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Addressing the socio-economic disparities of net zero transition

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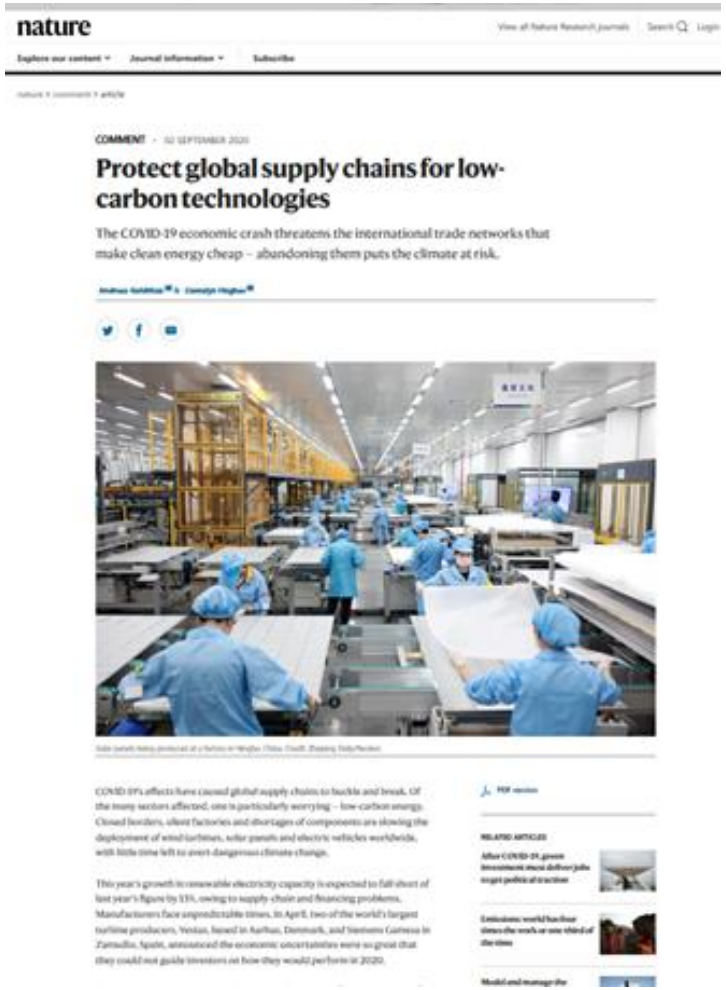
Energy transition and equity

Paris, 2015

Paris, 2018

Energy transition and economic recovery



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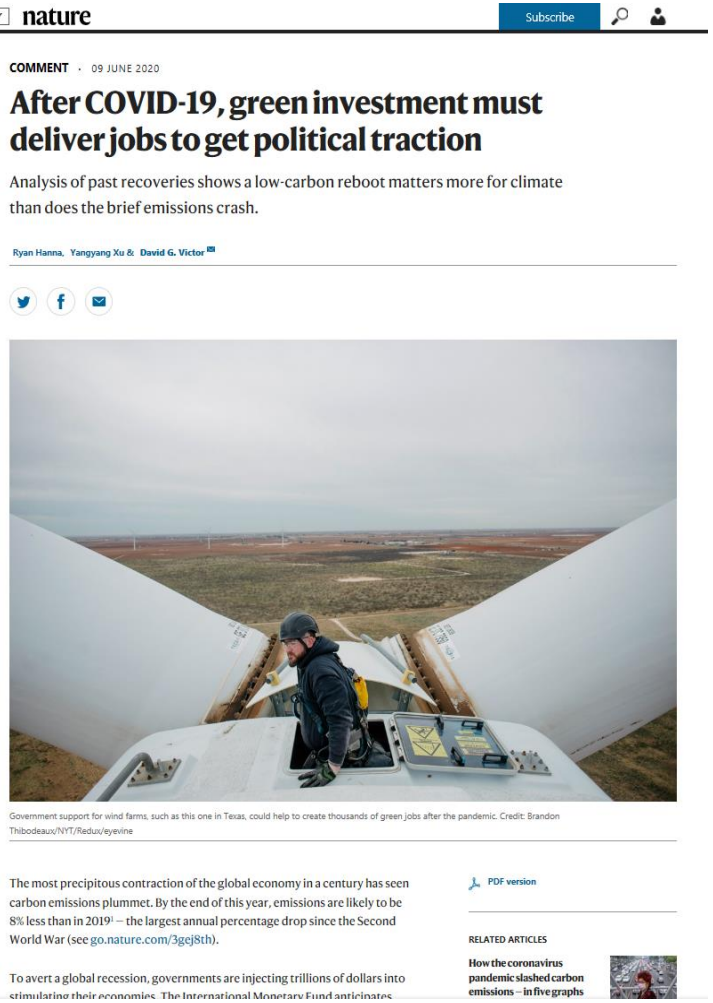
COMMENT

Protect global supply chains for low-carbon technologies

The COVID-19 economic crash threatens the international trade networks that make clean energy cheap – abandoning them puts the climate at risk.



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COMMENT · 09 JUNE 2020

After COVID-19, green investment must deliver jobs to get political traction

Analysis of past recoveries shows a low-carbon reboot matters more for climate than does the brief emissions crash.

Ryan Hanna, Yangyang Xu & David G. Victor

Government support for wind farms, such as this one in Texas, could help to create thousands of green jobs after the pandemic. Credit: Brandon Thibodeaux/NYT/Redux/eyevine

The most precipitous contraction of the global economy in a century has seen carbon emissions plummet. By the end of this year, emissions are likely to be 8% less than in 2019[1] – the largest annual percentage drop since the Second World War (see go.nature.com/3gejSth).

To avert a global recession, governments are injecting trillions of dollars into stimulating their economies. The International Monetary Fund anticipates

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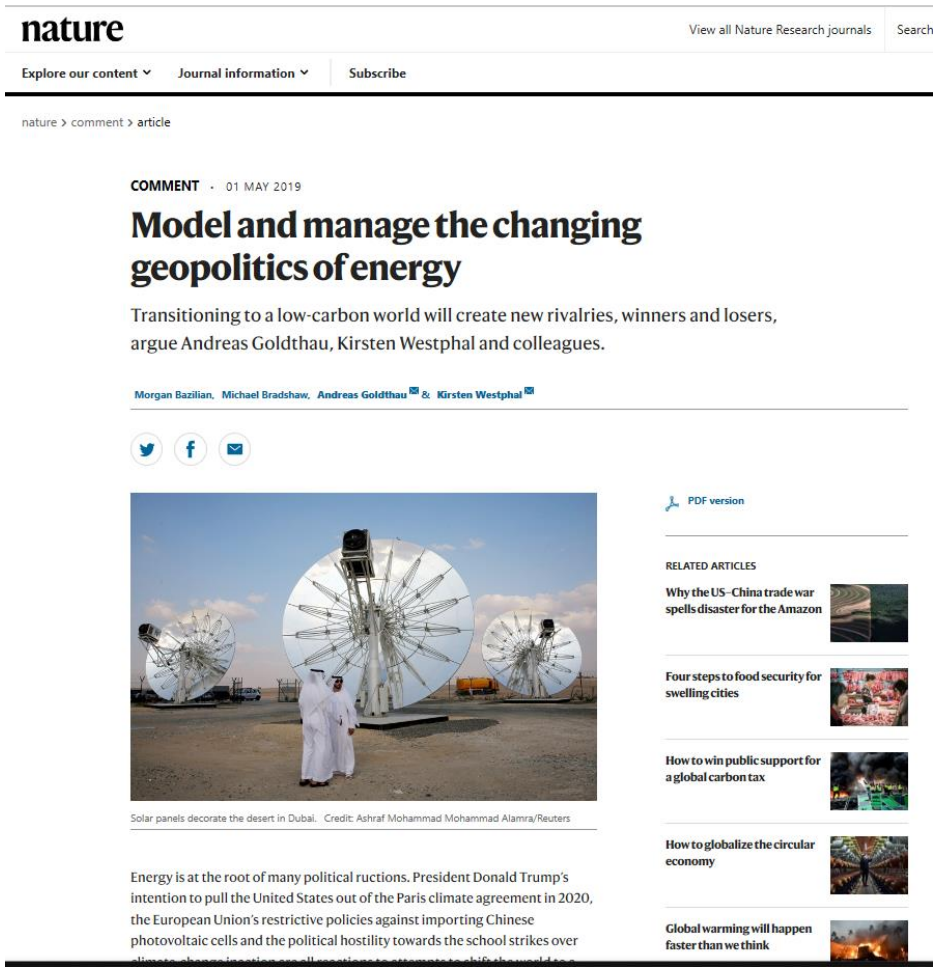

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COMMENT · 01 MAY 2019

Model and manage the changing geopolitics of energy

Transitioning to a low-carbon world will create new rivalries, winners and losers, argue Andreas Goldthau, Kirsten Westphal and colleagues.

