PARIS
REINFORCE

Delivering on the Paris Agreement in a fragmenting world

PARIS REINFORCE final event, Sorbonne, Paris, November 15, 2022

Walking out of a pandemic and into an energy crisis

Dr. Dirk-Jan van de Ven (*BC3 Basque Centre for Climate Change*)

www.paris-reinforce.eu

Outline of the presentation

- Introduction on COVID-19 green recovery packages
- Methodological approach
- Impacts of recovery packages throughout the globe
- Deep-dive into EU green recovery portfolios

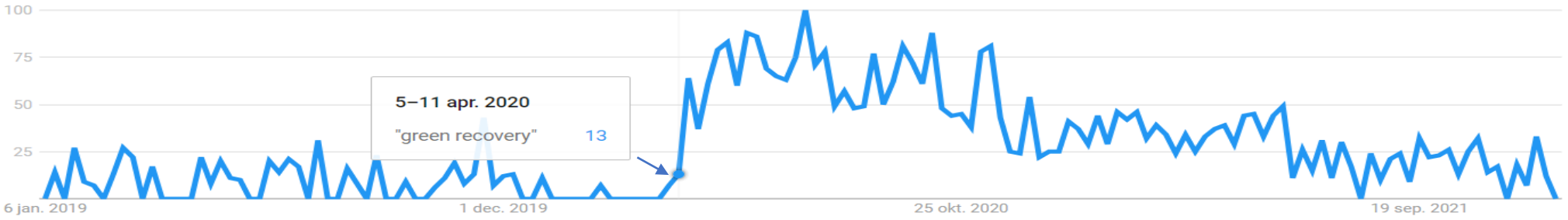
The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

Introduction on COVID-19 green recovery packages

Coronavirus Recovery:
LET'S BUILD A BETTER TOMORROW

GRI
GREEN RECOVERY INITIATIVE

"Green recovery" Google search term



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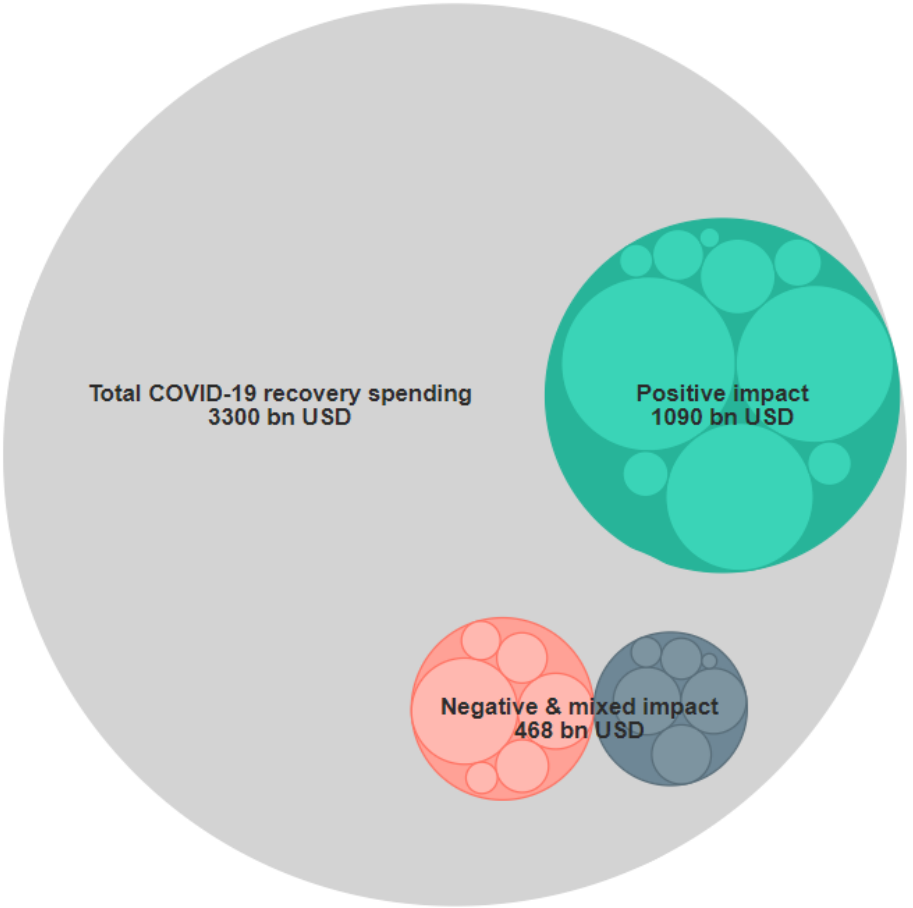
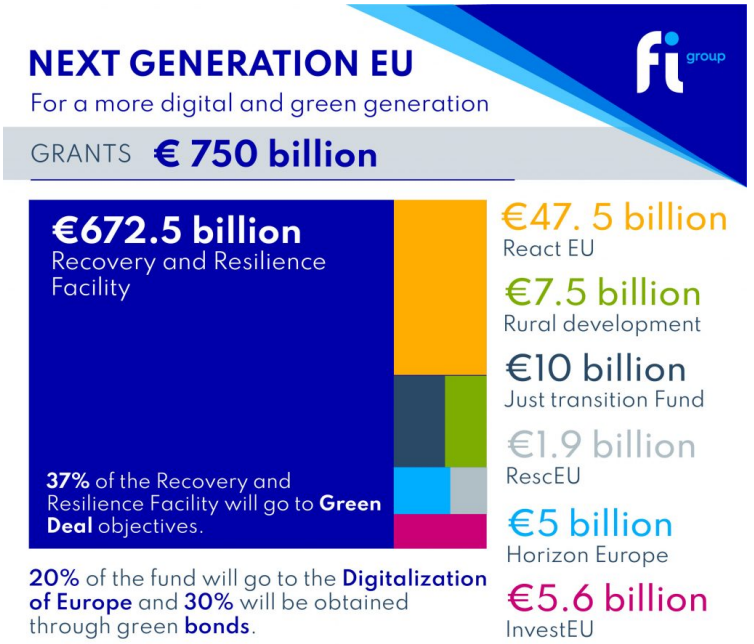
Introduction on COVID-19 green recovery packages





