Climate change and development
Synergies and trade-offs

Stephane Hallegatte
Climate Change Group, The World Bank

The adaptation imperative:
How to ensure successful development and poverty reduction in a changing climate?

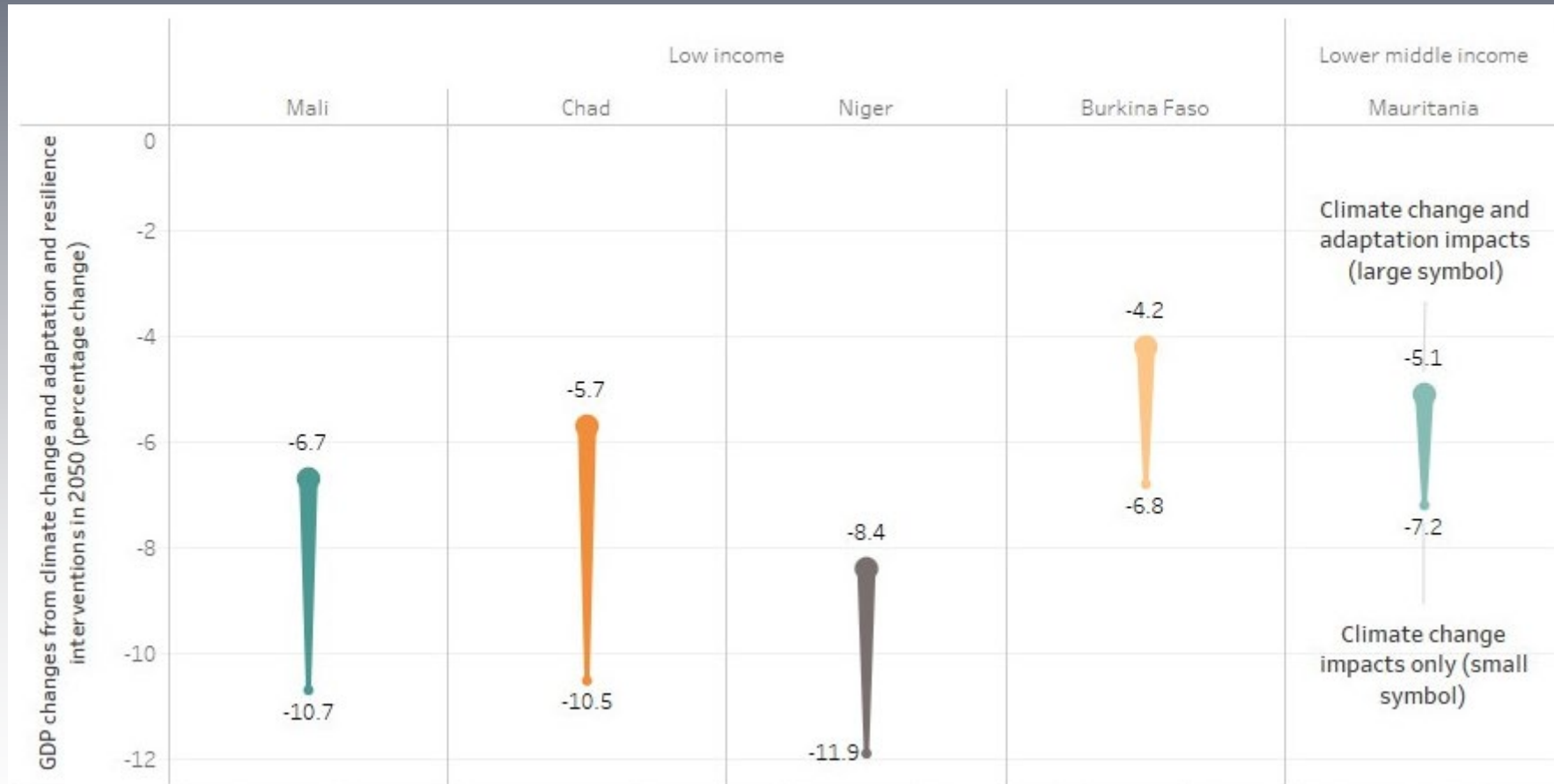2011   2020

About 200 meters of beach have disappeared in 10 years in Cua Dai, near Hội An, Vietnam. –Google Earth Images

Source: Resilient Shores, World Bank Group

Climate change will affect GDP and growth...