Morgan Bazilian, Michael Bradshaw, Andreas Goldthau & Kirsten Westphal

Solar panels decorate the desert in Dubai. Credit: Ashraf Mohammad Mohammad Alamra/Reuters

Energy is at the root of many political ructions. President Donald Trump's intention to pull the United States out of the Paris climate agreement in 2020, the European Union's restrictive policies against importing Chinese photovoltaic cells and the political hostility towards the school strikes over

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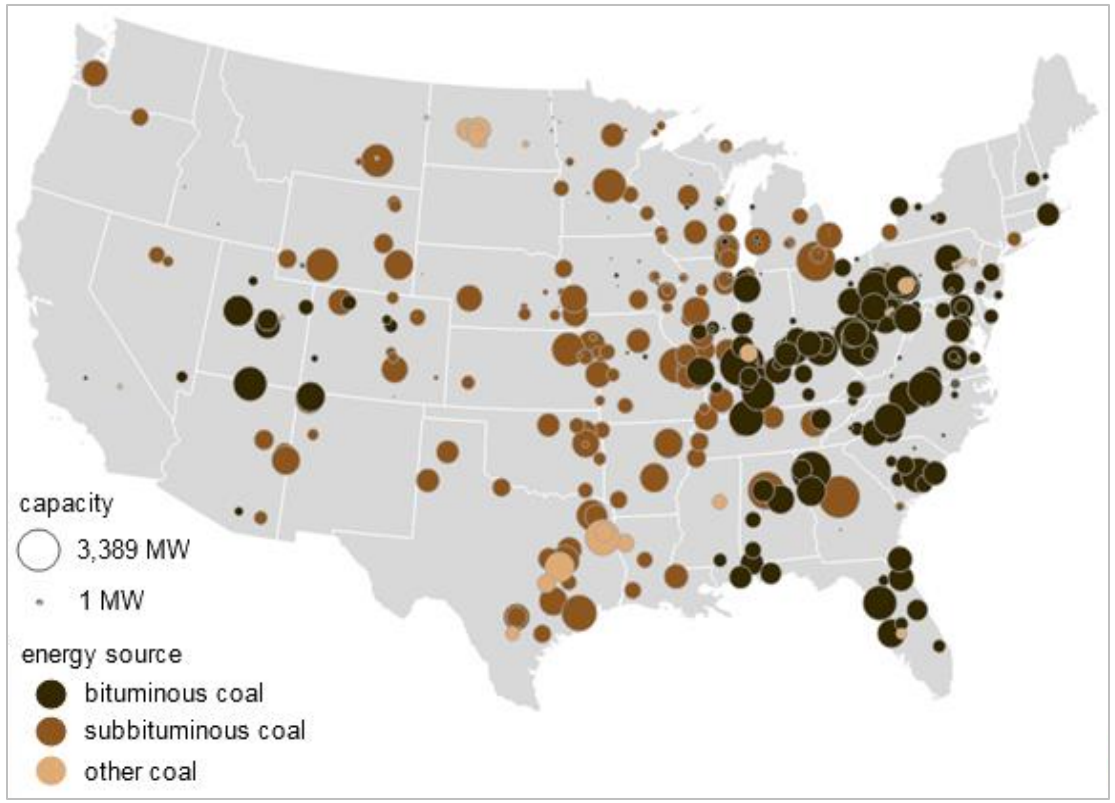
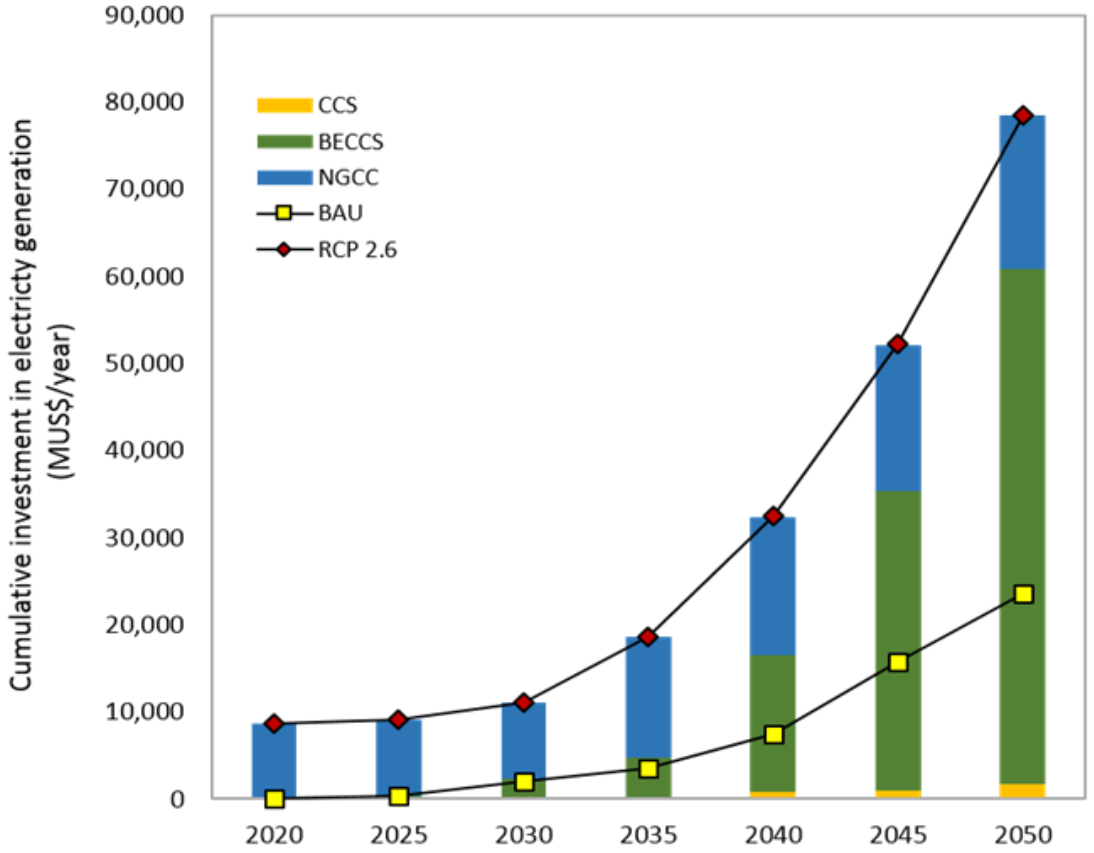
Global warming will happen faster than we think