Source: [OECD Green Recovery Database (2022)]

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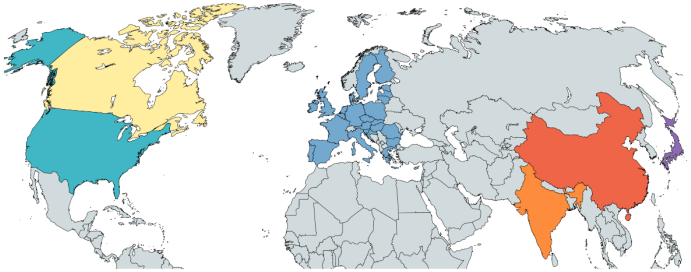
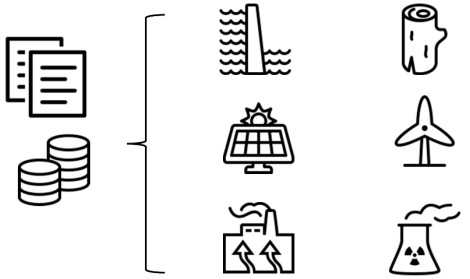
Methodological Approach: overall flow

Announced COVID recovery packages towards clean energy projects

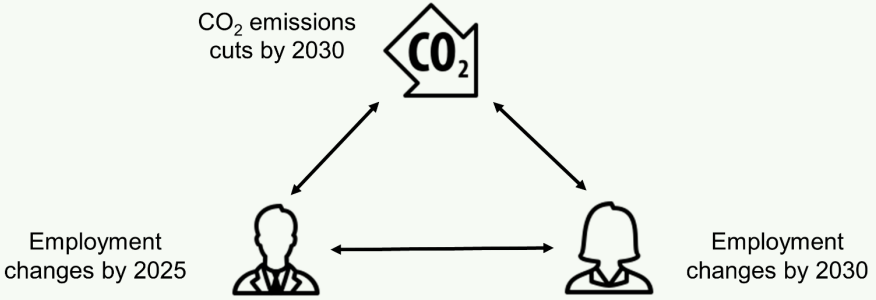
From six major emitters: Canada, China, EU (including the UK), India, Japan, USA



Clean energy technologies: PV, CSP, onshore and offshore wind, geothermal, nuclear, biomass, hydro, biofuels



Optimal allocation of recovery packages
in terms of:



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Methodological Approach: models

Model	Model type	Temporal solution dynamic	Technology choice mechanism	Technology dispatch	Technology representation [b]								
					Solar PV	Solar CSP	Onshore wind	Offshore wind	Geothermal	Nuclear	Biomass	Hydropower	Biofuels
TIAM-Grantham	Partial equilibrium	Inter-temporal optimisation	Winner-takes-it-all	Flexible capacity factors	✓	✓	✓	✓	✓	✓	✓	✓	
GCAM-PR	Partial equilibrium	Recursive dynamic	Logit choice	Constant capacity factors	✓	✓	✓	✓	✓	✓	✓		✓
GEMINI-E3	Computable general equilibrium	Recursive dynamic	Nested CES function	Constant capacity factors	✓		✓				✓		

- Current policies scenario as baseline in all three models (Sognnaes et al 2021):
  - The most relevant pre-pandemic national energy and climate policies explicitly modelled
  - "Fixing in" policies before applying additional recovery subsidies (e.g. ETS Price)

