2050 Pathways Platform Annual Meeting Series

The inclusion of macro-economic issues and their analytical approaches in long-term strategies

Wednesday 17 May 2023

Agenda

- **Welcome and introductions** from Richard Baron, Executive Director of the 2050 Pathways Platform

- **Presentations** from panellists:
  - Ms. Dana Yermolyonok – **GIZ (Kazakhstan)**
  - Prof. Chukwumerije Okereke - **Centre for Climate Change and Development in Nigeria** represented by Mr. Chukwuemeka Emenekwe.
  - Mr. Stéphane Hallegatte – **The World Bank**
  - Mr. Robin Smale – **McKinsey**

- **Q&A session** with the audience

- **Closing remarks** by Siddharth Pathak, Director of Partnerships at the 2050 Pathways Platform

2050 Pathways Platform

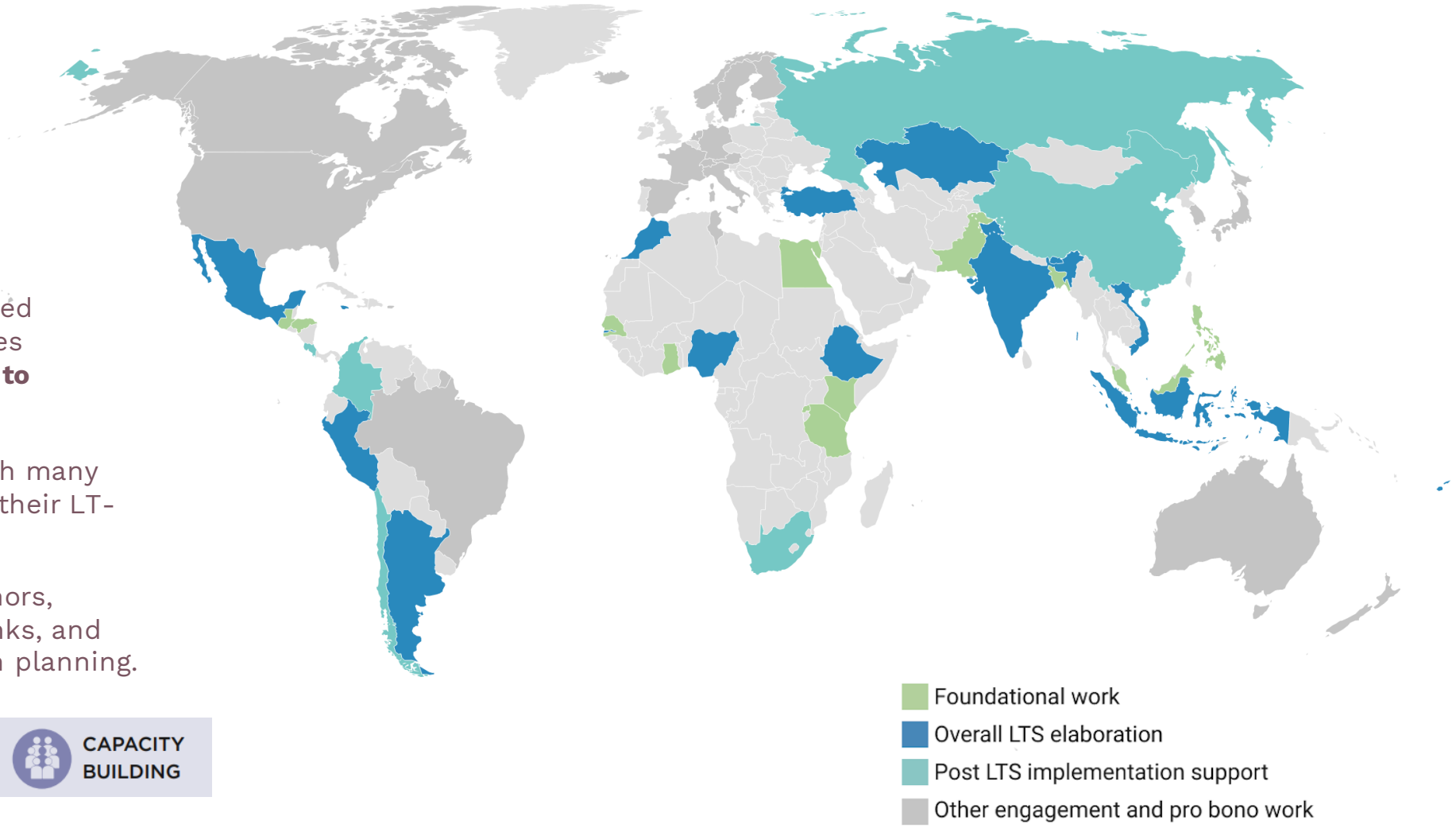
Key facts

- The Platform is a **government and multi-stakeholder initiative** launched at COP22 at the request of countries who wanted a **“big tent” approach to 2050 long-term climate strategies**.
- **36 member countries** and work with many non-member countries to support their LT-LEDS development.
- It **brings together a network** of donors, international and national think tanks, and climate policy experts on long term planning.

FINANCIAL SUPPORT

KNOWLEDGE & ADVISORY

CAPACITY BUILDING



Why bring macro-economics in the discussion of LT-LEDS?

- *Long-term strategies are about **major structural and infrastructure transformations** in coming decades (and narratives around sectoral needs, just transition, finance, etc.)*
- *For the most part, **LT-LEDS tend to focus on the physical transformation** of a country's economy (power generation capacity, transport fleets, agricultural practices, built environment, mitigation technologies in industry, etc.)*
- ***Technology and infrastructure costs** are often estimated but…*
- *… Few examples of macro-economic analyses featured in LT-LEDS to date:*
  - Aggregate GDP impacts – sometimes including adaptation – as deviation from a baseline
  - Aggregate (energy systems) cost estimates
  - Employment creation and destruction

Why bring macro-economics in the discussion of LT-LEDS? (2)

- ***Many macro-economic dimensions should be explored further :***
  - Trade implications, current accounts, debt, competitiveness
  - Employment, regional development
  - Future value added of fossil fuel-era sectors and growing low-GHG sectors
  - Prices, implications for households disposable income
  - Overall economic vulnerability to the global transition to low-carbon
  - Secondary macro-economic effects. E.g., air quality improvement, transport policies effects on labour productivity.
- ***Beyond: how climate policies play out in current macro-economic conditions, what synergies and trade-offs?***
  - Climate policies will not be rolled out on a 'clean slate'
  - Ministries of Economy need to see how the climate policy agenda fits in their broader set of priorities, and ask hard questions about corresponding financing needs.
- ***Today: country examples of various methods to explore the macro-economics of LT-LEDS & illustration of why macro-economic analysis matters***

Presentation from GIZ on the Kazakhstan experience

Ms. Dana Yermolyonok

Economic modelling for Kazakhstan 2060 Carbon Neutrality Strategy: Lessons Learnt

GIZ Programme on Capacity Development for Climate Policy in the countries of South East, Eastern Europe, the South Caucasus and Central Asia, Phase III

Dana Yermolyonok| 17-05-2023

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
of the Federal Republic of Germany

Expectations from LT-LEDS Kazakhstan

- to guide society, government and business in transition toward a low-carbon future;
- seize the opportunities of the global transition to low-carbon development and minimize the economic risks associated with lack of action;
- provide a strategic vision for large-scale decarbonization, transformation of economic sectors, major investments, and transformation of technology and infrastructure;
- complement the existing long-term strategies.