Reducing the US coal emissions is costly…

Distribution of US coal plants. Source: IEA, 2018

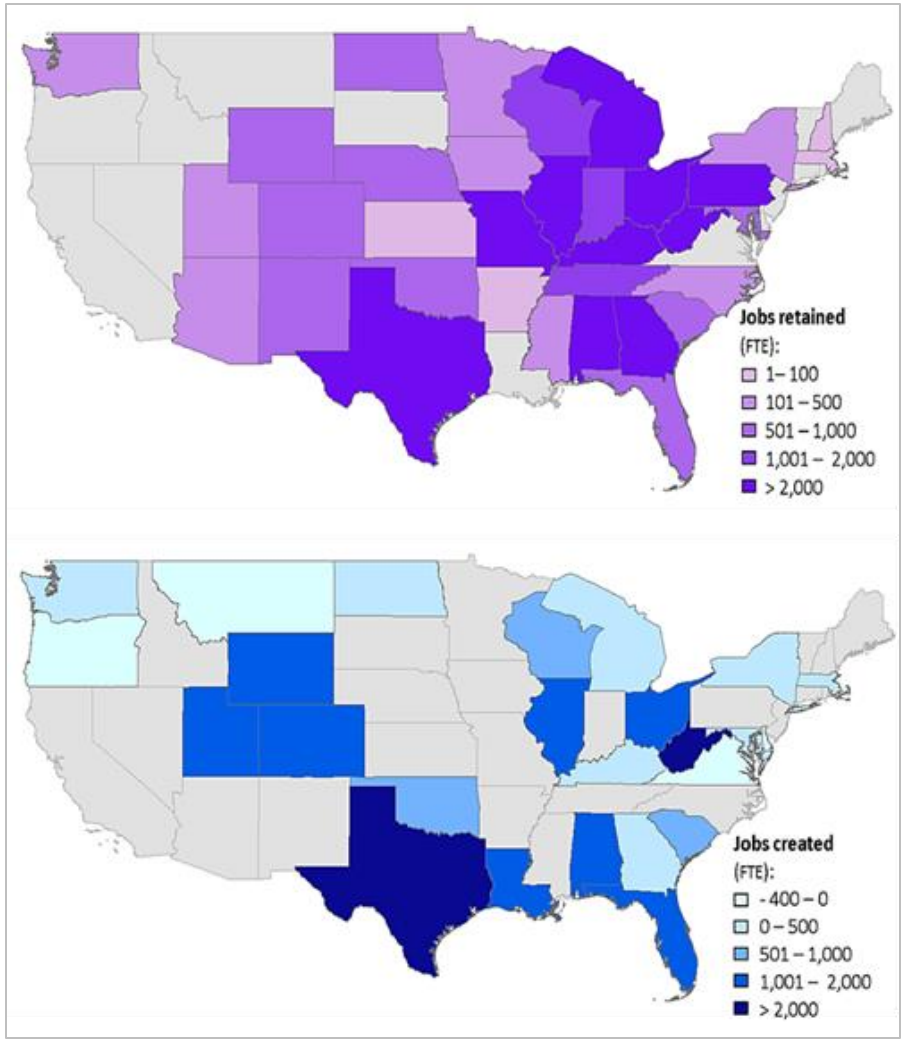


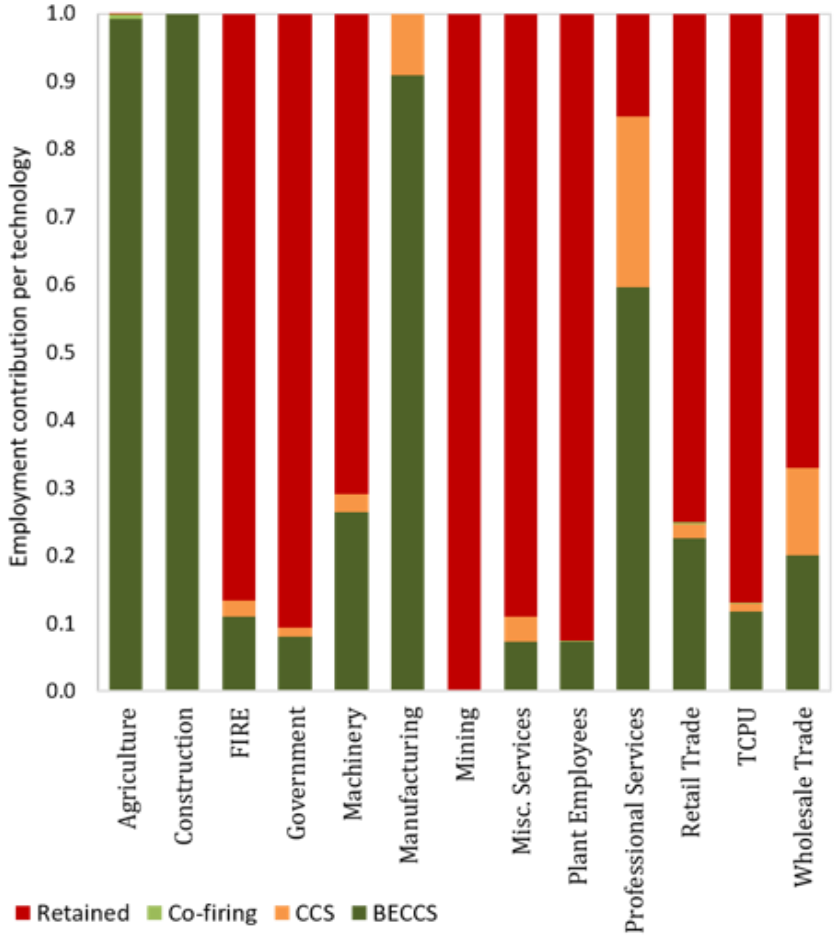


The rapid ramp-up of BECCS from 2030 doubles the cost of electricity in 2050: from an average value of 36.7 US$/MWh to 80 US$/MWh.

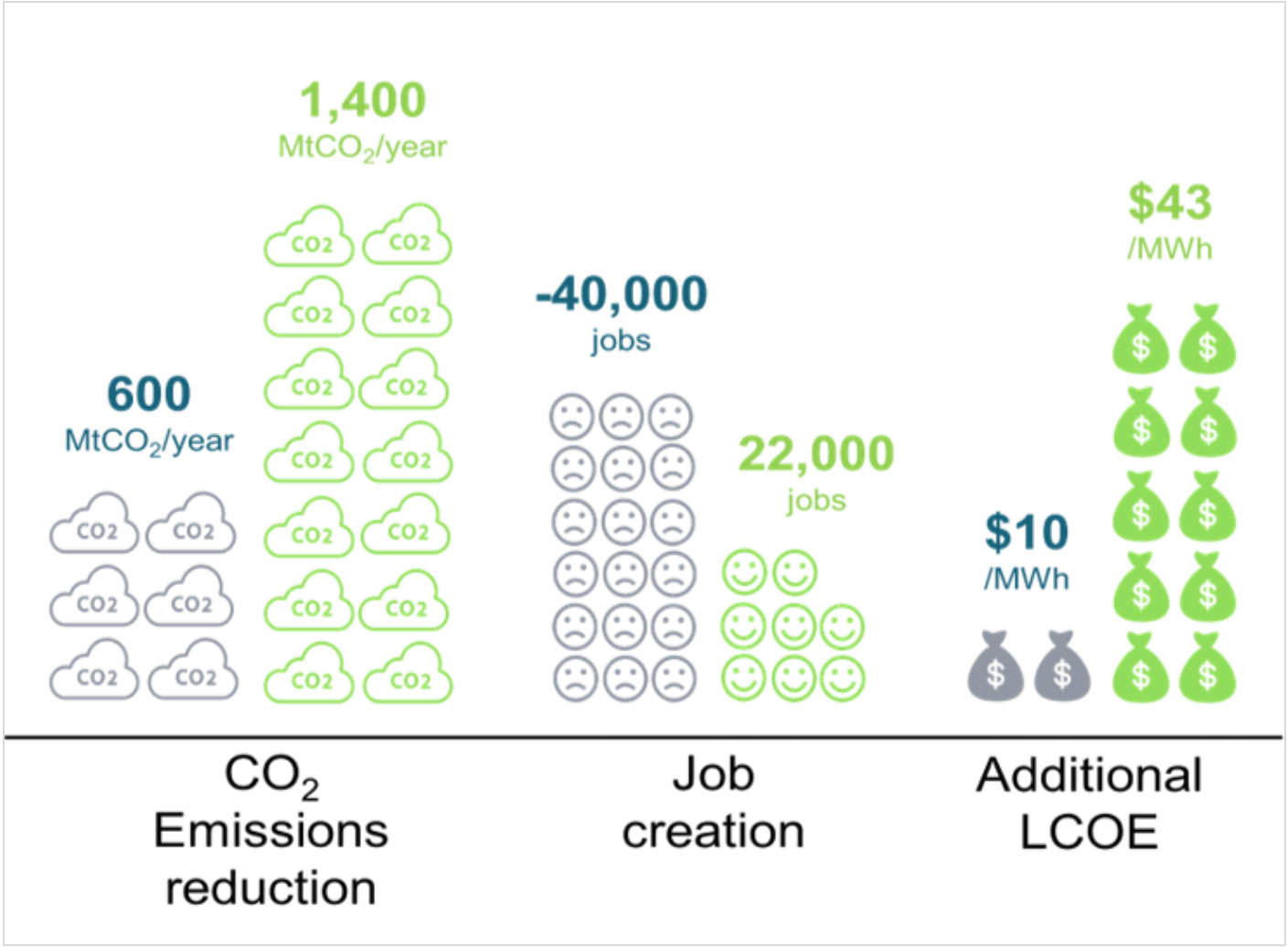
The 2-degree target costs 76,700 MUS$ to the coal sector.