→ Assures CO_2 and energy impacts of subsidies entirely additional to pre-pandemic policies

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Impacts of recovery packages throughout the globe

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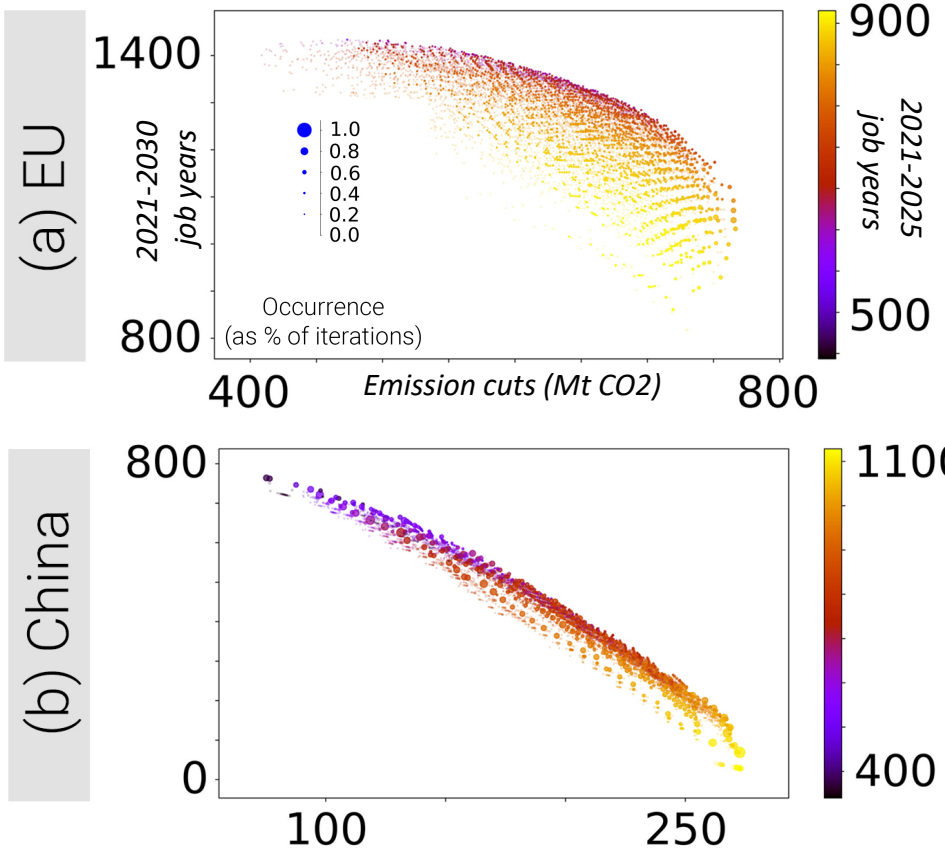
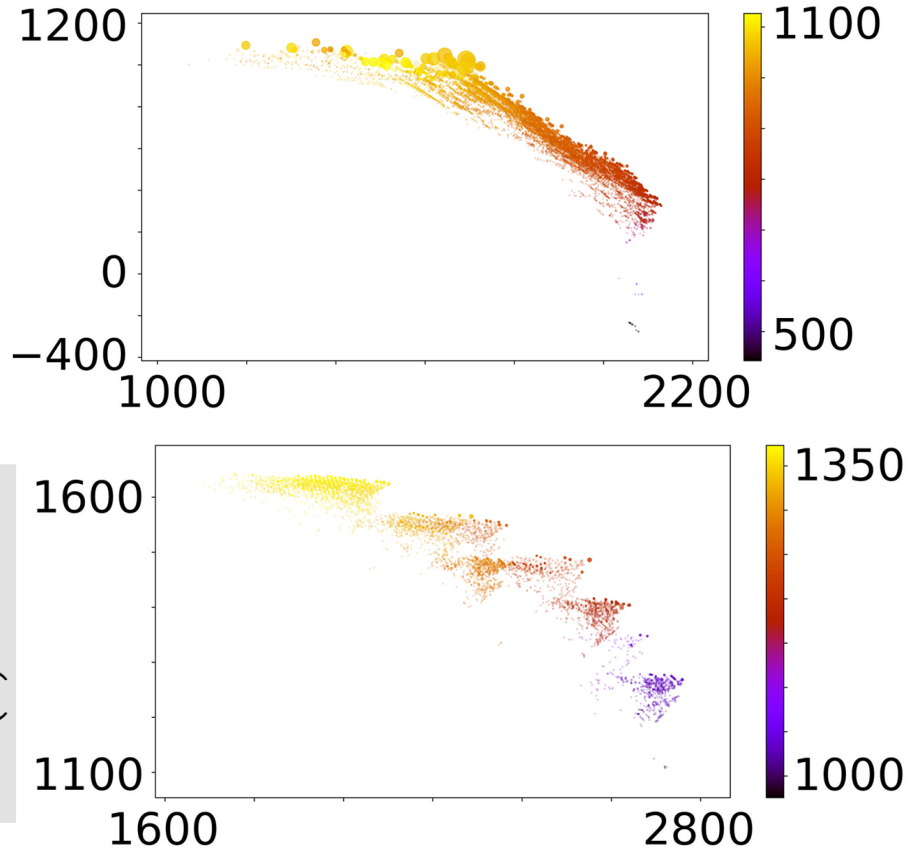
(i) GCAM