But it may also not be the main story

Estimated GDP impacts of climate change in the Sahel, with and without adaptation interventions

(Source: Sahel CCDR)

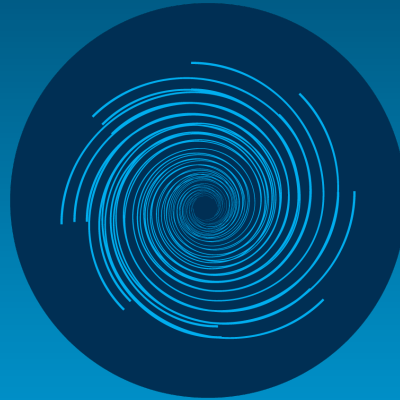Women of Takalafiya-Lapai village in Niger. –Arne Hoel / World Bank

Why does one fall into poverty?

There are three common reasons.

Spikes in food prices and shocks to agricultural or ecosystem-based income

Natural disasters such as droughts, floods, and storms

Disease and health shocks, such as malaria, diarrhea, stunting, mental disorders
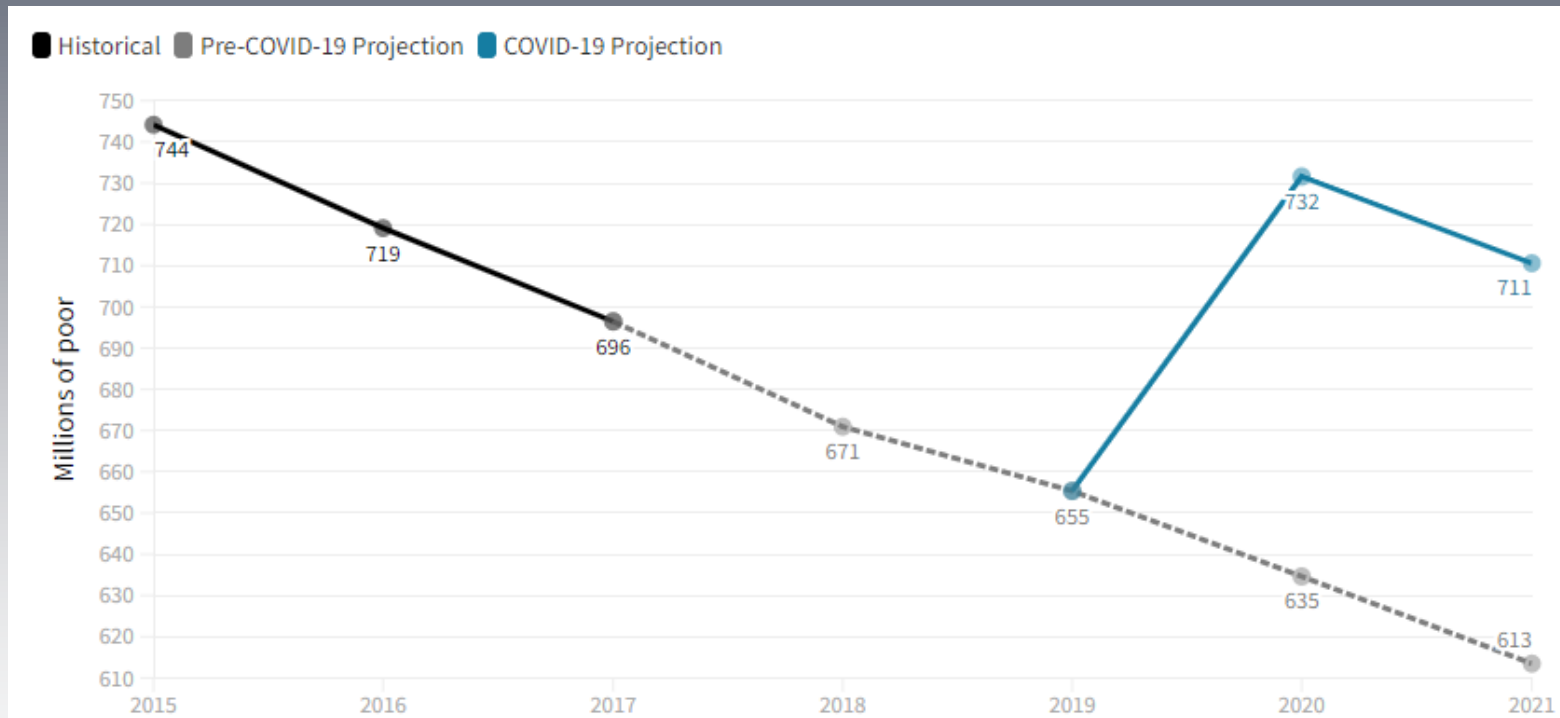
The shocks that already drive or keep people in poverty will be worsened by climate change.