…and will bring uneven regional economic opportunities





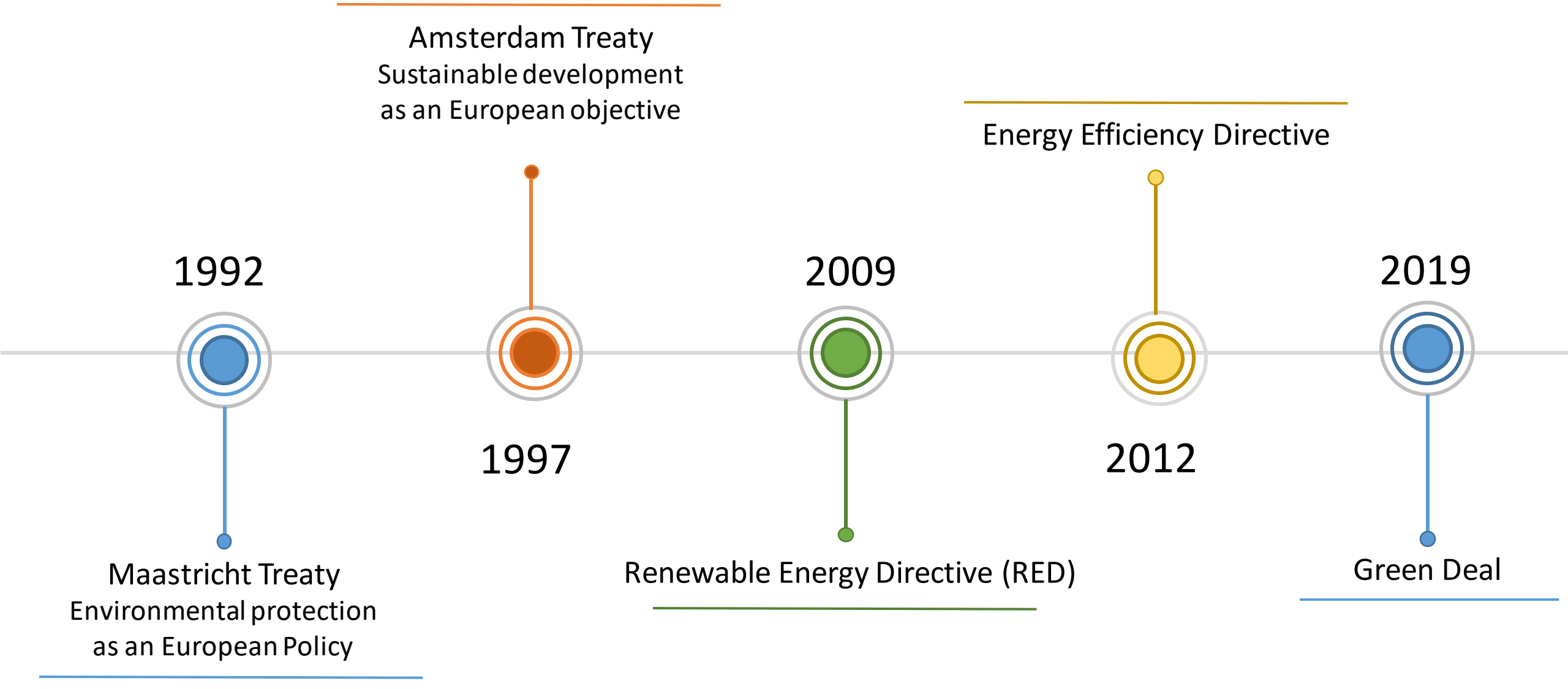
Reducing US coal emissions can boost employment



