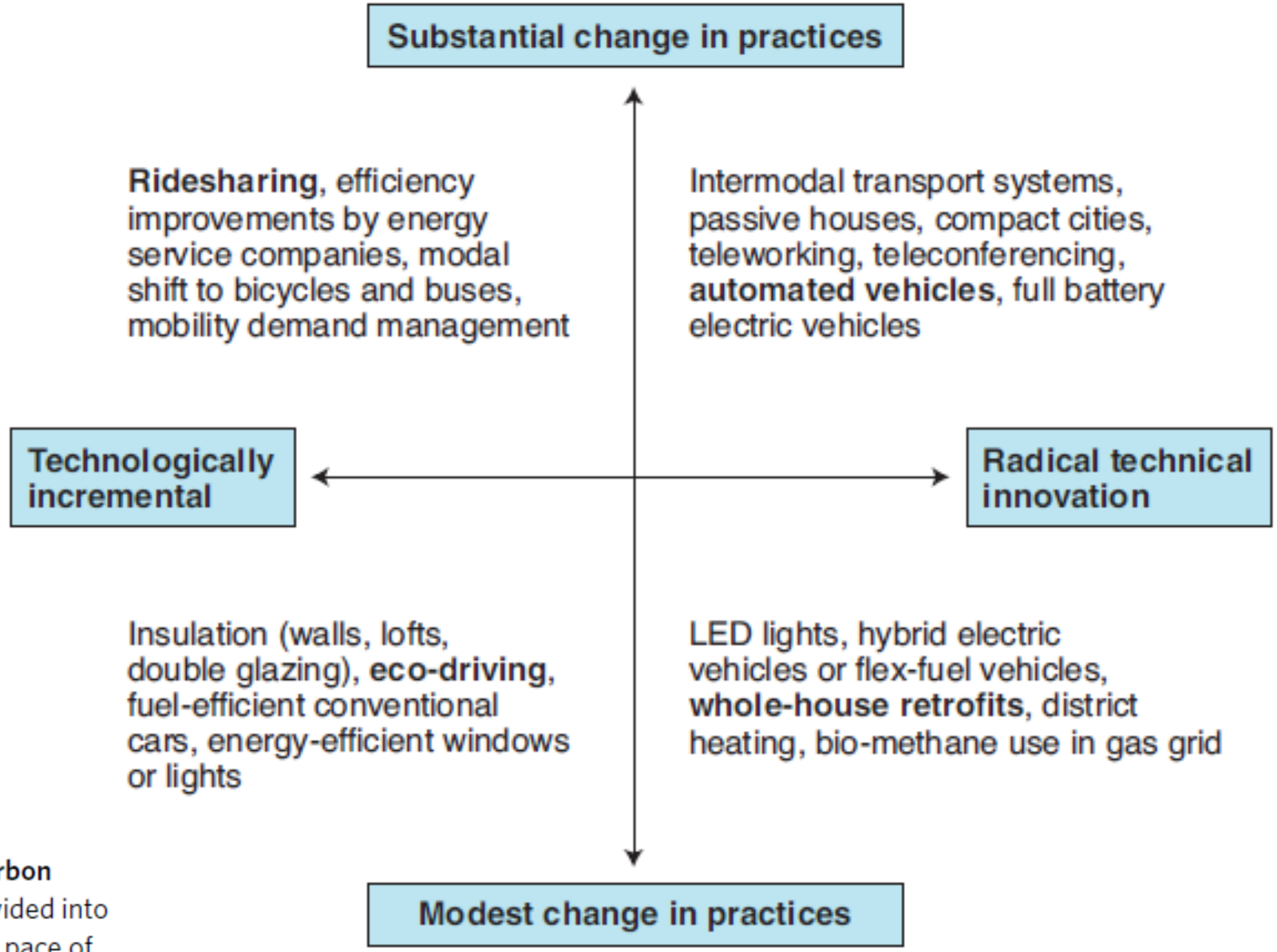
Figure 10. Critical role of demonstration and prototype technologies in carbon mitigation pathways (modified from IEA[55])

The case for technological innovation

Source: van de Graaf, T and BK Sovacool. *Global Energy Politics* (Oxford: Polity Press, 2020)



How do we balance behavioral and technical disruption?