How will more frequent and intense shocks and stressors affect poverty?

Up to 132 million people in extreme poverty due to climate change in 2030.

Not available
0 - 0.01%
0.01 - 0.5%
0.5 - 1%
1 - 3%
3 - 7%
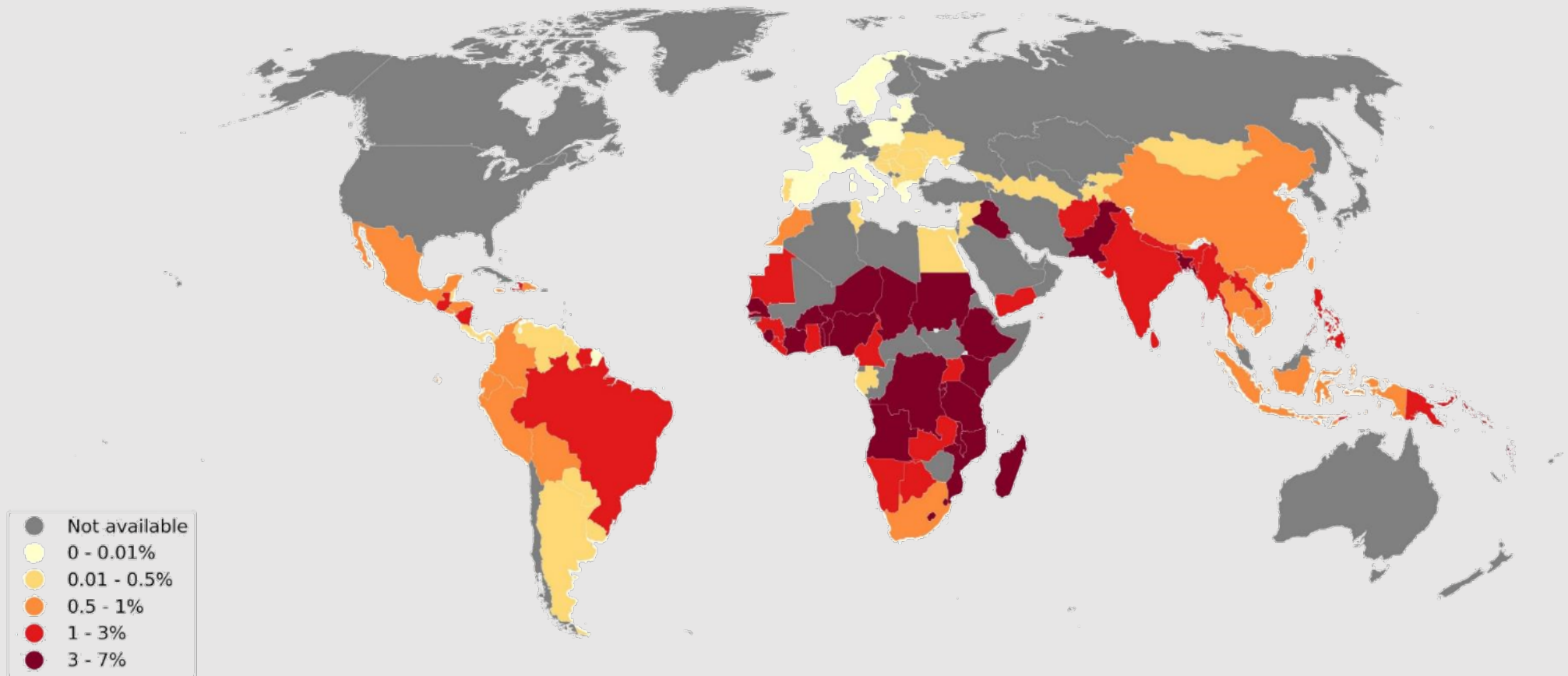
2030 climate change and COVID-19 poverty impacts have the same order of magnitude
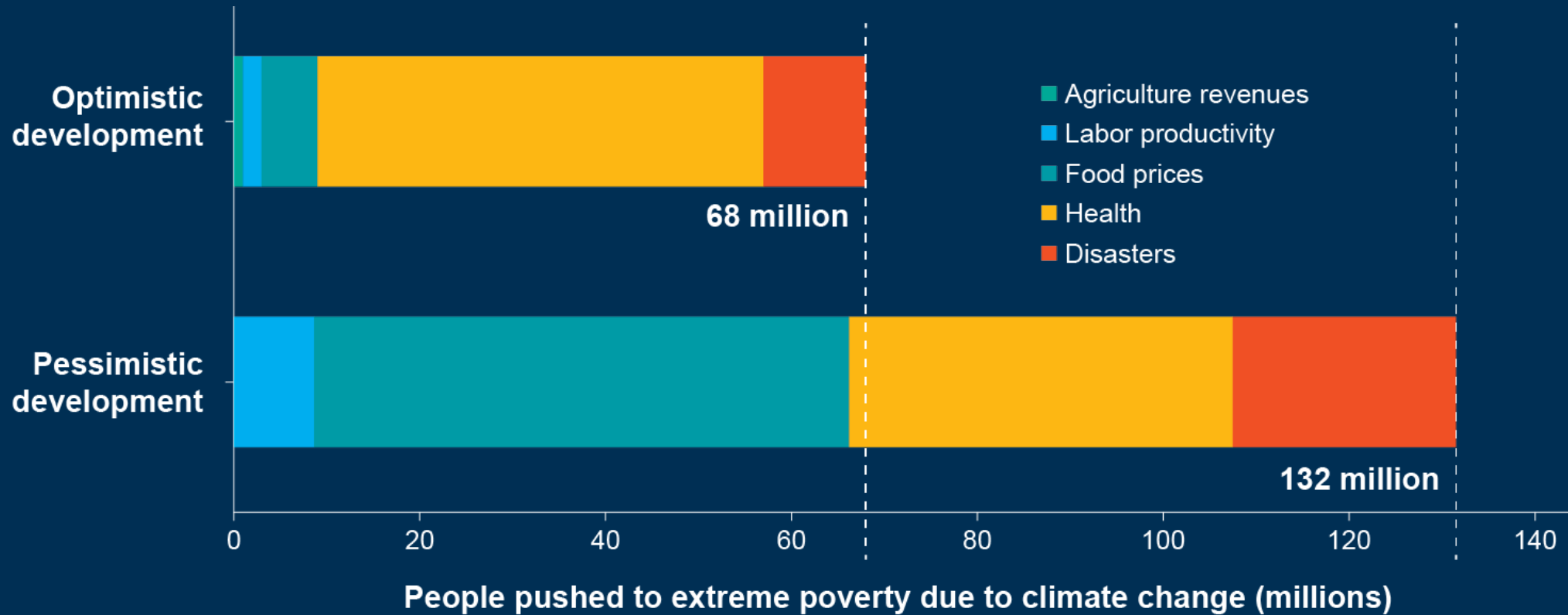

Source: Lakner et al (2020) (updated), PovcalNet, Global Economic Prospects.
Note: Extreme poverty is measured as the number of people living on less than $1.90 per day. 2017 is the last year with official global poverty estimates. Official poverty estimates are available for East Asia & Pacific, Europe & Central Asia, Latin America & Caribbean, and rest of the world for up to 2019, and for Middle East & North Africa and Sub-Saharan Africa up to 2018. Regions are categorized using PovcalNet definition.