(ii) TIAM



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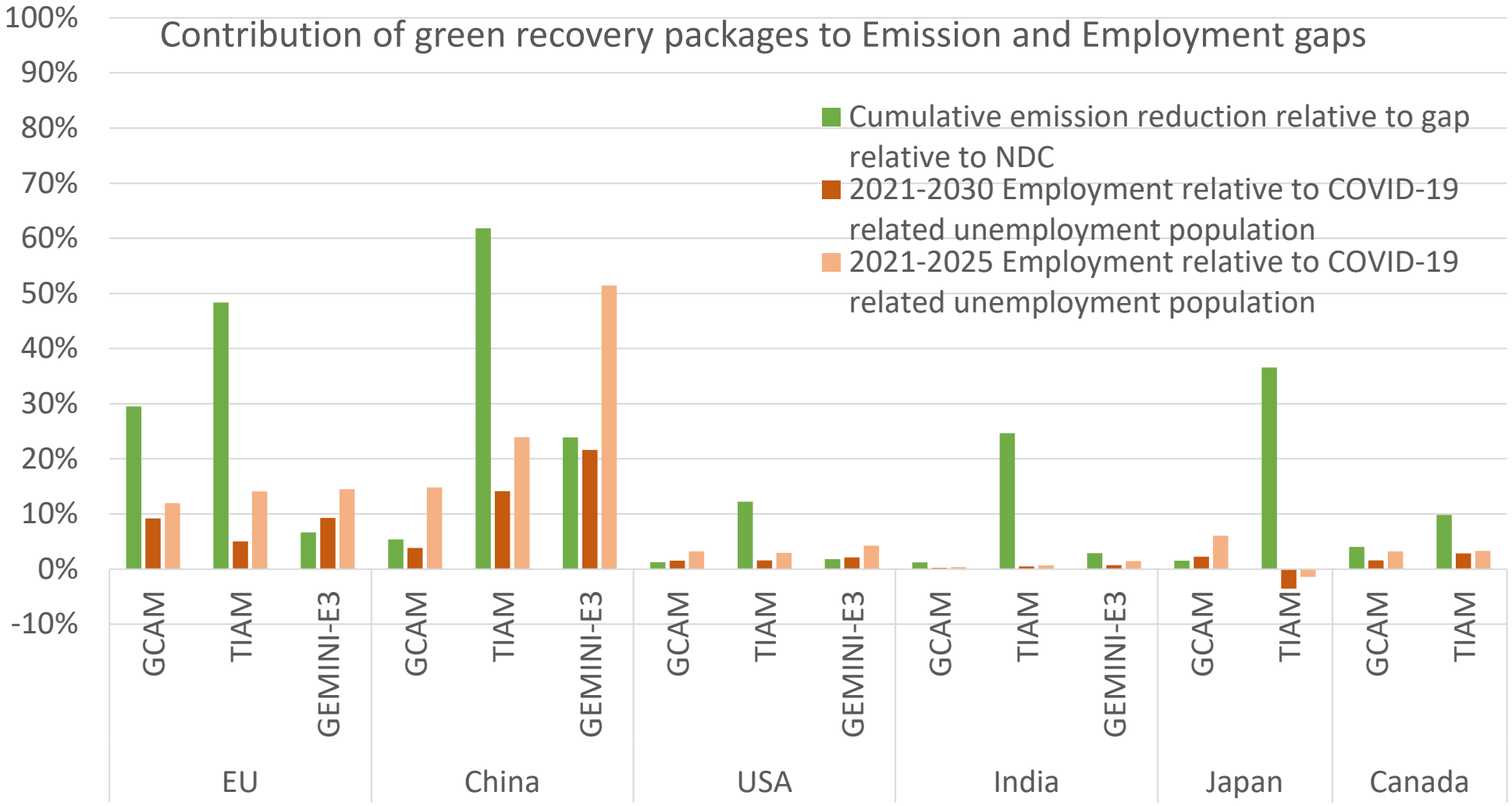
Impacts of recovery packages throughout the globe