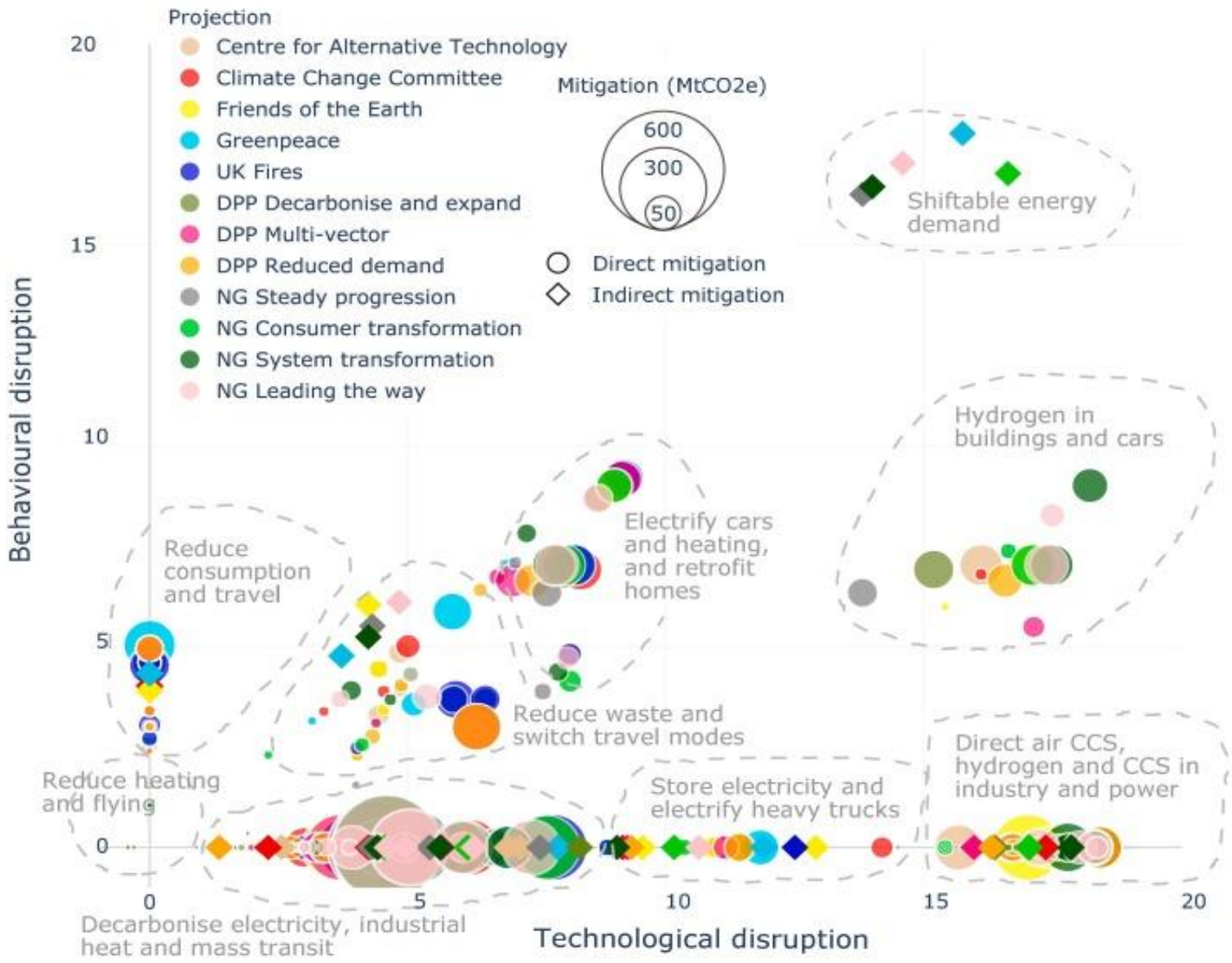


Source: Sovacool, BK and S Griffiths, "Culture and low-carbon energy transitions," *Nature Sustainability* 3 (September, 2020), pp. 685–693.

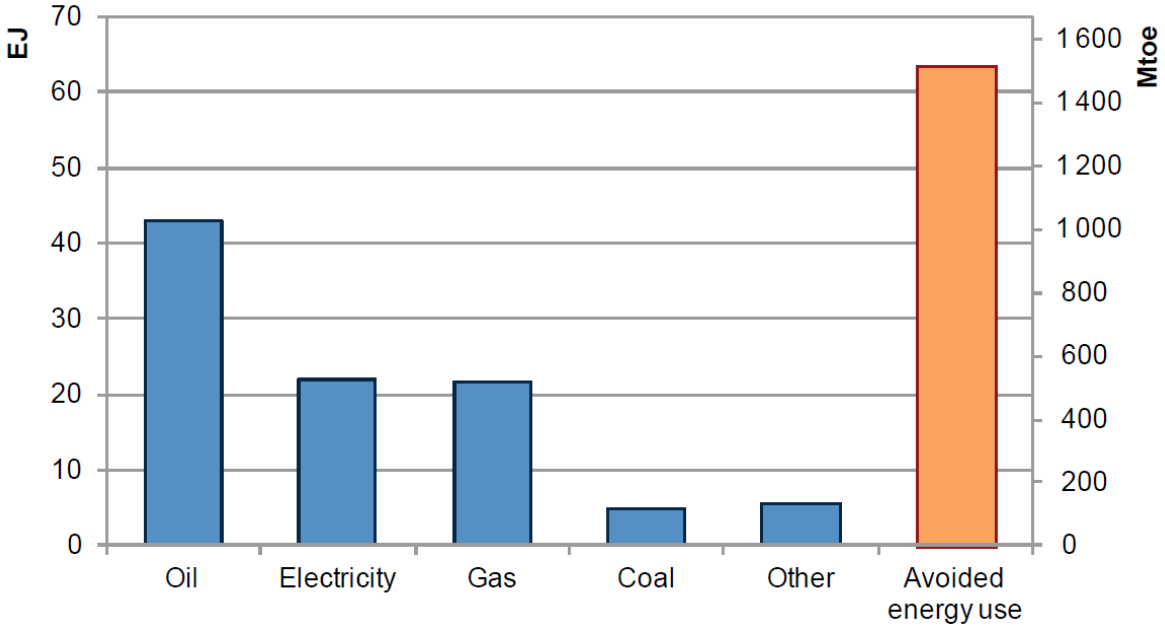
Fig. 1 | A technological and behavioural typology of low-carbon transitions. The four categories discussed in the text are divided into quadrants based on their level of change in practice and the pace of technological innovation.

