

Is green recovery enough?

Analysing the impacts of post-Covid economic packages

Panagiotis FRAGKOS¹, Pedro R. R. ROCHEDO², Rafael GARAFFA^{2,3}, Lilia Caiado COUTO⁴, Luiz Bernardo BAPTISTA^{2*}, Bruno S. L. CUNHA², Roberto SCHAEFFER², Alexandre SZKLO²

Energies 2021, 14(17), 5567; <https://doi.org/10.3390/en14175567>

¹ E3-Modelling S.A., Athens, Panormou 70-72, Greece

² Centre for Energy and Environmental Economics (CENERGIA), Energy Planning Program, COPPE, Universidade Federal do Rio de Janeiro

³ European Commission, Joint Research Centre - JRC-Seville / Spain

⁴ The Bartlett School of Environment, Energy and Resources, University College London, UK

*Correspondence: luizbernardo@ppe.ufrj.br

E3Modelling
Energy Economy Environment

ECEMP
European Climate + Energy
Modelling Platform

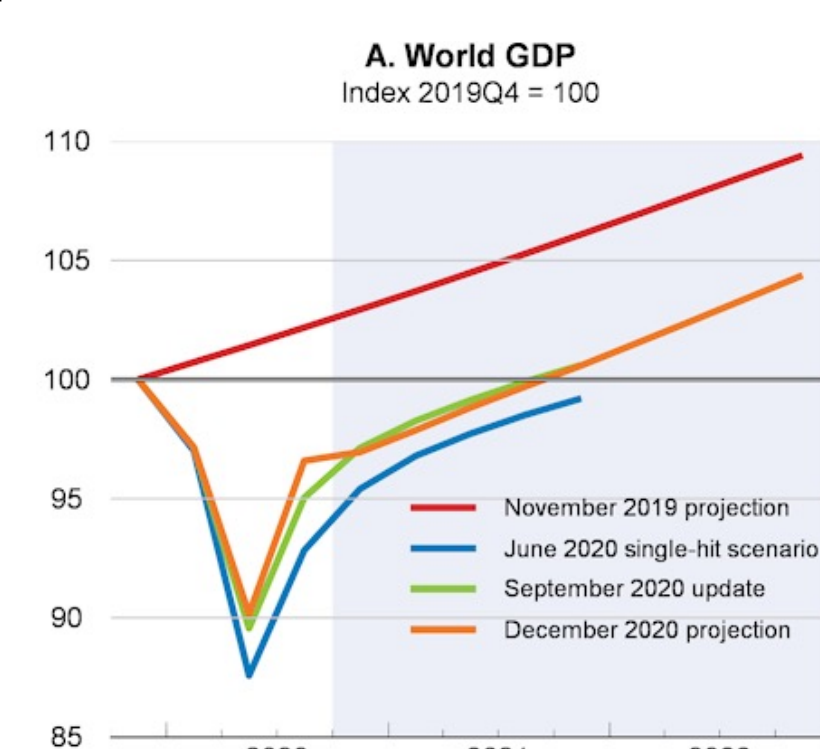
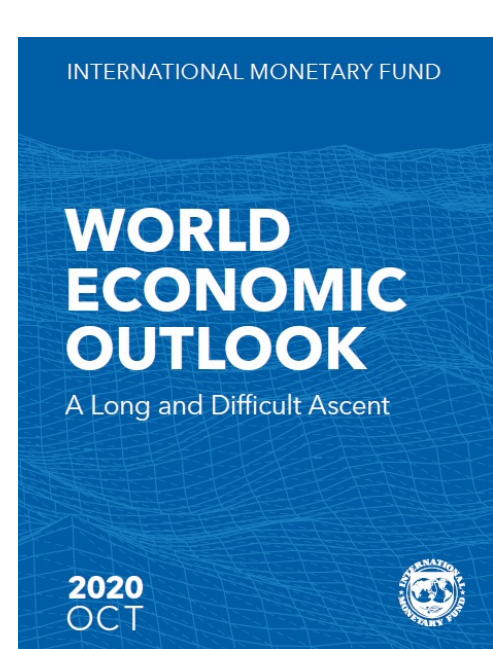
1 Introduction

Emissions pathways after COVID-19 will be shaped by how governments' economic responses translate into infrastructure expansion, energy use, investment planning and societal changes. This paper provides **novel evidence on the energy system and greenhouse gas (GHG) emissions implications of post-COVID recovery packages** by assessing the gap between pledged recovery packages and the actual investment needs of the energy transition to reach the Paris Agreement goals.