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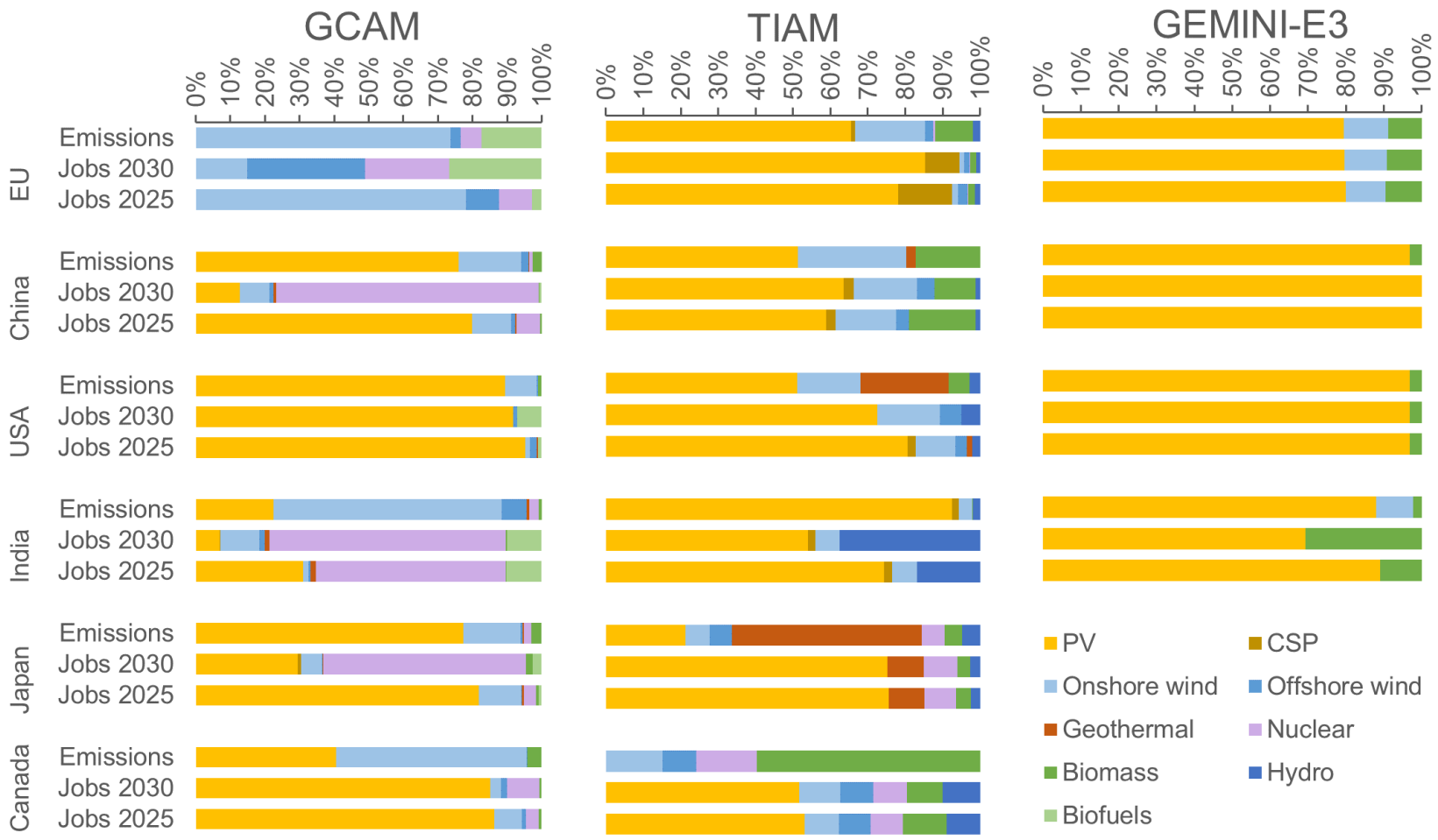
Impacts of recovery packages throughout the globe