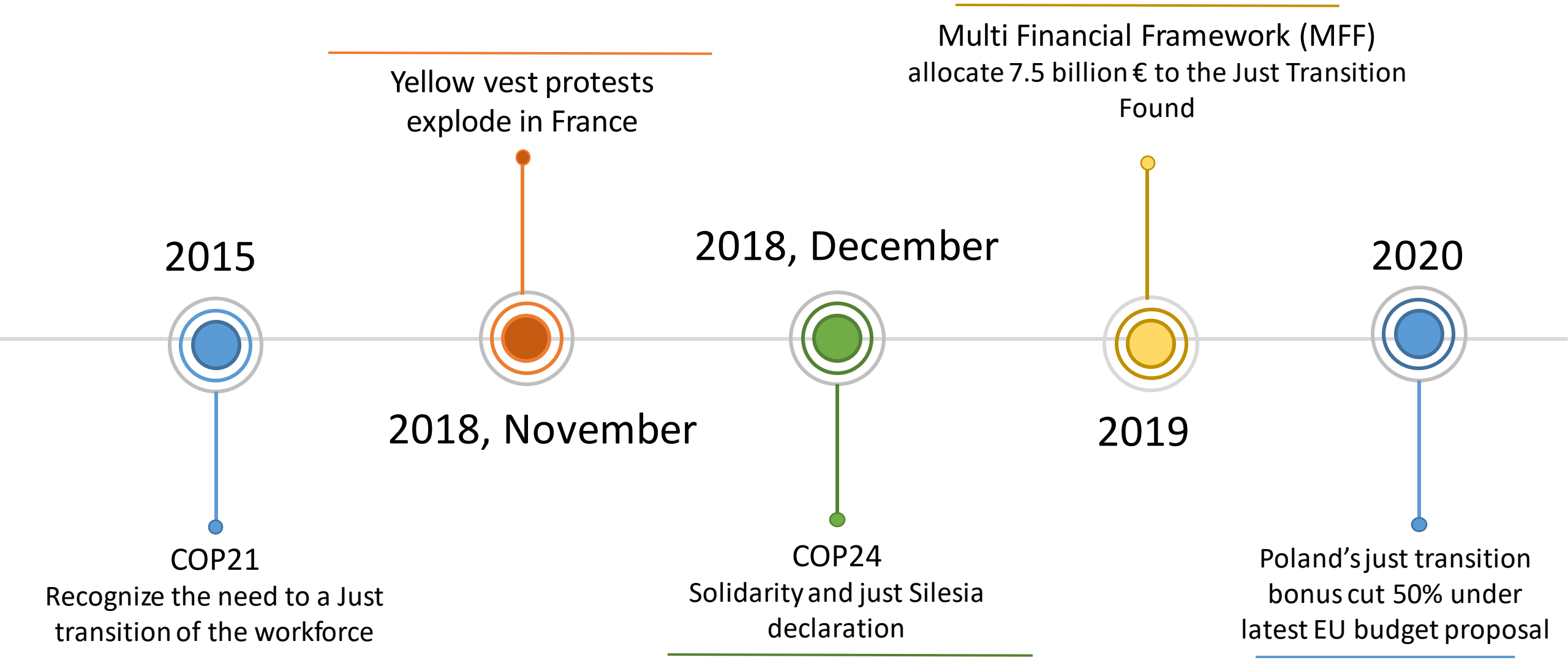
Patrizio et al, 2018. *Joule* 2, 1-16

Socially equitable energy transition

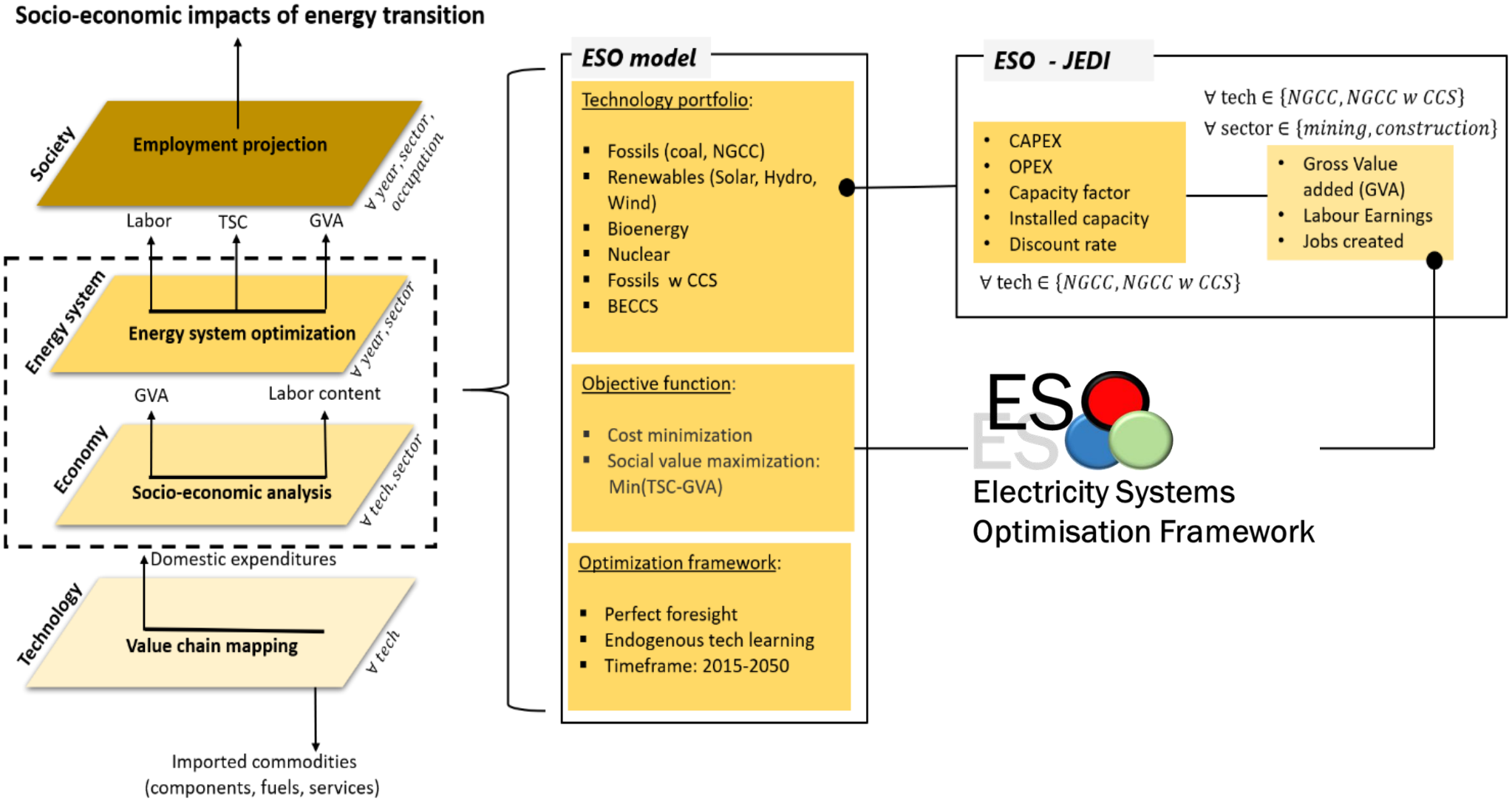
A brief history of environmental protection…



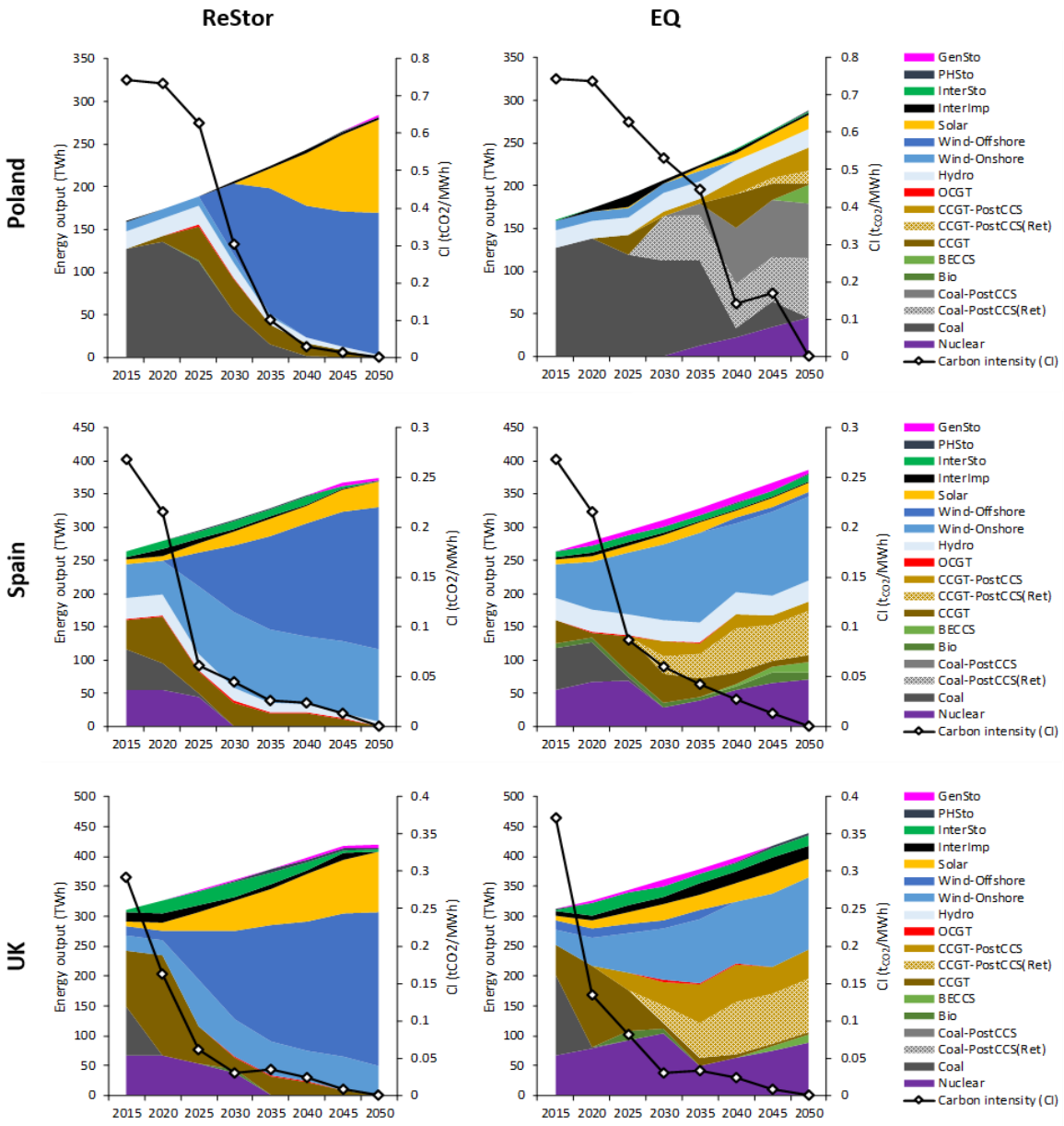
… and the Just transition narrative



ESO - JEDI framework



Creating value with the transition



The equity scenario favours a **more diverse** energy generation mix within each country with shares of local resources varying according to the services provided to the system.