Sectoral and Macroeconomic Modelling for LT-LEDS

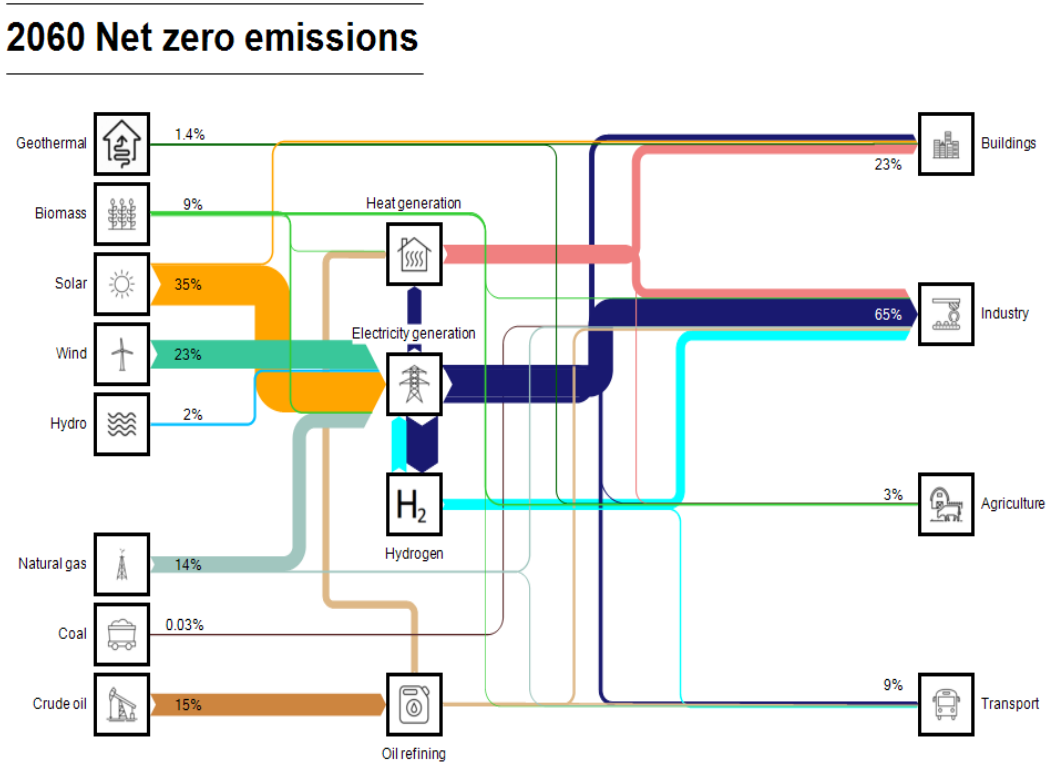
- Defines the least-cost pathway to reach carbon neutrality by 2060;
- Estimates the investment needs;
- Defines key sectorial milestones for reaching carbon neutrality;
- Estimates the ancillary benefits of decarbonization;
- Provides technical and economic arguments for the national dialogue on decarbonization and consensus building.

The modelling framework applied

Three interlinked economic and technological models:

- **TIMES-KAZ:** contains detailed information on available technologies and their costs and is used to produce a least-cost energy system => possible energy futures.
- **CGE-KAZ:** estimates how the Kazakh economy might react to changes in policy, technology and other external factors.
- **SD-KAZ:** a set of System Dynamics sectoral models to understand the nonlinear behaviour of complex systems over time and assess direct, indirect and induced economic and societal costs and benefits i.e. income effects, health consequences and costs of accidents.
- **TICS-KAZ:** a hybrid model created by linking the three models above to increase consistency and accuracy of modelling and providing a broader scope of indicators.

Macroeconomic and sectoral modelling results



- Ambitious climate policies are economically beneficial and technologically possible.
- GDP in 2060 carbon neutrality scenario is 97% higher in comparison to the BAU scenario.
- Need in USD 667 billion investments (46% in power and heat generation).
- Energy mix in BAU and Carbon Neutrality scenarios.

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Presentation from Nigeria's Centre for Climate Change and Development

Professor Chukwumerije Okereke

represented by Mr. Chukwuemeka Emenekwe

Presentation from the World Bank

Mr. Stéphane Hallegatte

World Bank Group

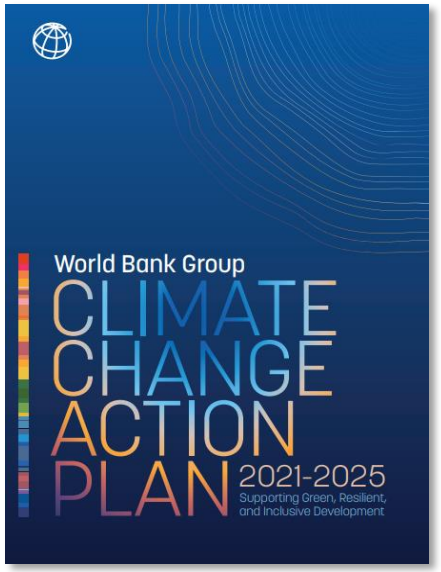
COUNTRY CLIMATE AND DEVELOPMENT REPORT

The Macroeconomic Implications of a Transition to Zero Net Emissions

Approaches of and lessons from Country Climate and Development Reports

WHY CCDRs?

Integrating climate and development is a pillar of the WBG's new Climate Change Action Plan 2021–2025. To advance its implementation, the WBG has launched a new, core diagnostic tool: the Country Climate and Development Report (CCDR).



ACTIONS

OPERATIONALIZING THE ACTION PLAN

1 Integrating Climate and Development

- **Country climate and development diagnostics**, planning, and policies
- Alignment with the Paris Agreement
- Climate finance and impact

2 Prioritizing Key Systems Transitions

- Energy
- Agriculture, Food, Water and Land
- Cities
- Transport
- Manufacturing

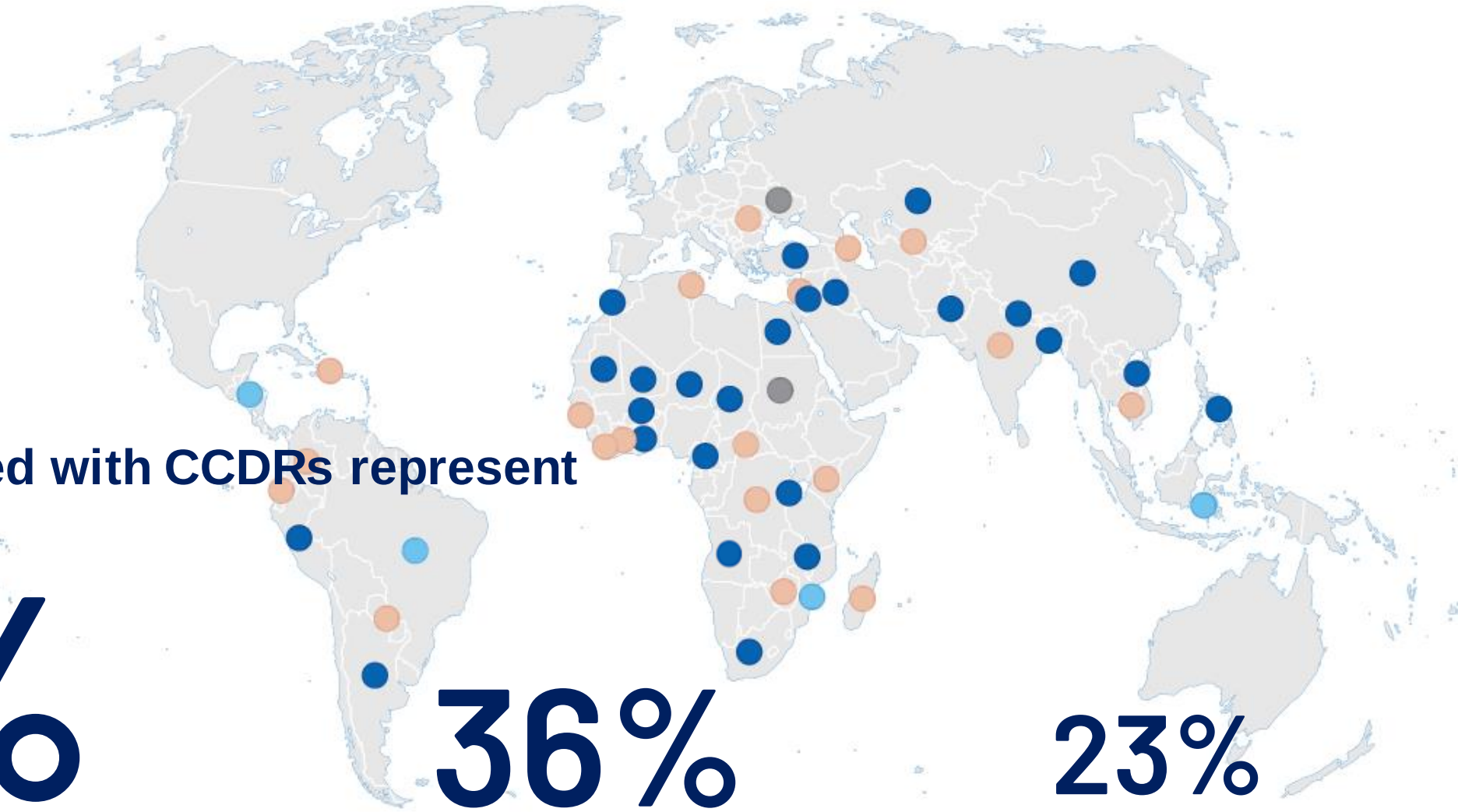
3 Financing to Support the Transitions

- Boosting client countries' public domestic resources
- Mobilizing and catalyzing private capital
- Concessional finance