2 COVID-19 Economic Recovery Packages Screening and Modelling

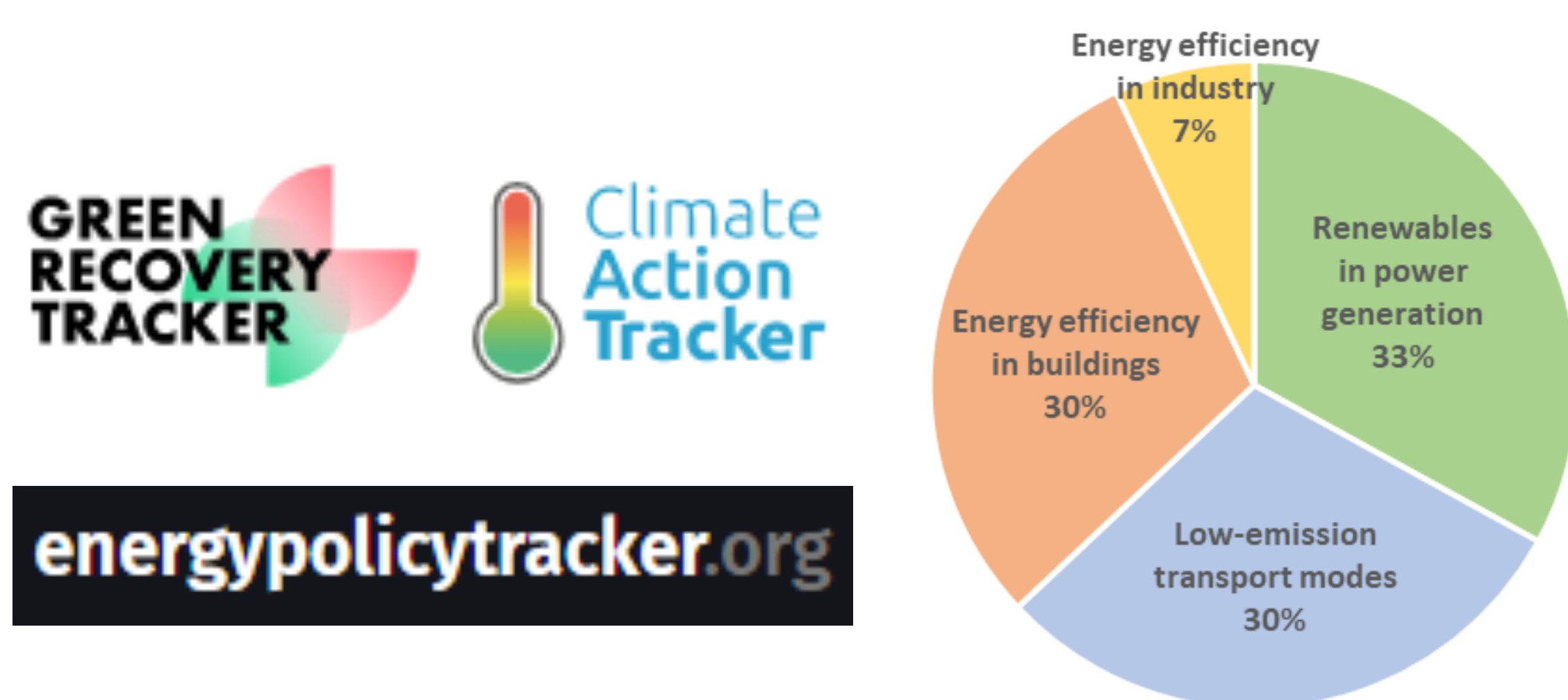
Two different modelling frameworks are used to assess the impacts of green recovery packages: the **COFFEE-TEA IAM** suite of models and **PROMETHEUS** energy system model.

We depart from a baseline (CurPol) scenario framed within the Shared Socioeconomic Pathway - **SSP2**, but applying short-term regional GDP growth shocks due to COVID-19 based on:



We screened **policy packages announced by governments up to May 2021** for investment in three main technology groups related to low-carbon transition (renewable energy, low-emission transport, energy efficiency).