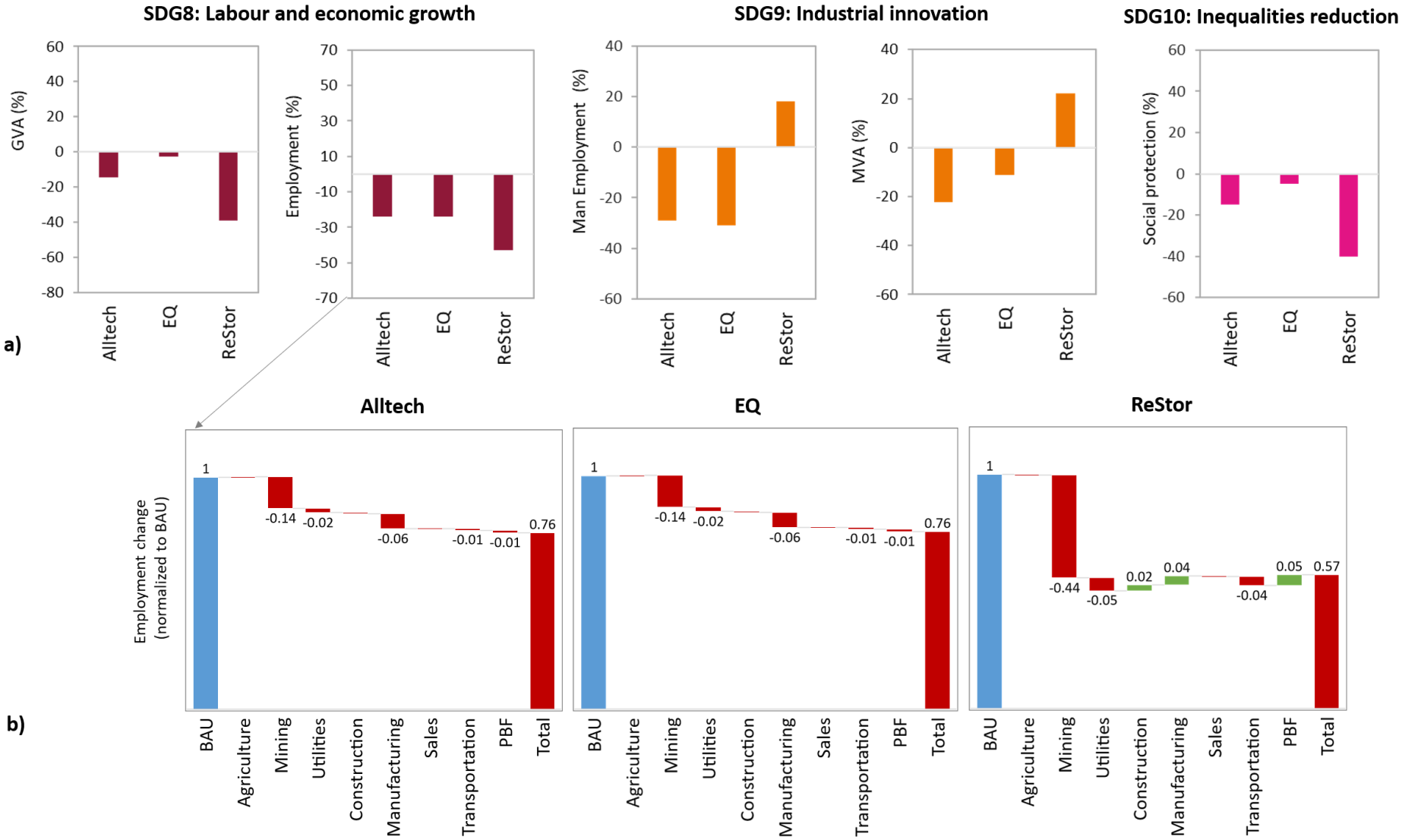
Poland: domestic abated coal supply more than 50% of the power output.

Spain: nuclear provides more than 70 MWh of power output in 2050 to minimize the use of imported natural gas

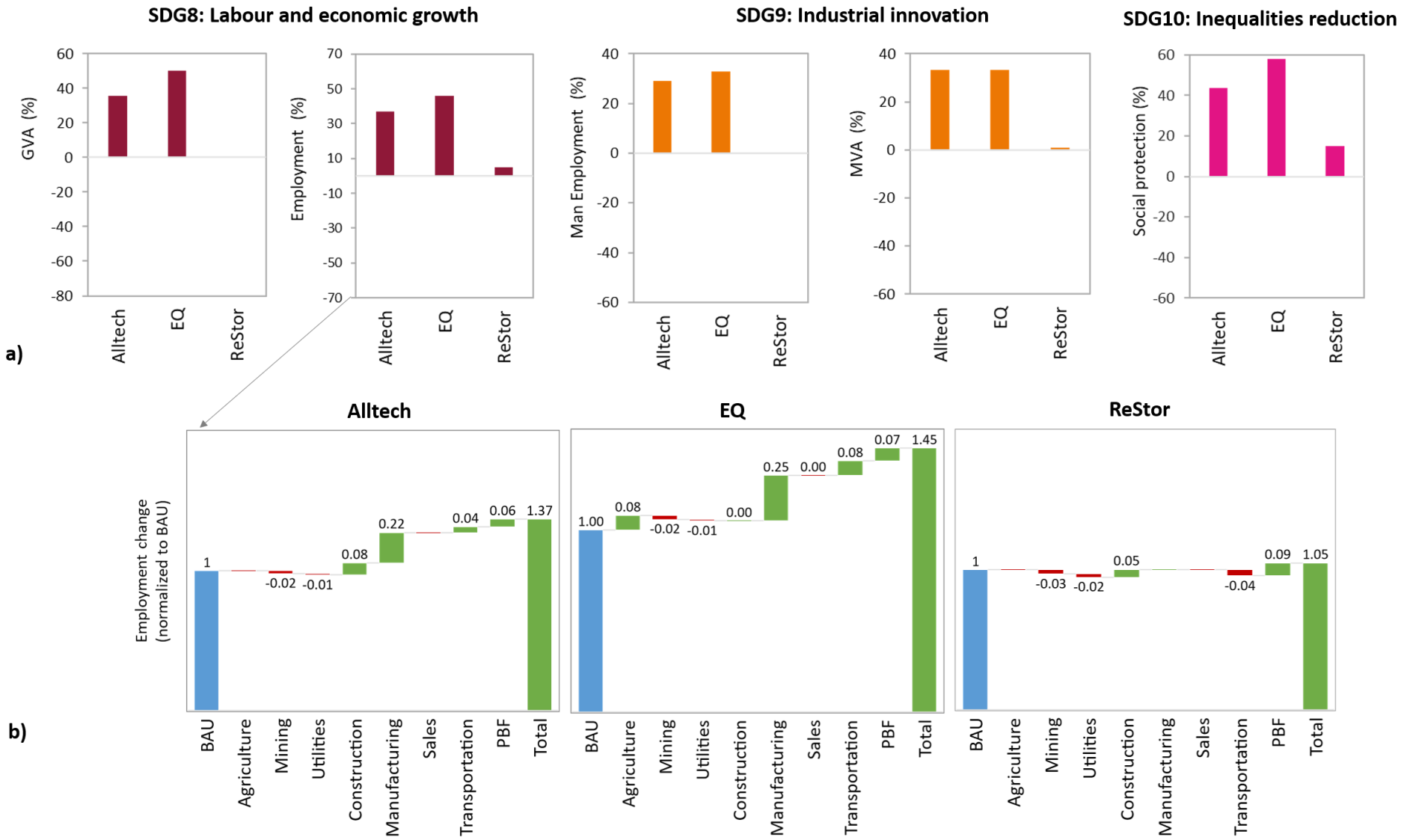
The UK: can utilize its CCGT-CCS capacity to provide low-carbon firm capacity to the system while boosting its manufacture and mining sectors.