WHAT ARE CCDRs?

Diagnostic that focuses on the **interplay between development** (including poverty reduction, growth, inequality), **climate change and climate policies** in the context of the Paris Agreement.

- Published
- Forthcoming
- Initiated
- On hold



25 countries covered with CCDRs represent

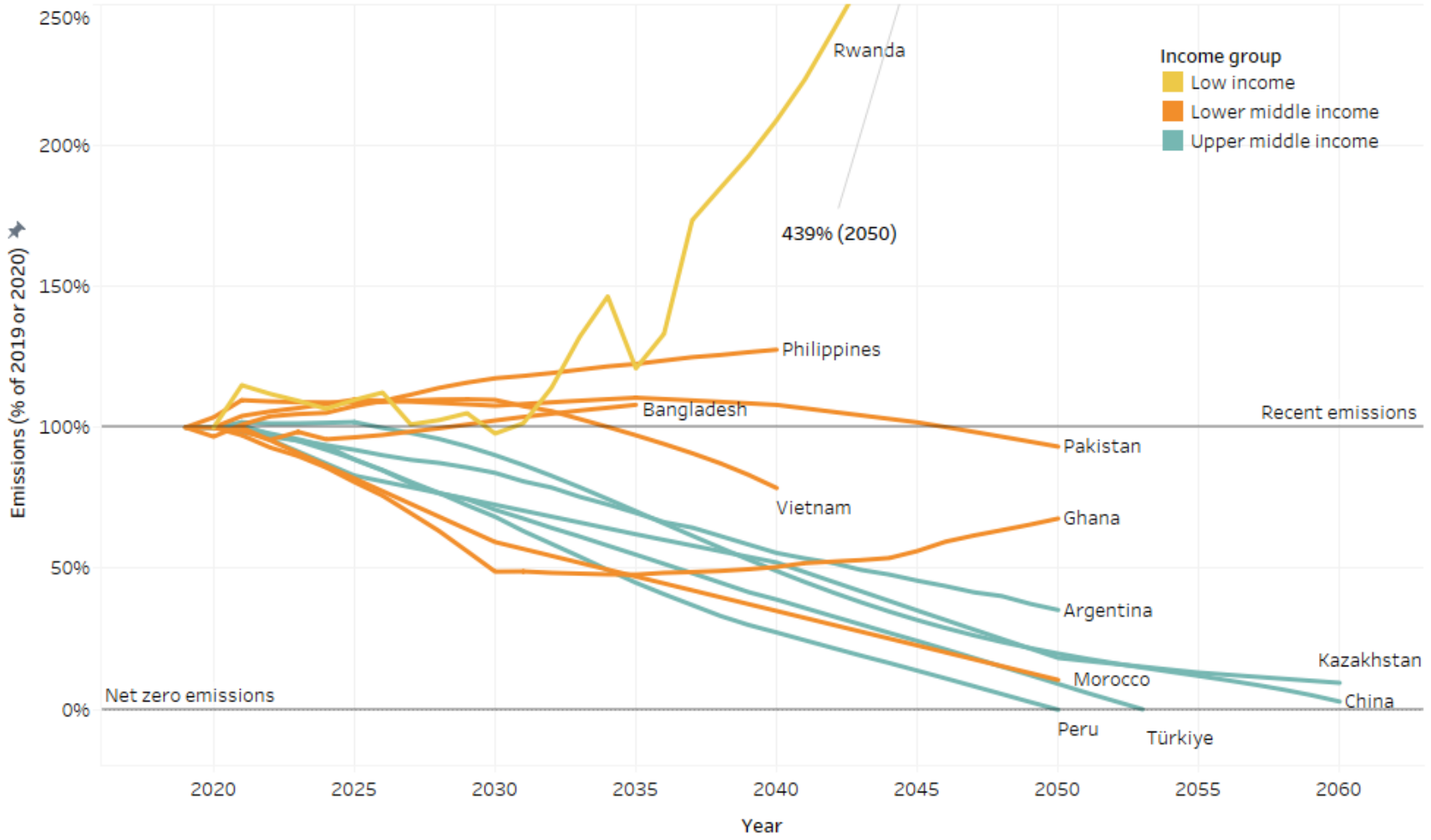
34%
of global population

36%
of global emissions

23%
of global GDP

Low-carbon scenarios explored by the CCDRs: GHG emissions, relative to 2019 emission levels