These impacts can be (partly) avoided …
Inclusive and climate-informed development is adaptation!

Legend:
- Agriculture revenues
- Labor productivity
- Food prices
- Health
- Disasters

Optimistic development: 68 million
Pessimistic development: 132 million

People pushed to extreme poverty due to climate change (millions)

To build resilience, development needs to be inclusive:

Better education and higher agriculture productivity

Infrastructure development and access to markets

Financial inclusion and private sector development

Stronger and more efficient social protection systems

Universal access to health care

Infrastructure and assets need to be designed for tomorrow's risks

The resilient infrastructure opportunity

3%
Average increase in infrastructure costs to build more resilient

$4
In net benefit for each $1 invested in infrastructure resilience

$4.2 trillion
Net benefit from building new infrastructure to higher resilience standards

$100 billion
Cost of delaying action by one year

Boris Rumenov Balabanov/ World Bank

Development and poverty reduction are key.

If it slows down poverty reduction, climate action is counterproductive.
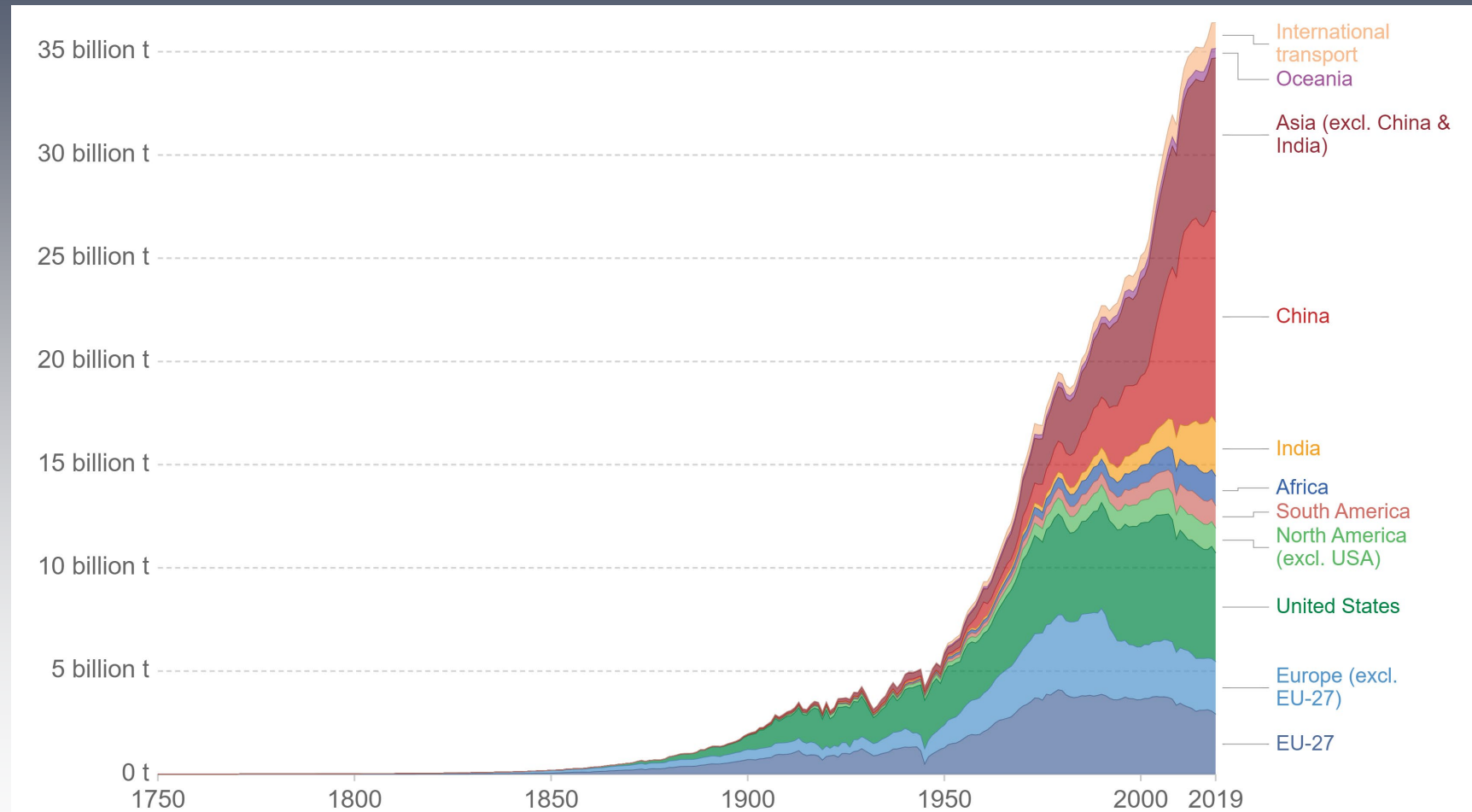
Morocco. Curt Carnemark/ World Bank