The recovery packages were inserted in the modelling tools by changing specific model parameters, in particular by imposing **additional investment in low-carbon technologies** exogenously or by inserting subsidy rates in the capital costs to reduce the purchase price and accelerate the deployment of mitigation options in each sector.



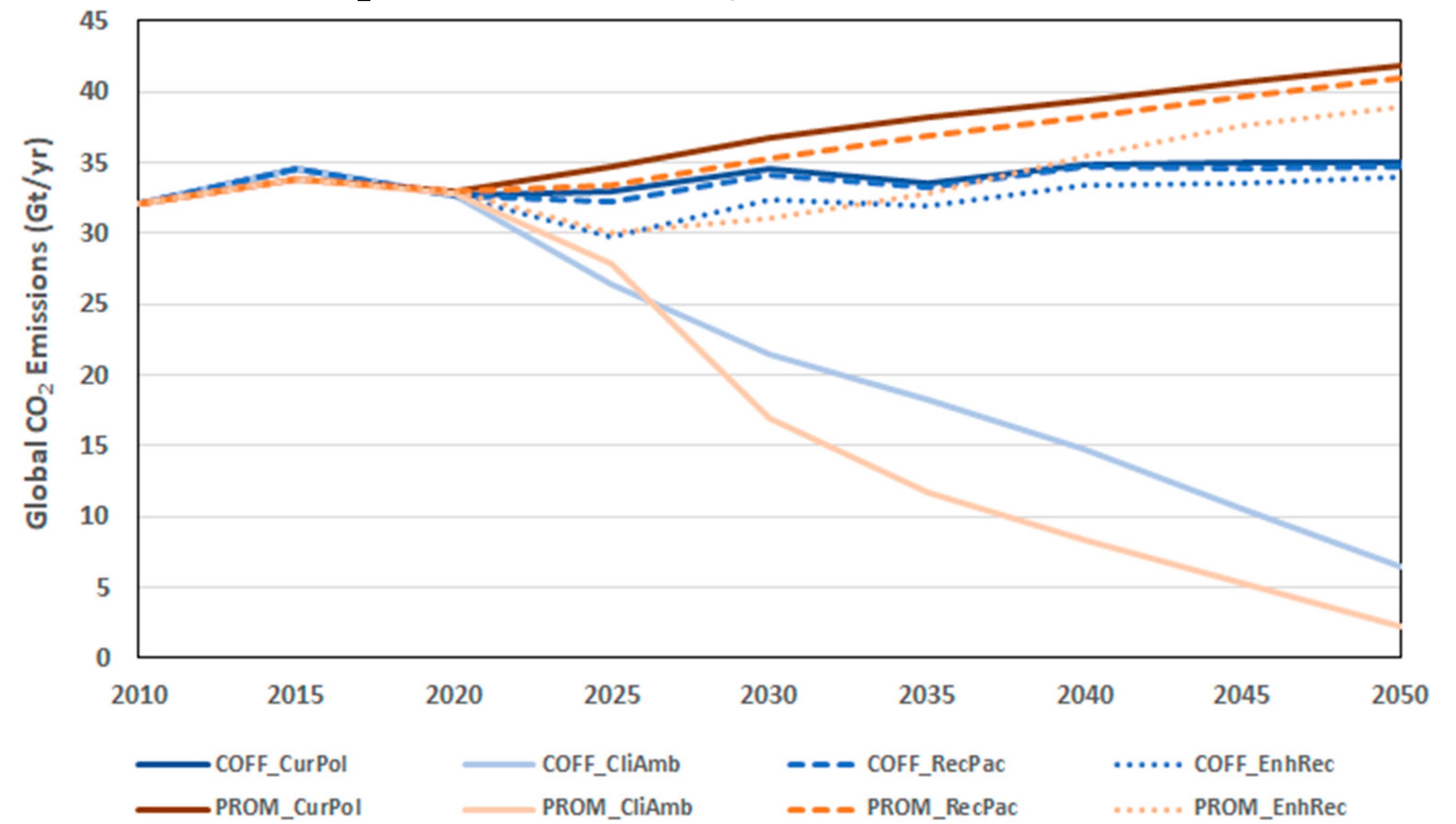
Scenario design

We translate them into assumptions for each of the scenarios and their main **policy instruments**, and compare them with 1.5°C scenarios.