-70%



The Macroeconomic Implications of a Transition to Zero Net Emissions

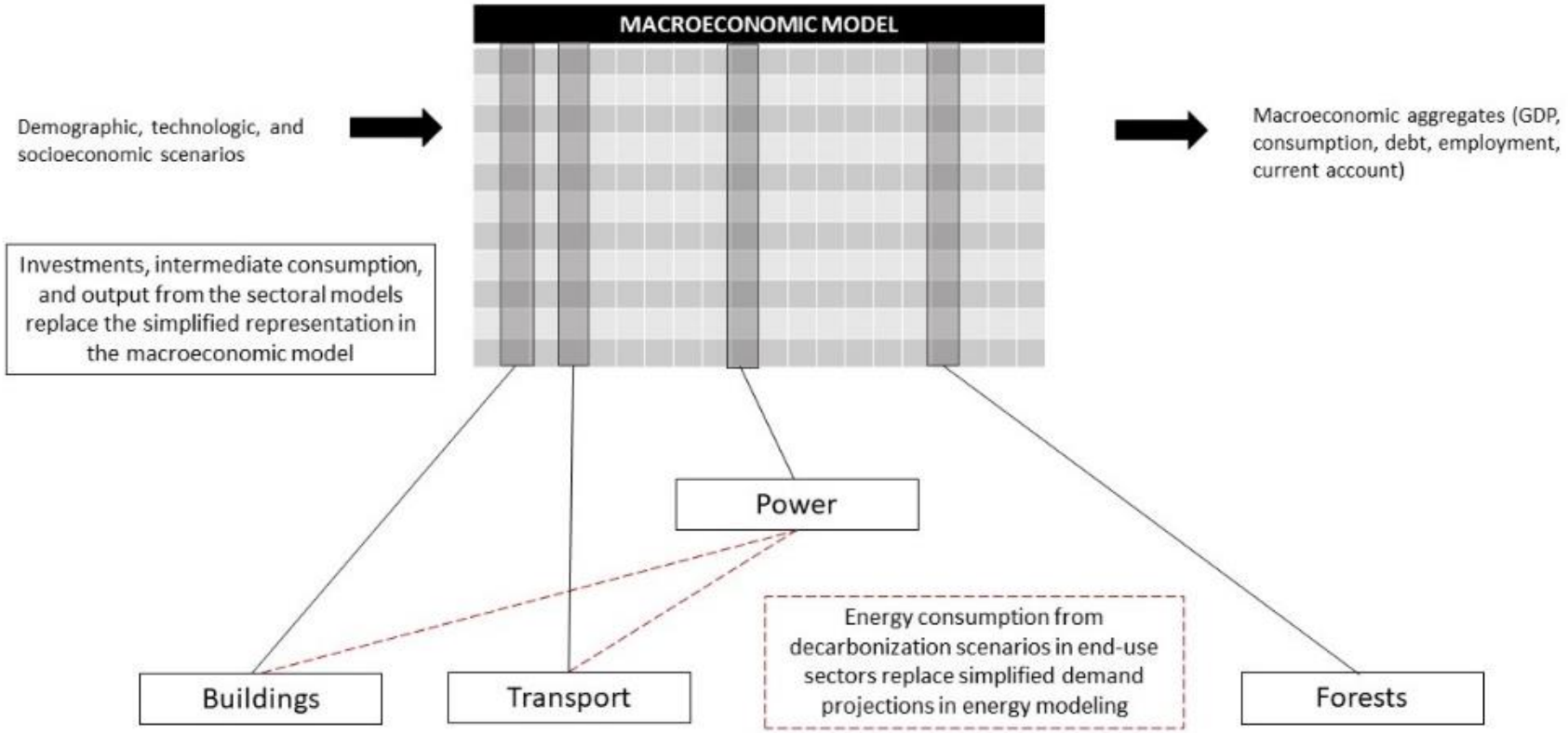
Policy Research Working Paper 10367

The Macroeconomic Implications of a Transition to Zero Net Emissions

A Modeling Framework

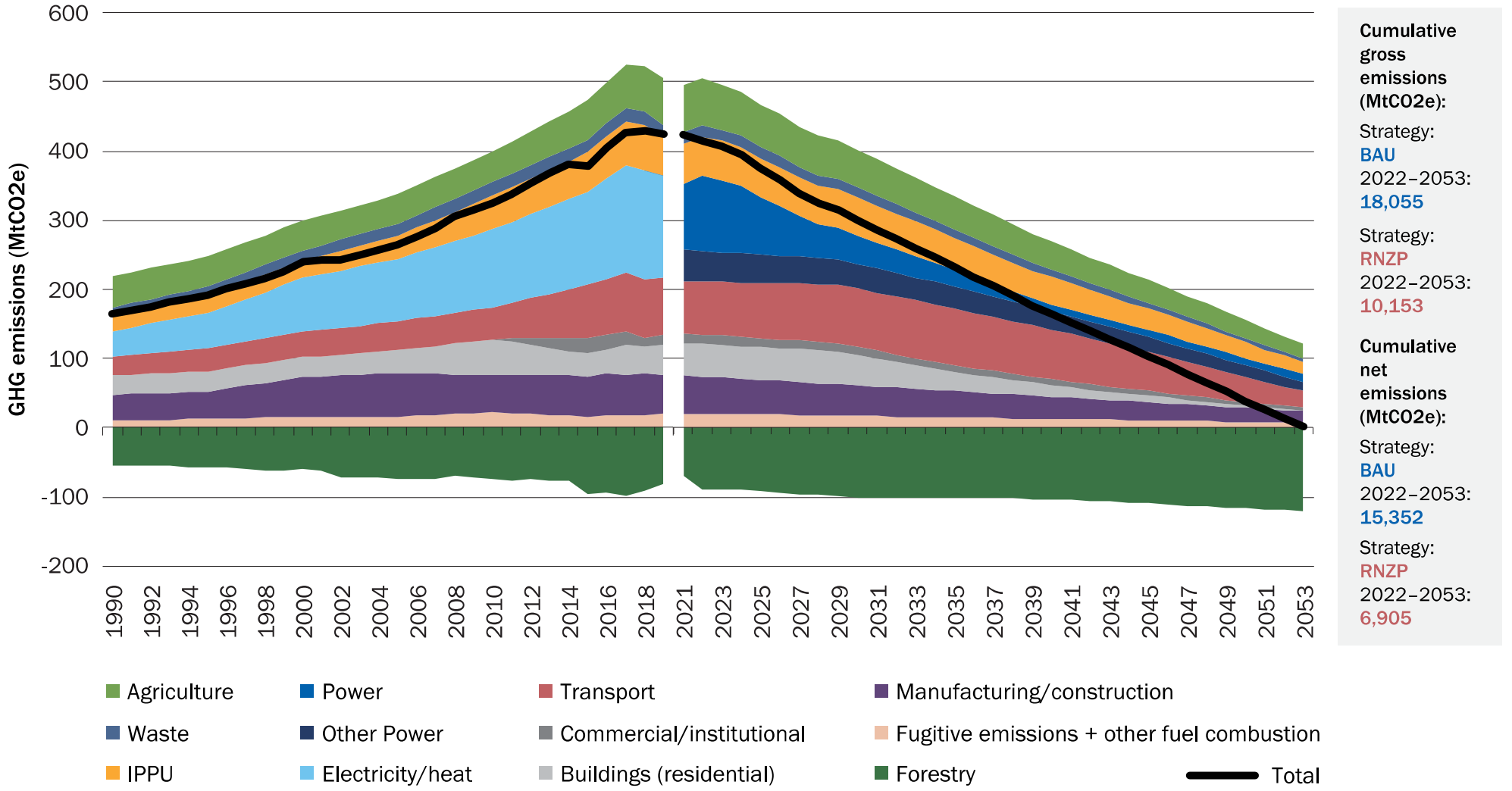
Stephane Hallegatte
Florent McIsaac
Hasan Dudu
Charl Jooste
Camilla Knudsen
Hans Beck

A hybrid modeling approach combining sectoral roadmap with macro modeling



1. **A sequence of models rather than a single integrated framework** (Bataille, Jaccard, Nyboer, & Rivers, 2006 ; Bosetti, Carraro, Galeotti, Massetti, & Tavoni, 2006 ; Böhringer & Rutherford, 2008 ; Hourcade, Jaccard, Bataille, & Ghersi, 2006 ; Kim, Edmonds, Lurz, Smith, & Wise, 2006 ; Köhler, Barker, Anderson, & Pan, 2006)
2. **Plausible rather than optimal decarbonation path** (Pindyck, 2013 ; IMF, 2022)
3. **Many market failures rather than one** (Lipsey & Lancaster, 1956 ; Batten 2018 ; Pisani-Ferry 2021)

Resilient Net zero Pathway (RNZP) for Türkiye



Cumulative gross emissions (MtCO2e):

Strategy: BAU
2022–2053: 18,055

Strategy: RNZP
2022–2053: 10,153

Cumulative net emissions (MtCO2e):

Strategy: BAU
2022–2053: 15,352

Strategy: RNZP
2022–2053: 6,905

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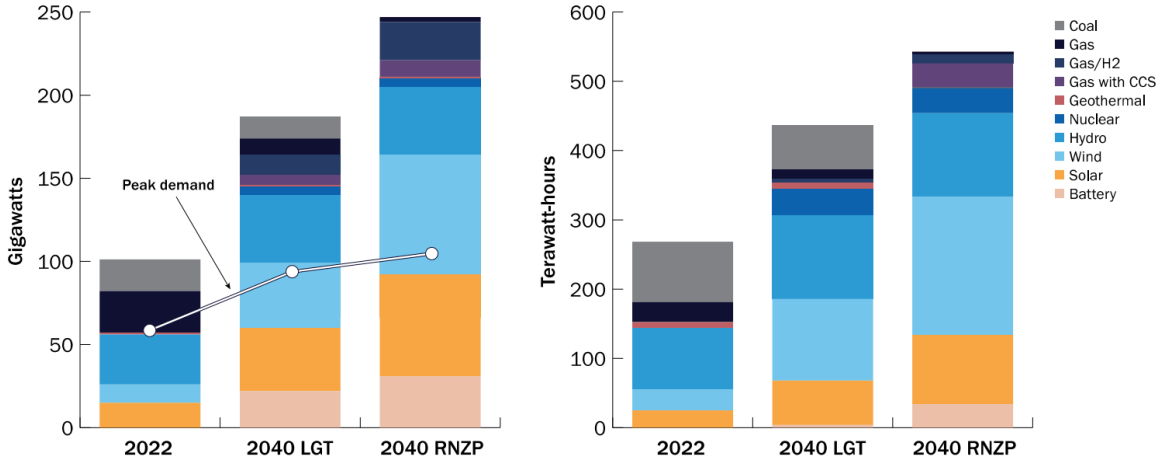
Four techno-economic models: Examples of energy and transportation