There are limits to what adaptation can achieve.

How to combine emission reductions with the development and adaptation imperative?
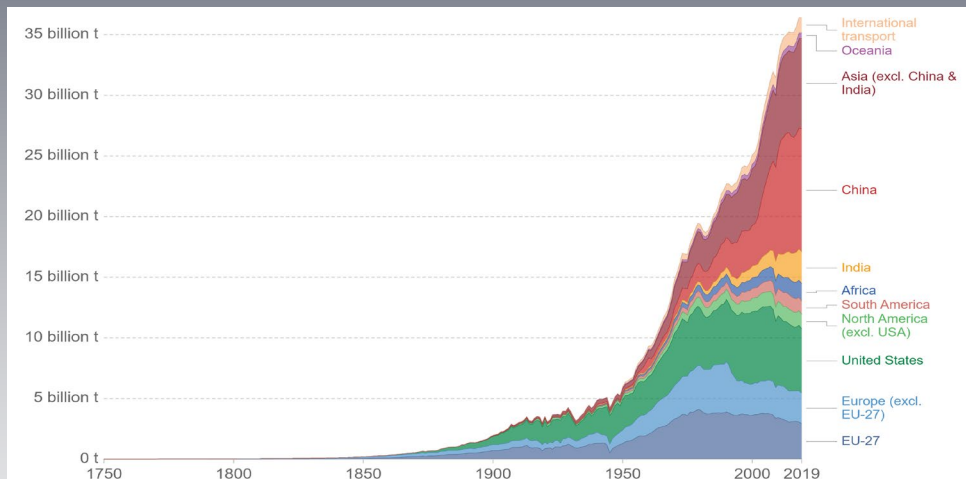
The wrong framing …