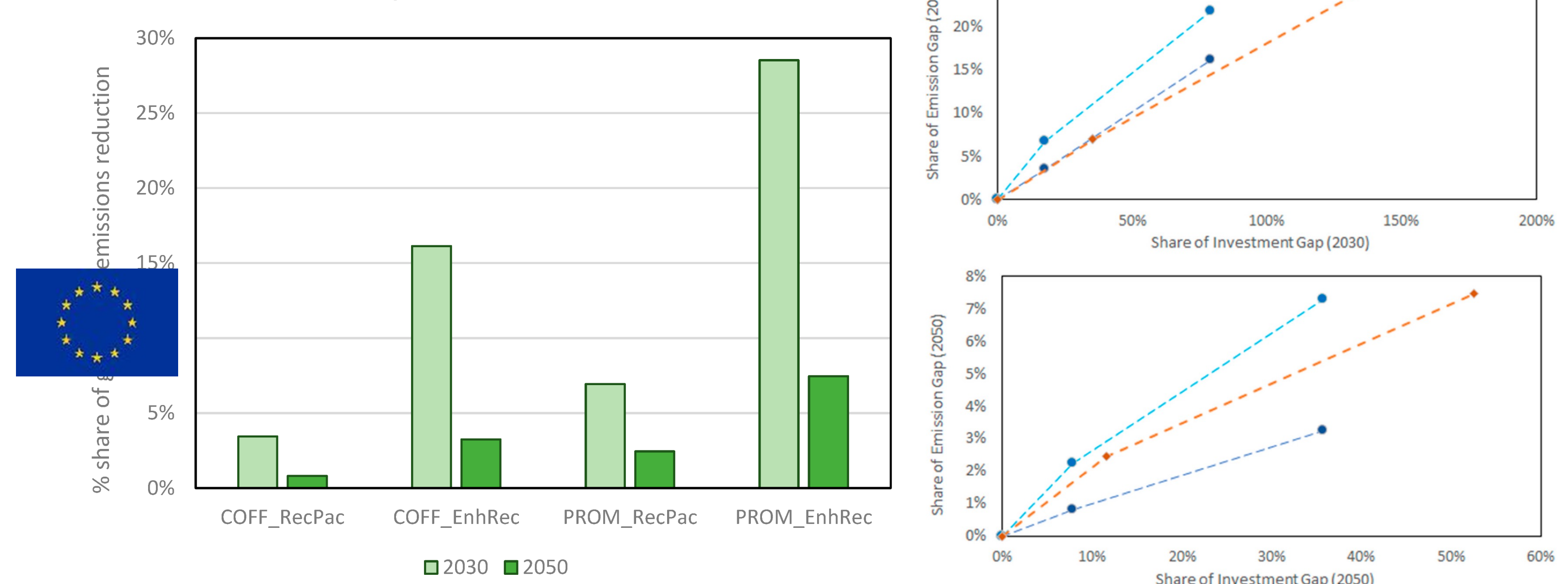
Scenario	Policy Instruments
Baseline (CurPol)	Current policies (no recovery packages)
Recovery Packages (RecPac)	CurPol + Recovery (direct investment, subsidies)
Enhanced Recovery (EnhRec)	CurPol + Enhanced recovery (5x recovery, direct investment, subsidies)
Climate Ambition (CliAmb)	Carbon pricing (600 GtCO ₂ carbon budget w/o temperature overshoot)
Global Governance (GloGov)	CurPol + Direct investment, subsidies (modelling framework optimal choice at global level)