Patrizio et al, 2020. *Joule* 8, 1700-1713

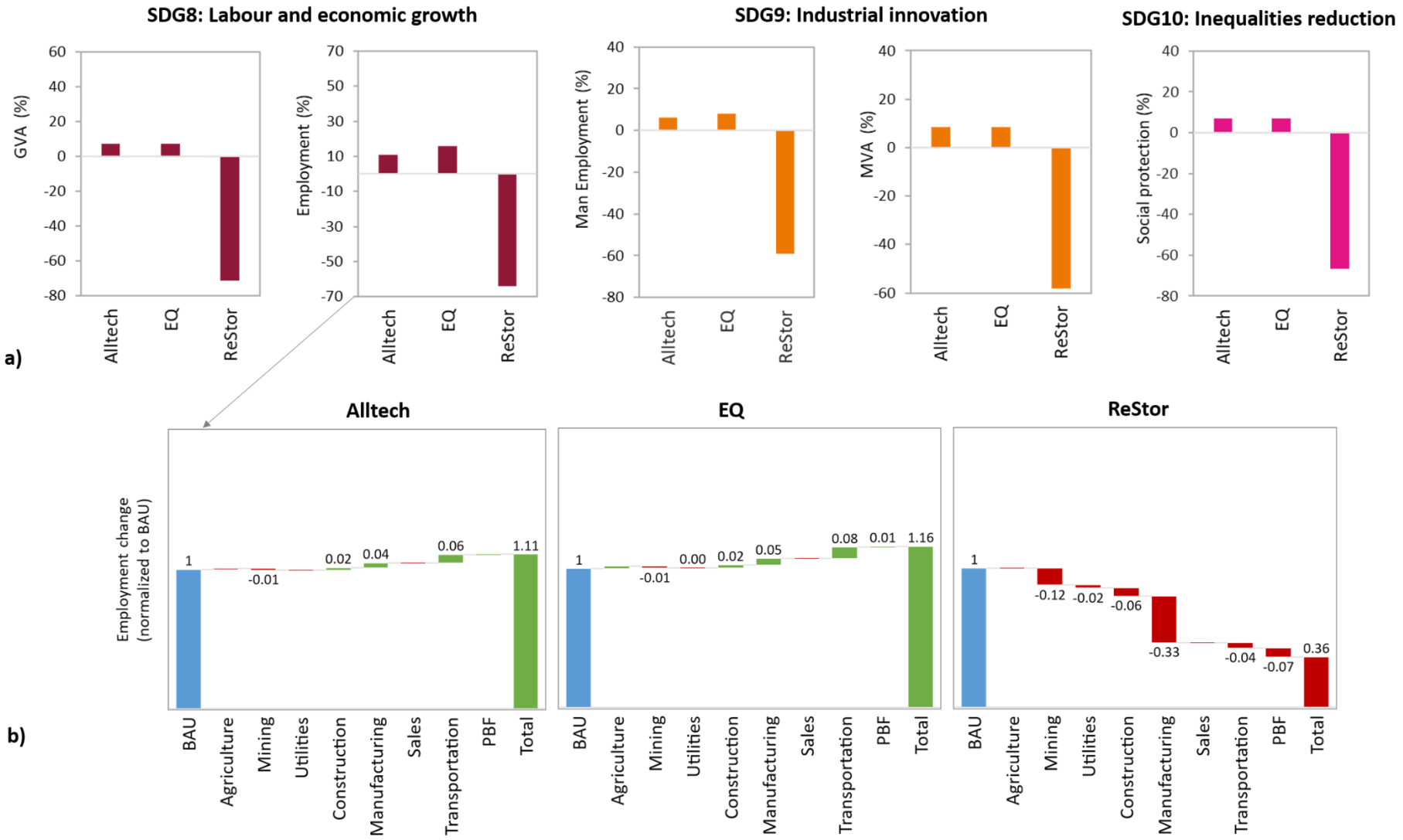
Trade-offs with SDGS goals: Poland



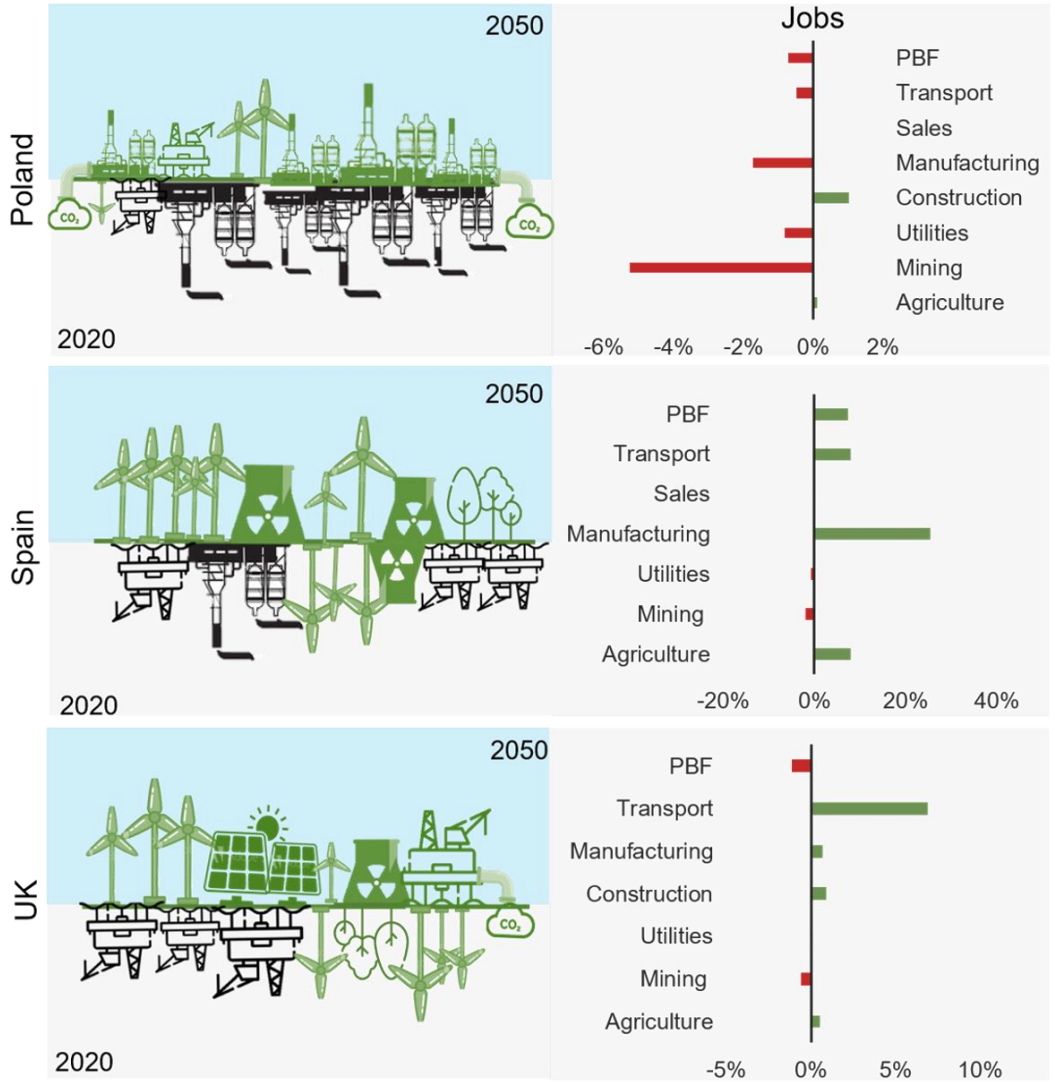
Trade-offs with SDGS goals: Spain



Trade-offs with SDGS goals: the UK



Socially equitable energy systems transition



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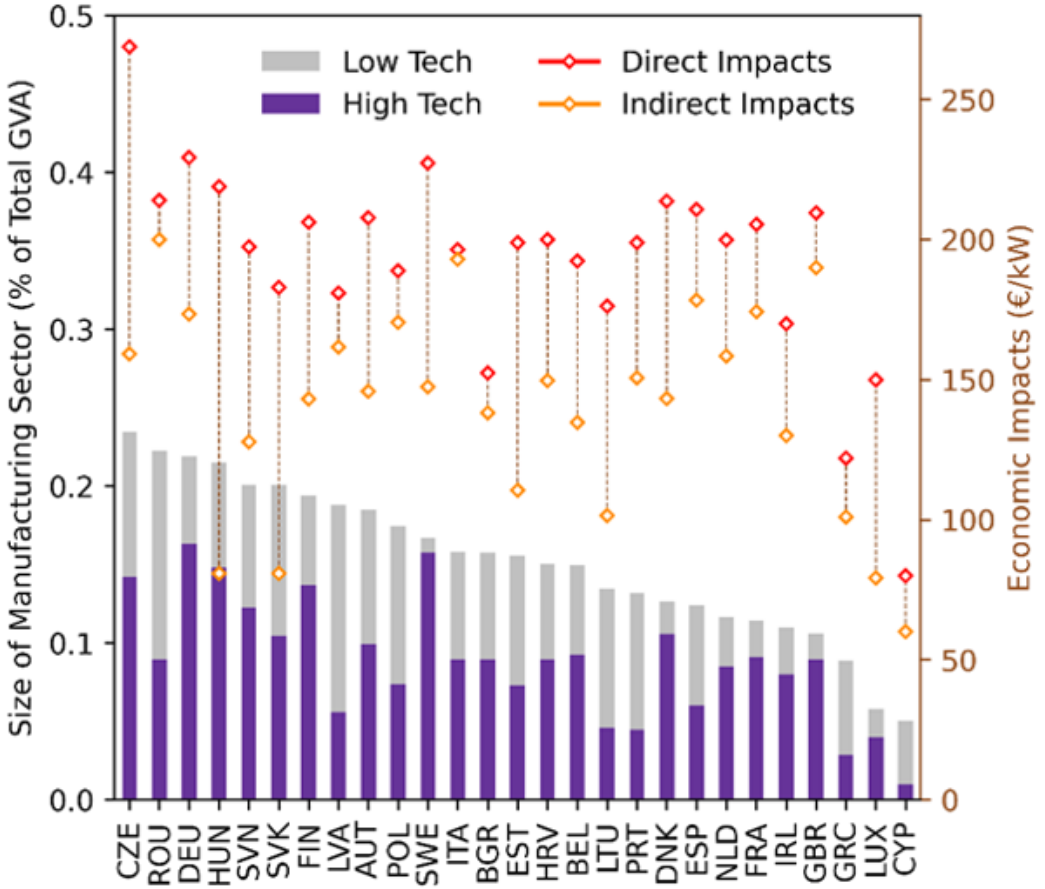
Levelling up regional inequalities *via* low-carbon investments

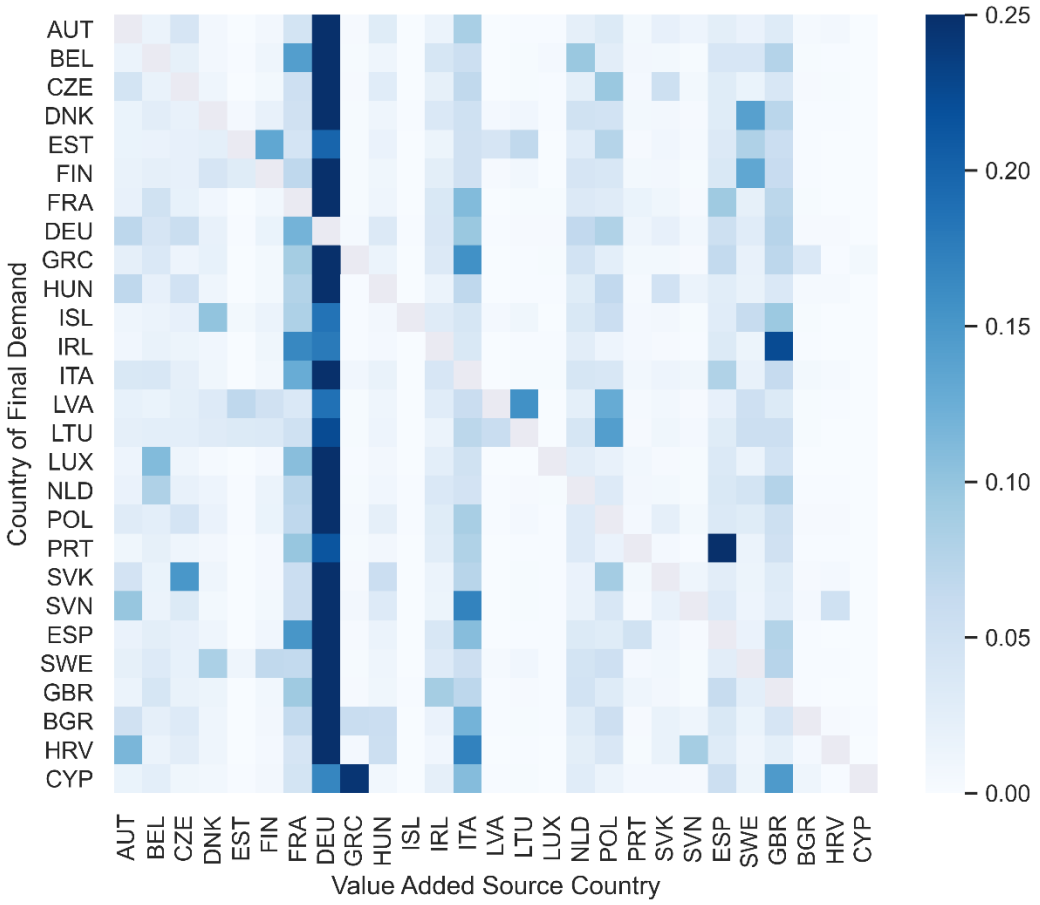
- Green policies aiming at decarbonizing the energy system may well exacerbate economic inequalities. These effects are seldomly recognised in spatially aggregated, top-down and techno-economic decarbonization strategies.

- We present a spatial economic framework that quantifies the socio-economic benefits of low carbon investments while accounting for region-specific factors, such as the industrial specialization of regions, their relative size, and their economic interdependencies.

- We conduct a thought experiment which uses low carbon hydrogen as an archetypal investment for decarbonizing the energy intensive industries in Europe and in the UK and demonstrate that interregional economic interdependencies drive the indirect effects of low carbon investment.

The uneven economic impacts of hydrogen investments





Some conclusions

- Green policies aiming at decarbonizing the energy system may well exacerbate economic inequalities. These effects are seldomly recognised in spatially aggregated, top-down and techno-economic decarbonization strategies.

- We present a spatial economic framework that quantifies the socio-economic benefits of low carbon investments while accounting for region-specific factors, such as the industrial specialization of regions, their relative size, and their economic interdependencies.

- We conduct a thought experiment which uses low carbon hydrogen as an archetypal investment for decarbonizing the energy intensive industries in Europe and in the UK and demonstrate that interregional economic interdependencies drive the indirect effects of low carbon investment.

Some conclusions

- Green policies are likely to create winners and losers, with local factors dictating the relative size of economic benefits generated by low carbon investments.

- Value chain mapping identifying strengths and connection between sectors and places is key

- This can deliver a technically feasible, financially viable, and socially equitable net zero transition

Questions?

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