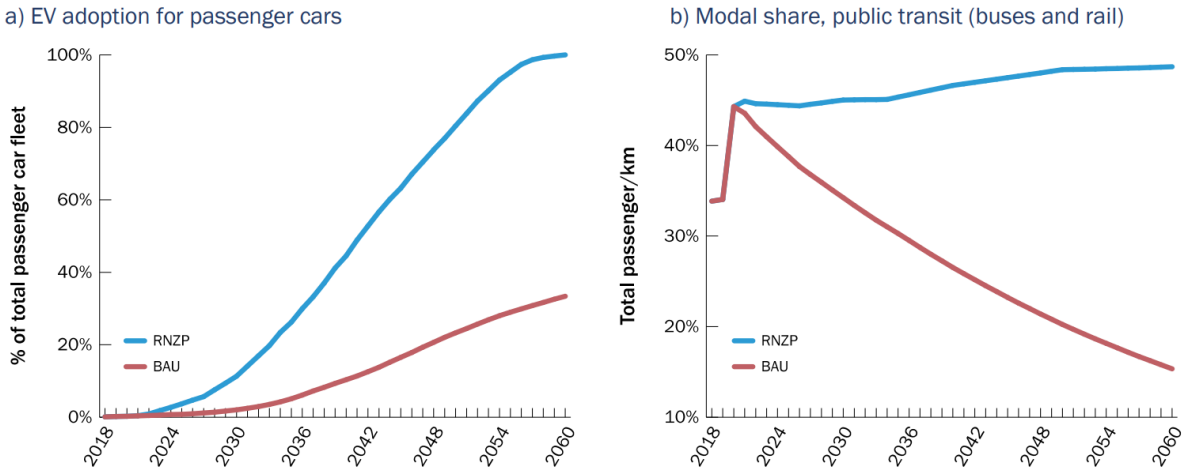
Source: World Bank staff estimates
Notes: Gas/H2 = hydrogen gas; CCS = carbon capture and storage. *Note: LGT = least-cost with current government targets (BAU)*

Energy

- least-cost power sector planning model EPM (Chattopadhyay, de Sisternes, & Oguah, 2018) to meet 90% reduction by 2040
- calculates the consumption of different fuels, distinguishing between imported and domestically produced fuels, operating costs and simple estimates of air pollution costs

Transportation

- A simple sectoral roadmap combining modal shift, energy efficiency, and electrification in transport.
- The shift affects total energy consumption, the energy mix used in transportation, as well as energy costs for households and firms as well as imports.
- calculates the consumption of various fuels, distinguishing imported and domestically produced fuels, the operational costs, and simple estimates for air pollution costs, as well as congestion and road fatalities



Source: World Bank staff estimates

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Main inputs for macroeconomic models

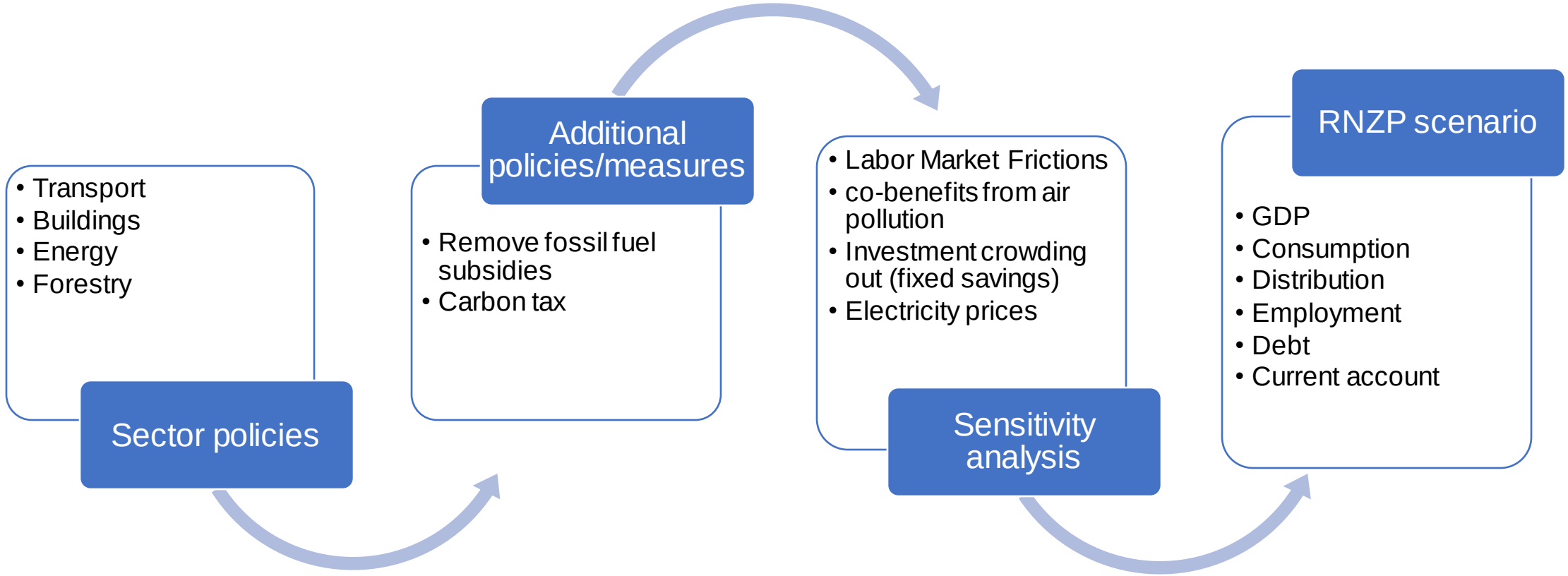
Table S.1: Investment needs and economic costs in the RNZP (additional compared with baseline)

	2022–30 ($, billions)	2022–40 ($, billions)
POWER		
Additional investment: new generation and storage capacity	+5	+33
Additional investment: transmission and distribution	+8	+14
Other economic costs: operational and fuel costs	-9	-23
Other economic costs: air pollution externality costs from coal	-9	-38
Other economic costs: decommissioning of coal plants and mines	< +1	+1.4
RESIDENTIAL		
Additional investment: energy efficiency, electrification, and resilience	+45	+100
Other economic costs: gas imports	-11	-46
Other economic costs: lives lost and injuries	-1	-3
TRANSPORT		
Additional investment: new resilient infrastructure	+8	+15
Other economic costs: fuel imports	-12	-36
Other economic costs: cost of disruptions	-3	-11
Other economic costs: air pollution, congestion, and road fatalities	-40	-171
FOREST LANDSCAPES		
Additional investment: restoration, reforestation, and fire management	+2	+3
Other economic costs: loss of harvest revenues	+1	+5
AGRICULTURE		
Other economic costs: on-farm emissions reductions	< +1	-
INDUSTRY AND MANUFACTURING		
Other economic costs: cement, iron, and steel	-	+11
TOTAL INVESTMENTS AND ECONOMIC COSTS		
Net economic costs	-15	-146
includes: additional investment	68	165

Notes: All amounts are discounted using a 6 percent discount rate. Decommissioning costs do not include the social expenditures to facilitate the transition of affected workers and communities. Numbers in red are net costs; numbers in green are net benefits.

complemented by an economywide carbon tax that starts from USD 11 in 2022 and gradually reaches USD 211 dollars by 2040