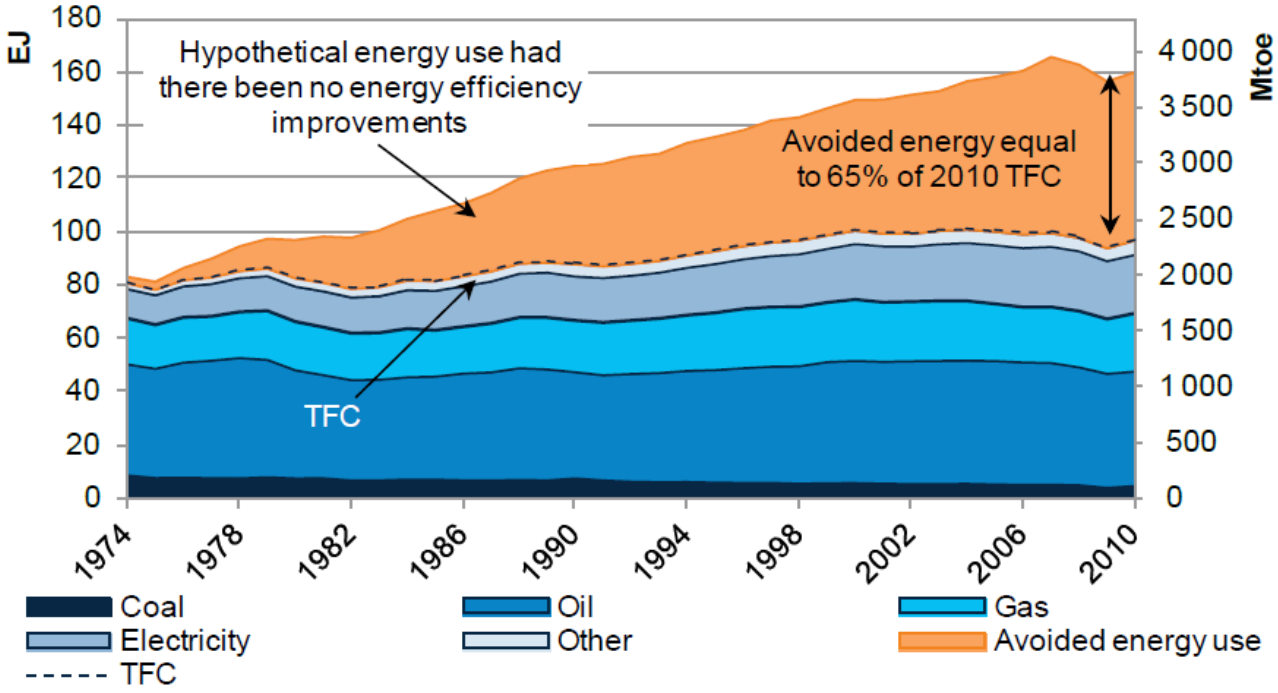
How do we balance behavioral and technical disruption?

Source: Nelson, S., Allwood, J.M. (2021). Technology or behaviour? Balanced disruption in the race to net zero emissions, *Energy Research & Social Science*, Volume 78, 2021, 102124



Contribution of energy efficiency compared to other energy resources for eleven countries, 1974-2010





Note: The 11 countries are Australia, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom and the United States. Avoided energy use represents the difference between global total final consumption in 2010 and the volume of energy that would have been consumed had there been no improvement in energy efficiency since 1974, based on a long-term IEA decomposition analysis. TFC=total final consumption. Source: IEA "The "first fuel" contribution of energy efficiency compared to other energy resources consumed in 2010 in 11 IEA member countries," December 2013.