3 Results

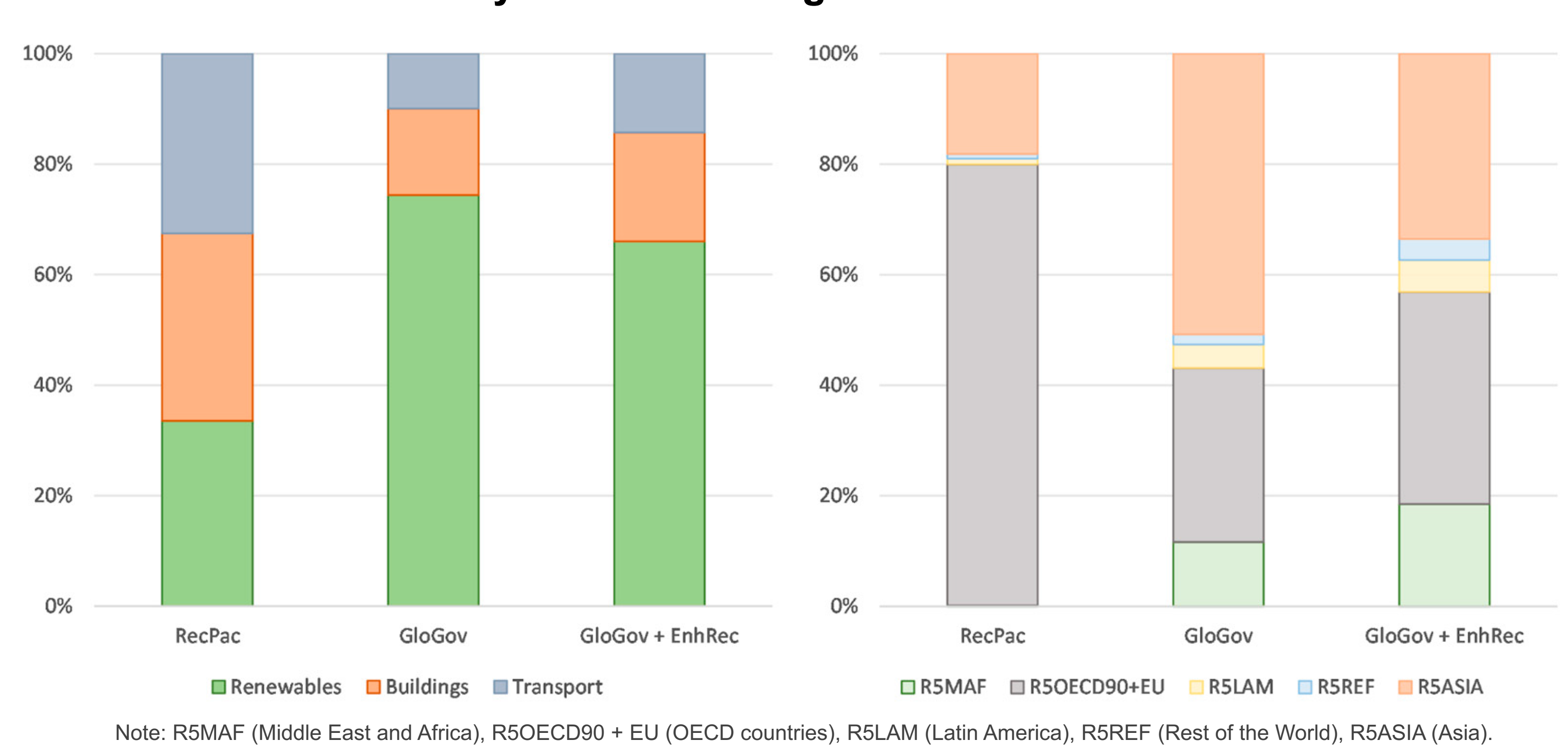
Global CO₂ emissions pathway over the 2010-2050 period



Closing the ambition gap to achieve the 1.5°C target in 2030 and 2050



Investment allocation by sectors and regions under different scenarios



4 Discussion and Conclusions

- Recovery packages stimulating investment in clean energy and energy efficiency can **reduce global CO₂ emissions** by 10-13% in 2025 and 6-15% in 2030 relative to the CurPol scenario.
- Green recovery packages provide more of an **investment gap closure** than an emission gap closure and can accelerate energy system transformation with higher uptake of renewable energy, EVs and energy efficiency until 2030.
- An *enhanced* green **recovery strategy would not be enough** to deliver the systemic long-term restructuring to pave the way towards carbon neutrality by 2050.
- Global **optimal allocation of recovery packages** yields a larger level of mitigation through larger shares of wind and PV power generation.
- Carbon pricing schemes** combined with green recovery packages boost medium and long-term system transformations towards net zero by mid-century.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No. 101003866

NDC ASPECTS

ECEMP
European Climate + Energy
Modelling Platform

E3Modelling
Energy Economy Environment