Flow of information in scenarios



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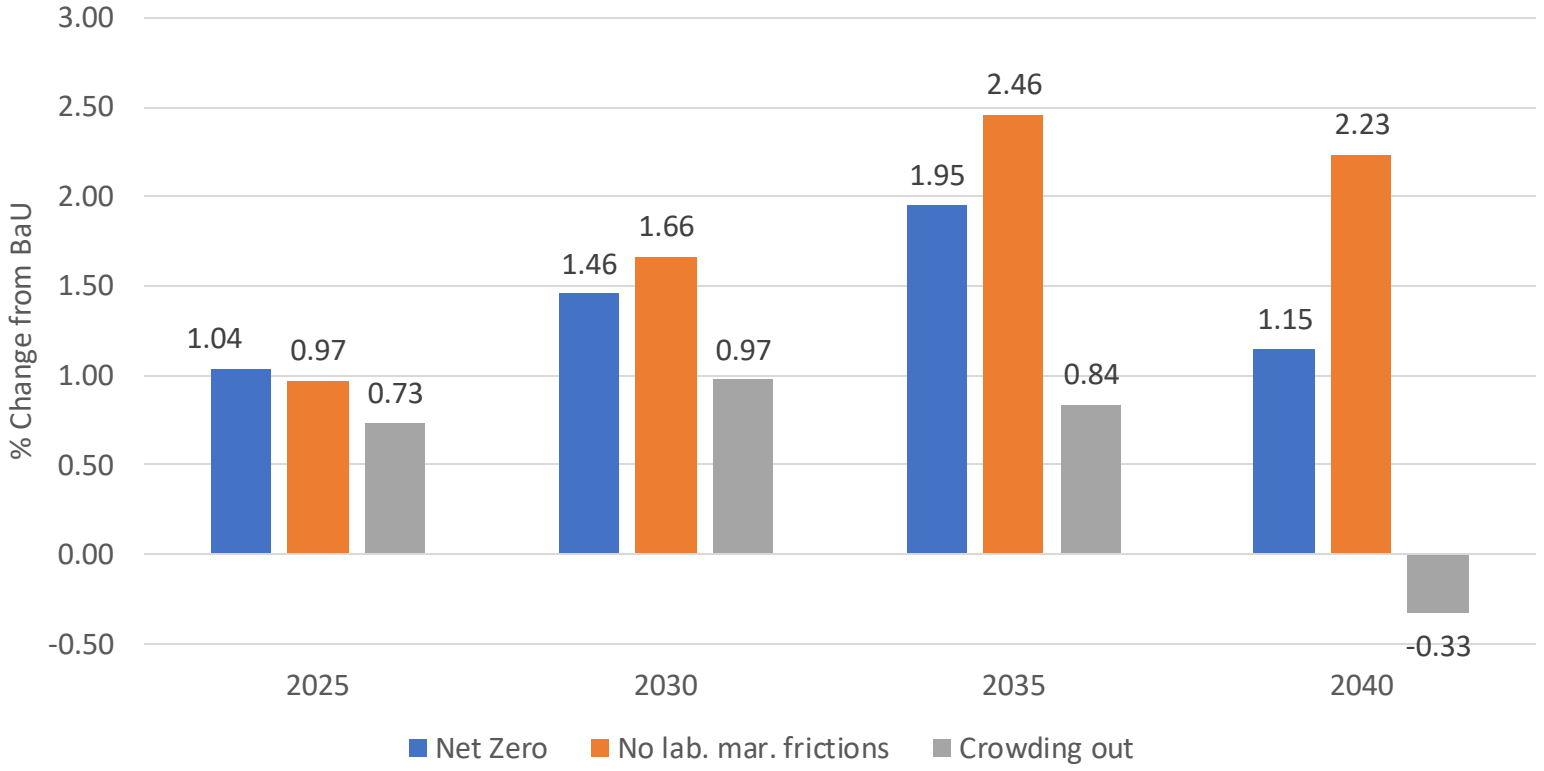
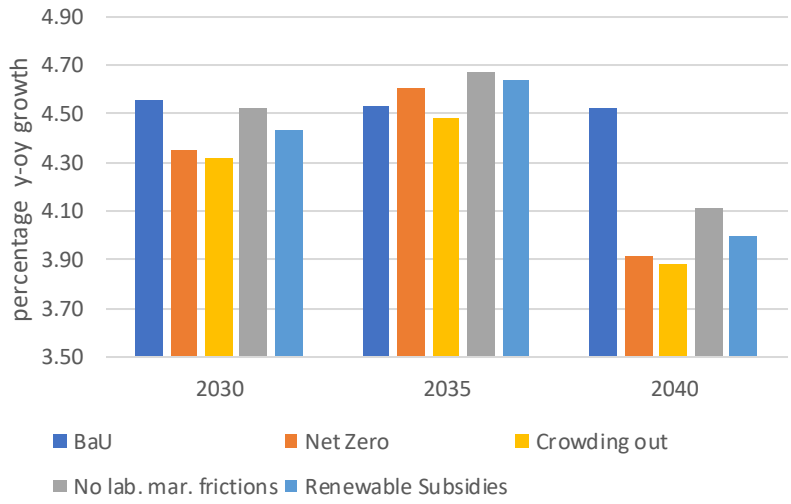
Türkiye can achieve higher growth and decarbonization simultaneously



Percentage point differences in GDP relative to the baseline

GDP growth rates



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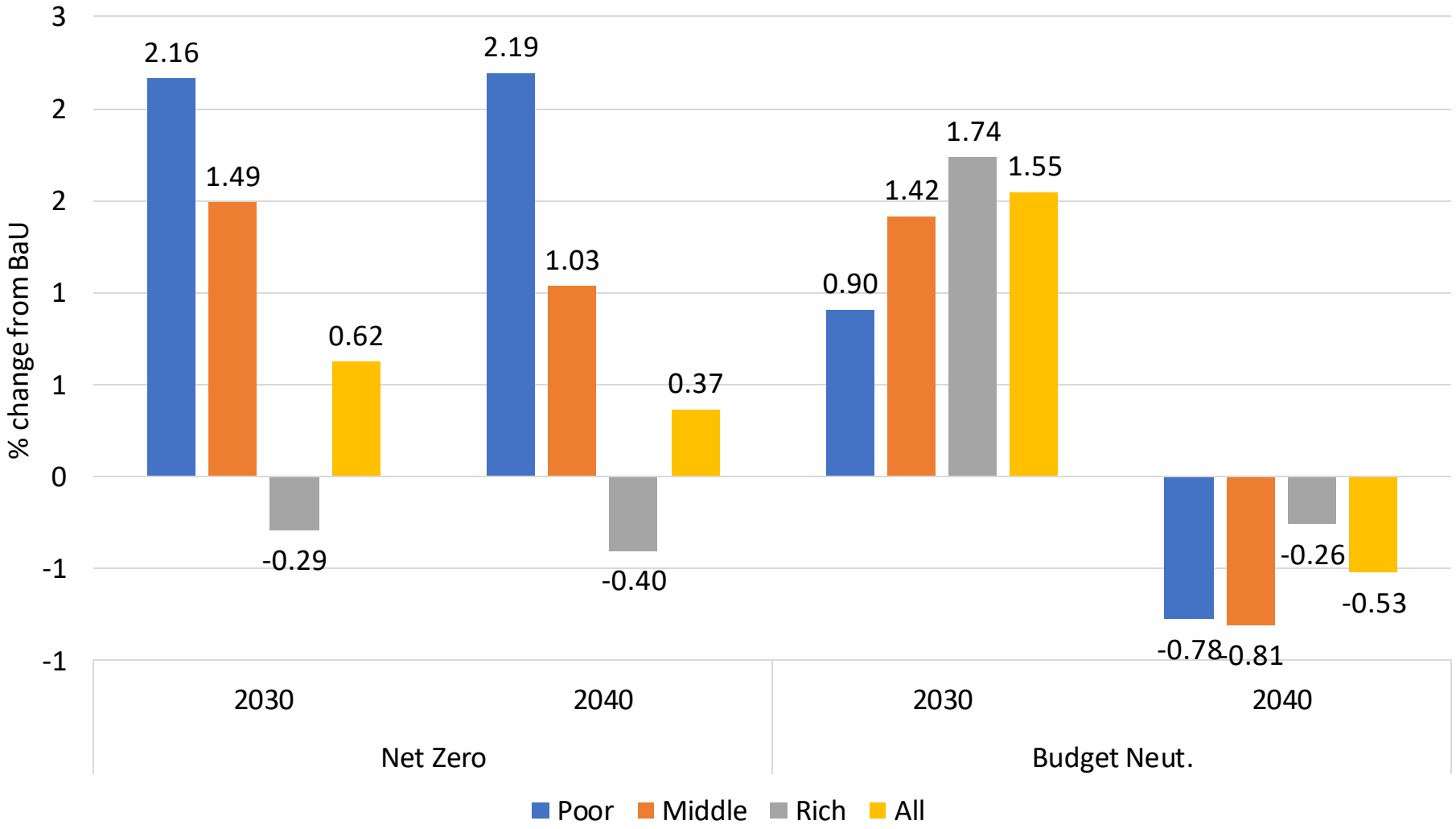
Consumption is affected more than growth, but the RNZP is progressive