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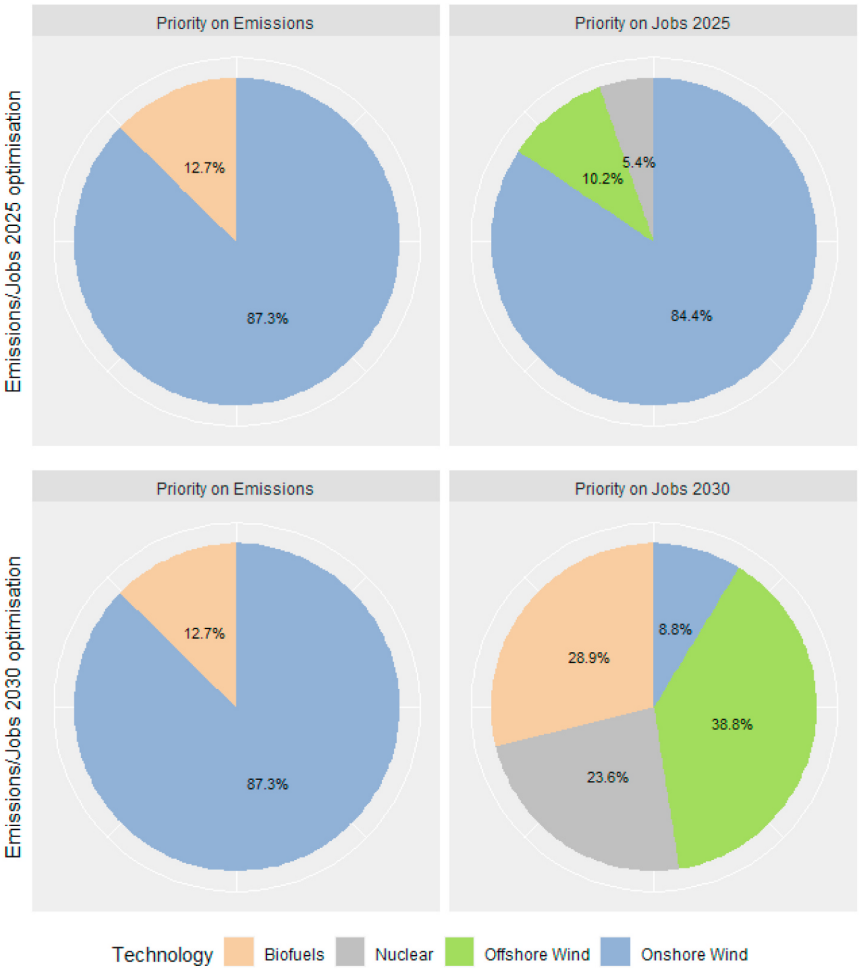
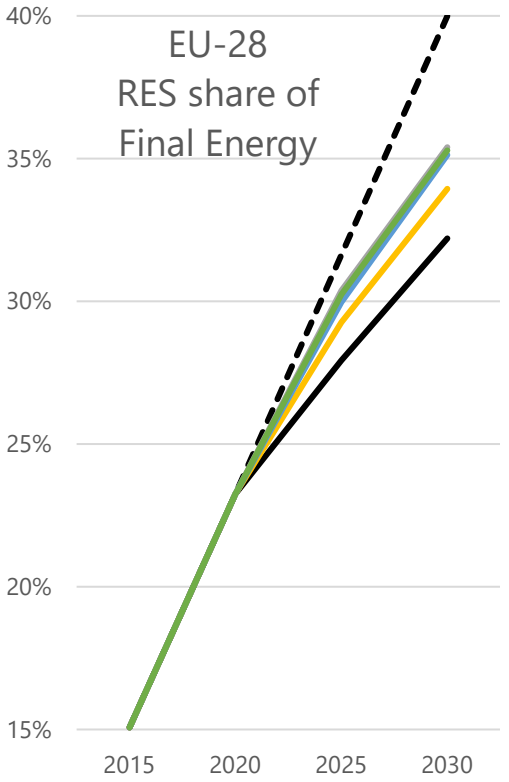
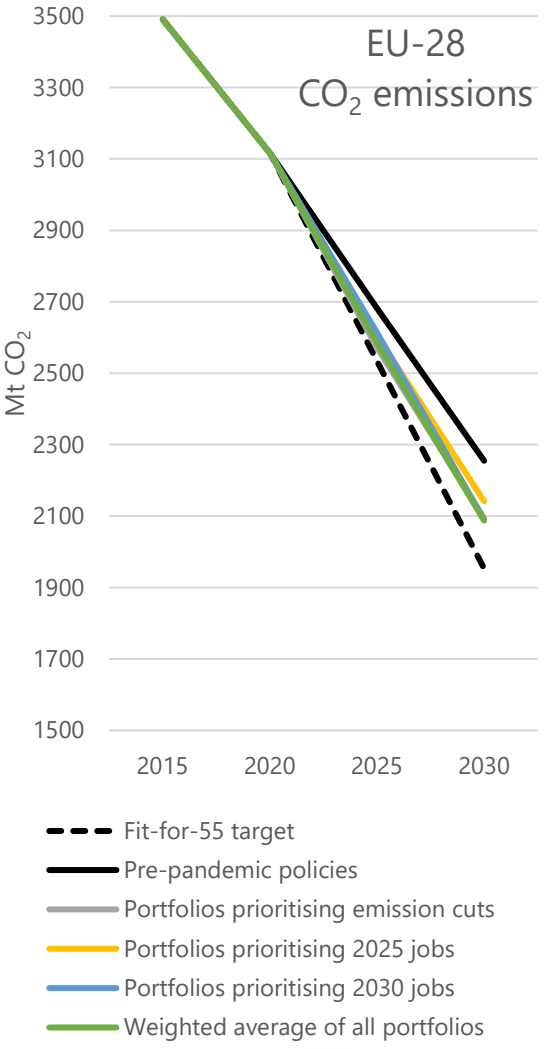
Deep-dive into EU green recovery portfolios







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Conclusions and Policy Recommendations

- Results show packages in the EU and China can contribute significantly to emission and employment goals. Packages in other economies have only incremental impacts.
- PV preferred technology for most optimal green recovery portfolios, although strong model diversity is reflected in technological breakdown.
- Green budget in European RRF is projected to bring the European around half-way towards fit-for-55 targets on renewables and emissions.
- Quick response to crisis key in European´s relatively impactful green recovery: potential lesson for current energy crisis.

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Thank you!

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Appendix: Further reading

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Global COVID recovery study	van de Ven, D. J., Nikas, A., Koasidis, K.,... & Gambhir, A. (2022). COVID-19 recovery packages can benefit climate targets and clean energy jobs, but scale of impacts and optimal investment portfolios differ among major economies. ***One earth, 5***(9), 1042.
EU deep-dive of COVID recovery study	Koasidis, K., Nikas, A., Van de Ven, D. J., Xexakis, G., Forouli, A., Mittal, S., ... & Doukas, H. (2022). Towards a green recovery in the EU: Aligning further emissions reductions with short-and long-term energy-sector employment gains. ***Energy Policy, 171***, 113301.
AUGMECON-R	Nikas, A., Fountoulakis, A., Forouli, A., & Doukas, H. (2022). A robust augmented ε-constraint method (AUGMECON-R) for finding exact solutions of multi-objective linear programming problems. ***Operational Research, 22***, 1291-1332.
Portfolio analysis framework	Forouli, A., Nikas, A., Van de Ven, D. J., Sampedro, J., & Doukas, H. (2020). A multiple-uncertainty analysis framework for integrated assessment modelling of several sustainable development goals. ***Environmental Modelling & Software, 131***, 104795.
Global analysis of 'where are we headed?'	Sognnaes, I., Gambhir, A., Van de Ven, D.J., Nikas, A., Anger-Kraavi, A., Bui, H., ... & Peters, G.P. (2021). A multi-model analysis of long-term emissions and warming implications of current mitigation efforts. ***Nature Climate Change, 11***, 1055-1062.
EU-level analysis (co-creation)	Nikas, A., Elia, A., Boitier, B., Koasidis, K., Doukas, H., Cassetti, G., ... & Chiodi, A. (2021). Where is the EU headed given its current climate policy? A stakeholder-driven model inter-comparison. ***Science of The Total Environment, 793***, 148549.

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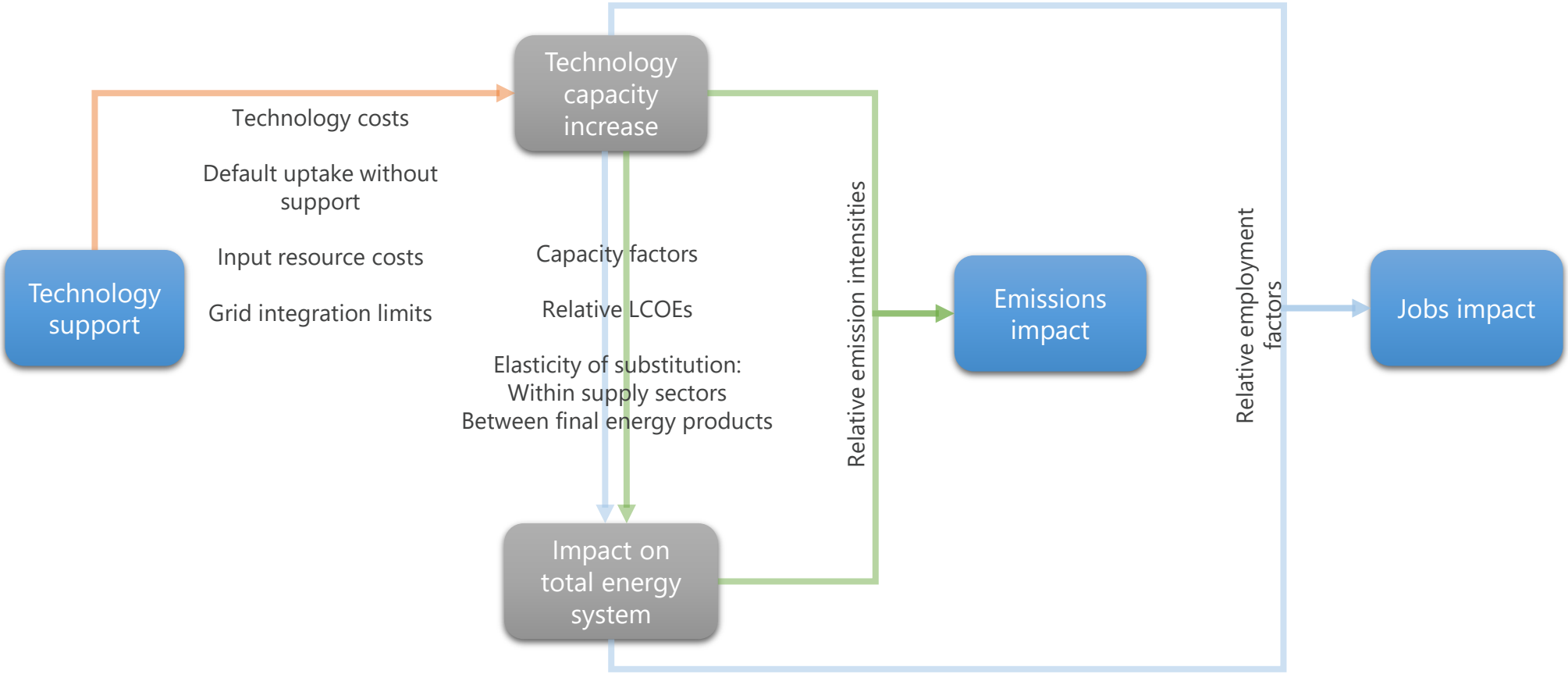
Methodological Approach: context