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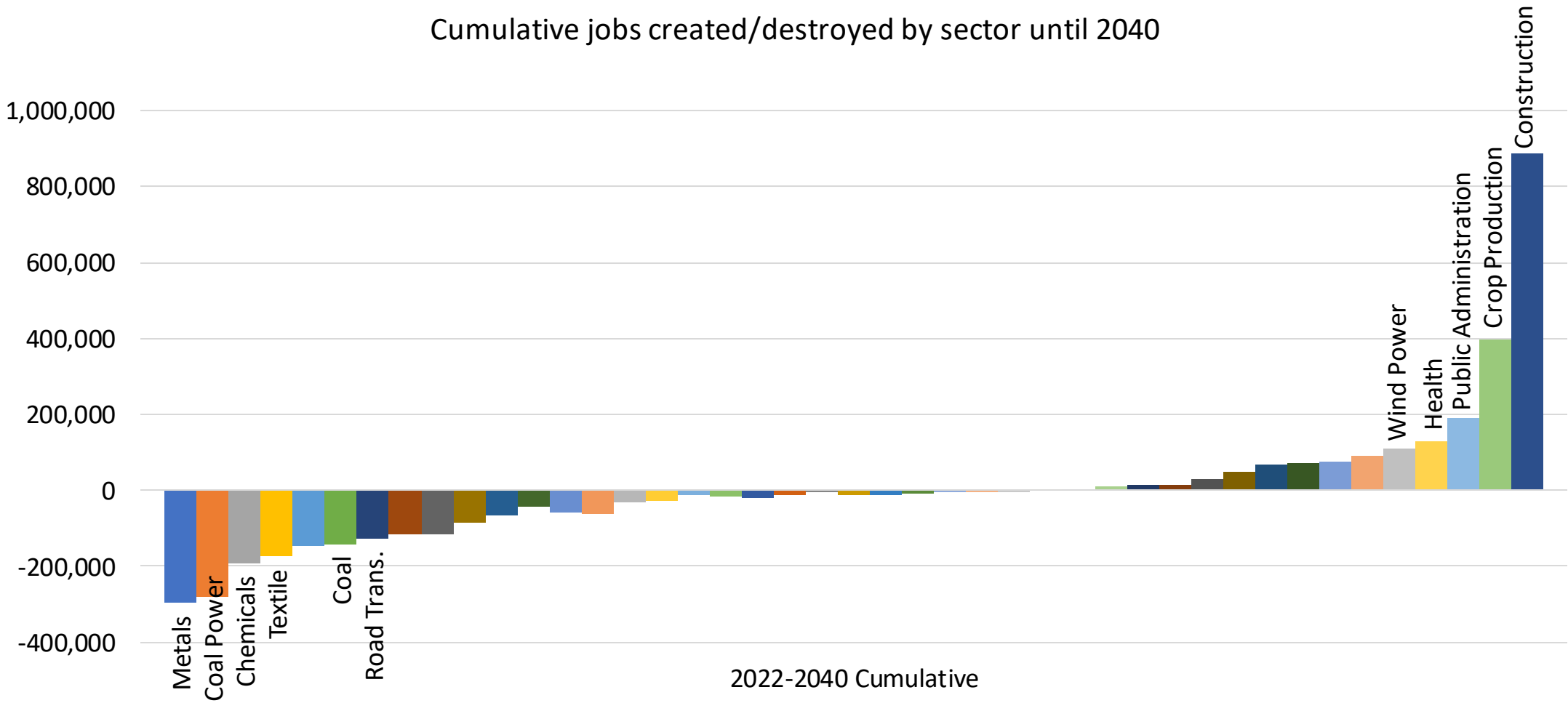
Significant reallocation of jobs from emission intensive sectors to services, renewables, agriculture and construction by 2040 (RNZP)



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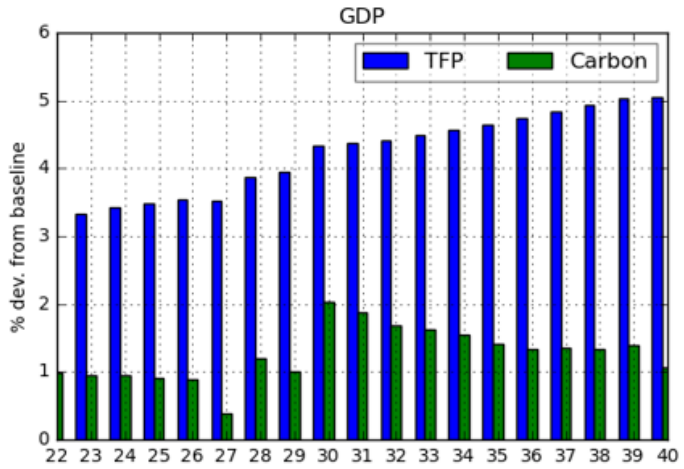
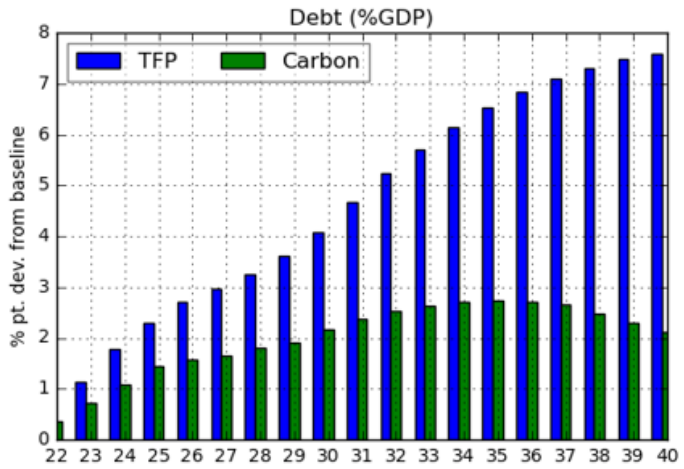
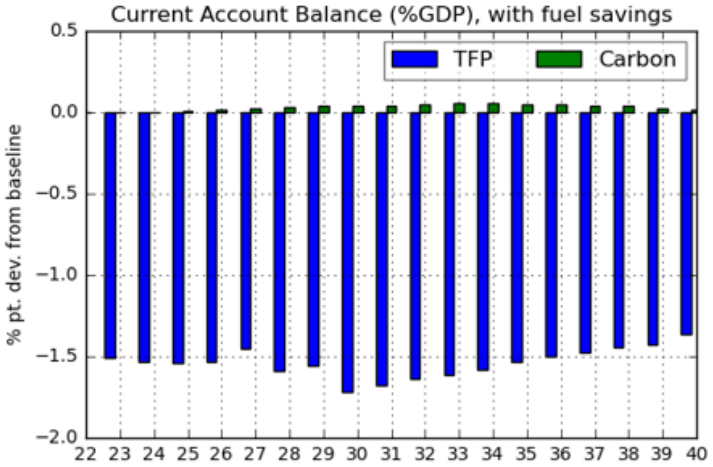
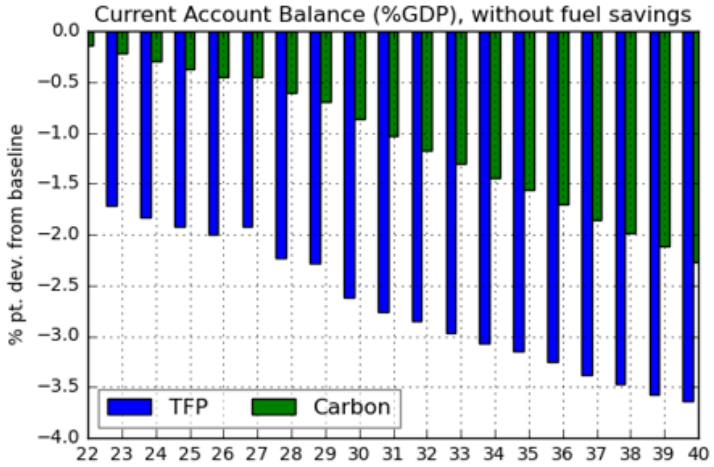
A macrostructural model to explore implications for debt and current account…and the importance of the financing channel









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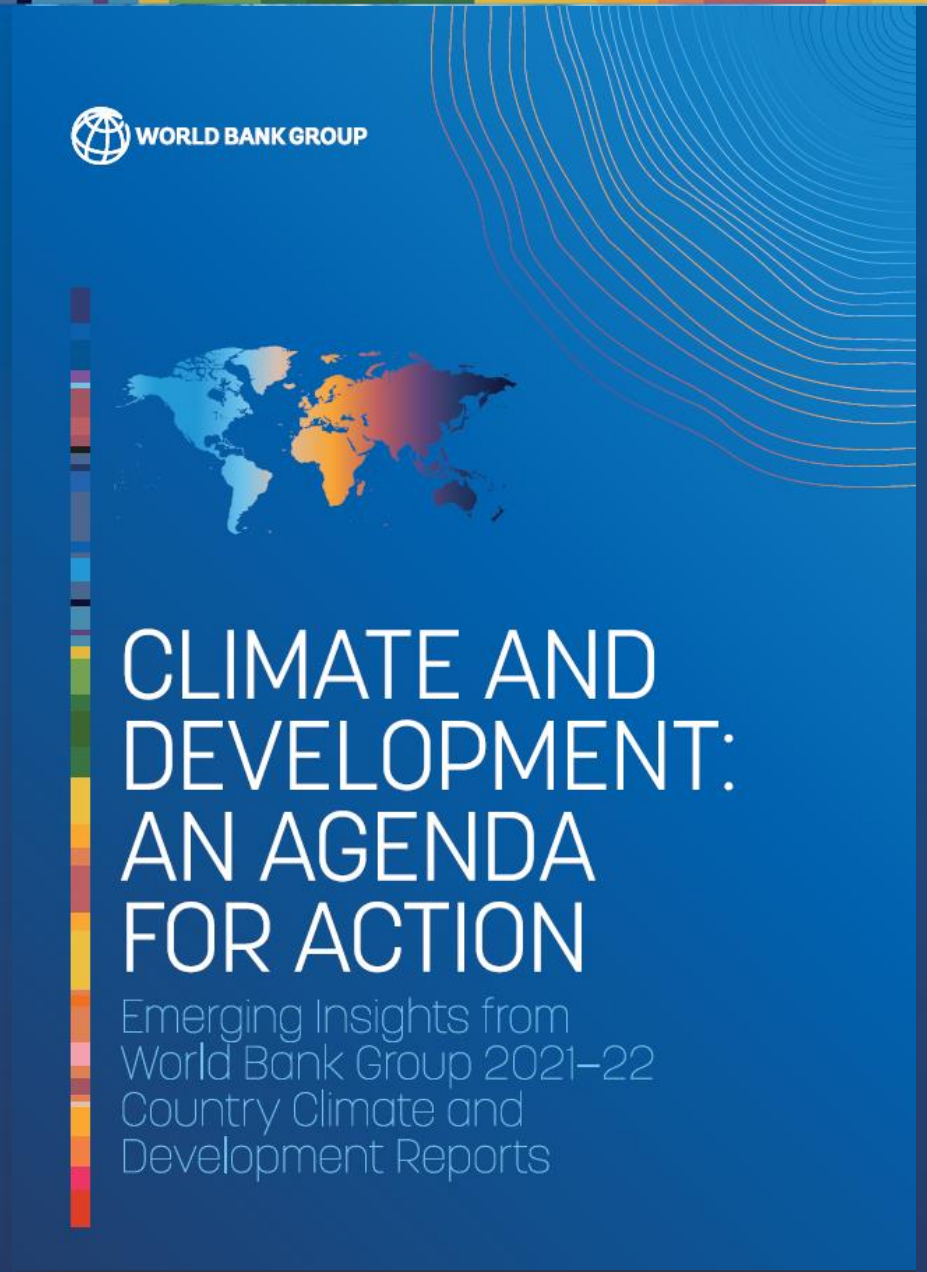
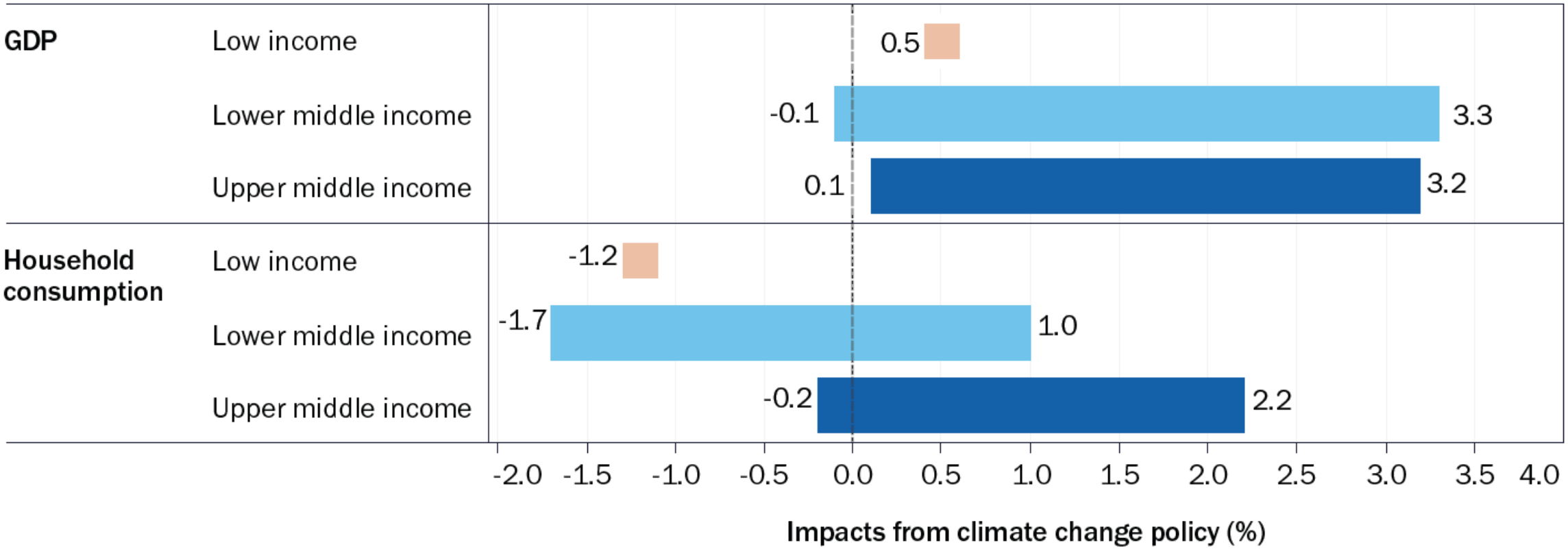
Key findings from the first batch of CCDRs



Macroeconomic impacts of climate policies would be low or positive

-0.1% to 3.3%

GDP impacts of climate action



Presentation from McKinsey

Mr. Robin Smale

Discussion / Q&A

Please submit your questions using the Q&A button in the Zoom bar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PLATFORM
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Thank you for your attention