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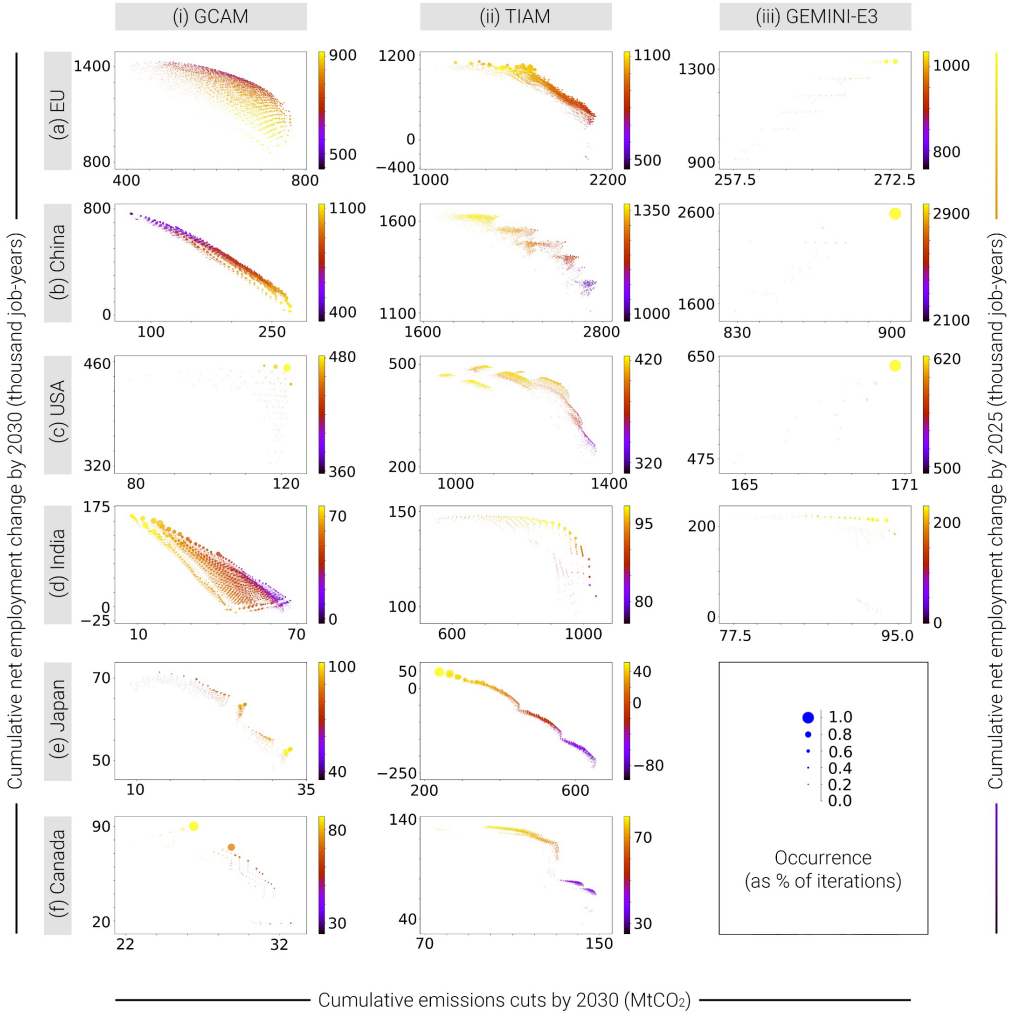
Appendix: Cumulative emissions cuts by 2030



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