Annual total
CO_2 emissions,
by world region

… and the right framing

GHG emissions

Global public debt, percent of GDP
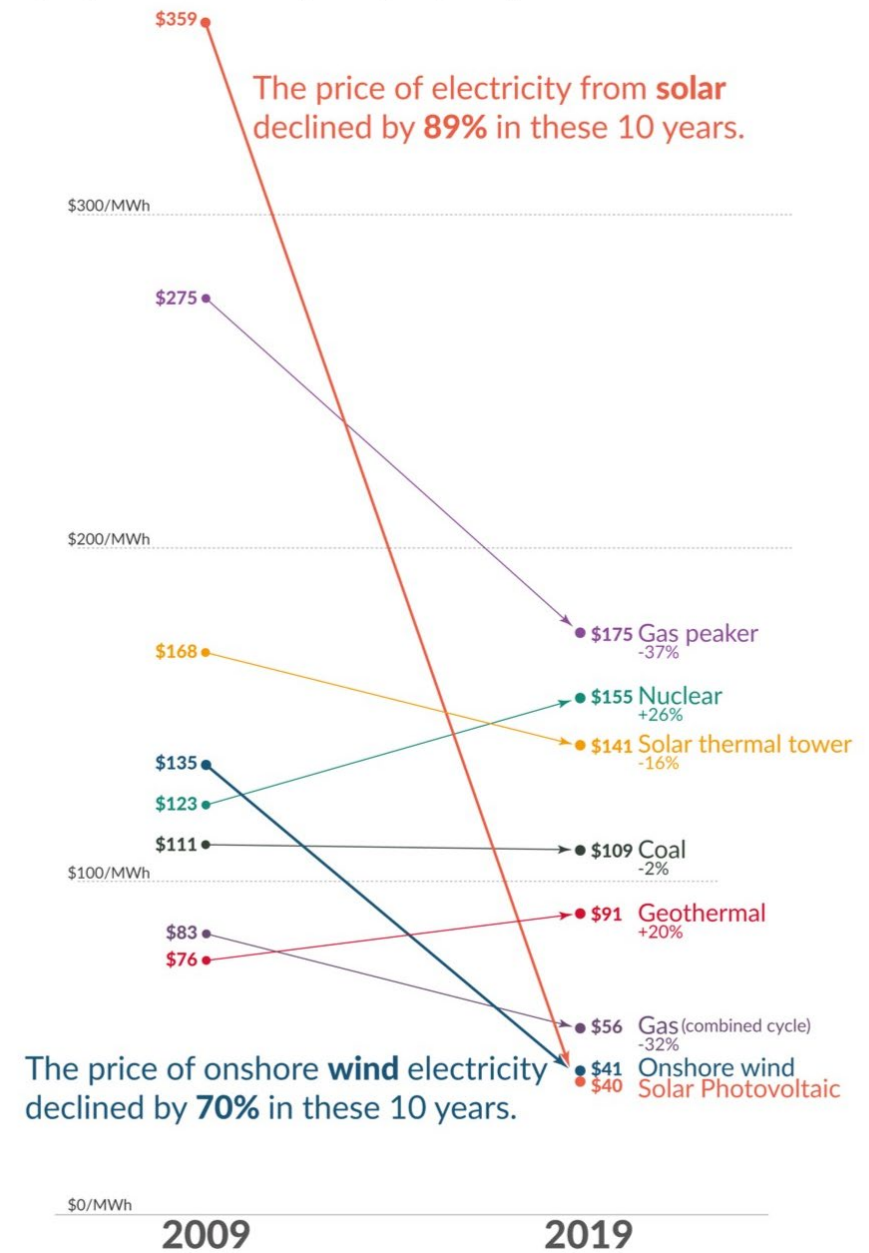

Lack of energy access?

Lack of access to improved water and sanitation ?

Congested and polluted cities?

Efforts to increase exports in key industries?

Technical change and innovation

Wind Park near Kavarna, Bulgaria. –Ivelina Taushanova/ World Bank

The price of electricity from **solar** declined by **89%** in these 10 years.

$359

$300/MWh

$275

$200/MWh

$175 Gas peaker
-37%

$168

$155 Nuclear
+26%

$141 Solar thermal tower
-16%

$135

$123

$111

$109 Coal
-2%

$100/MWh

$91 Geothermal
+20%

$83

$76

$56 Gas (combined cycle)
-32%

The price of onshore **wind** electricity declined by **70%** in these 10 years.

$41 Onshore wind
$40 Solar Photovoltaic

$0/MWh

2009   2019

Building on the services provided by nature

Tajikistan. Gennadiy Ratushenko/ World Bank

Productivity and efficiency

Removing price distortions and incentivizing efficiency

Fossil fuel subsidies are implemented to help people access energy, but they are a very inefficient way of helping people.

Impact of reforming fossil-fuel subsidies and distributing the savings as universal cash transfers
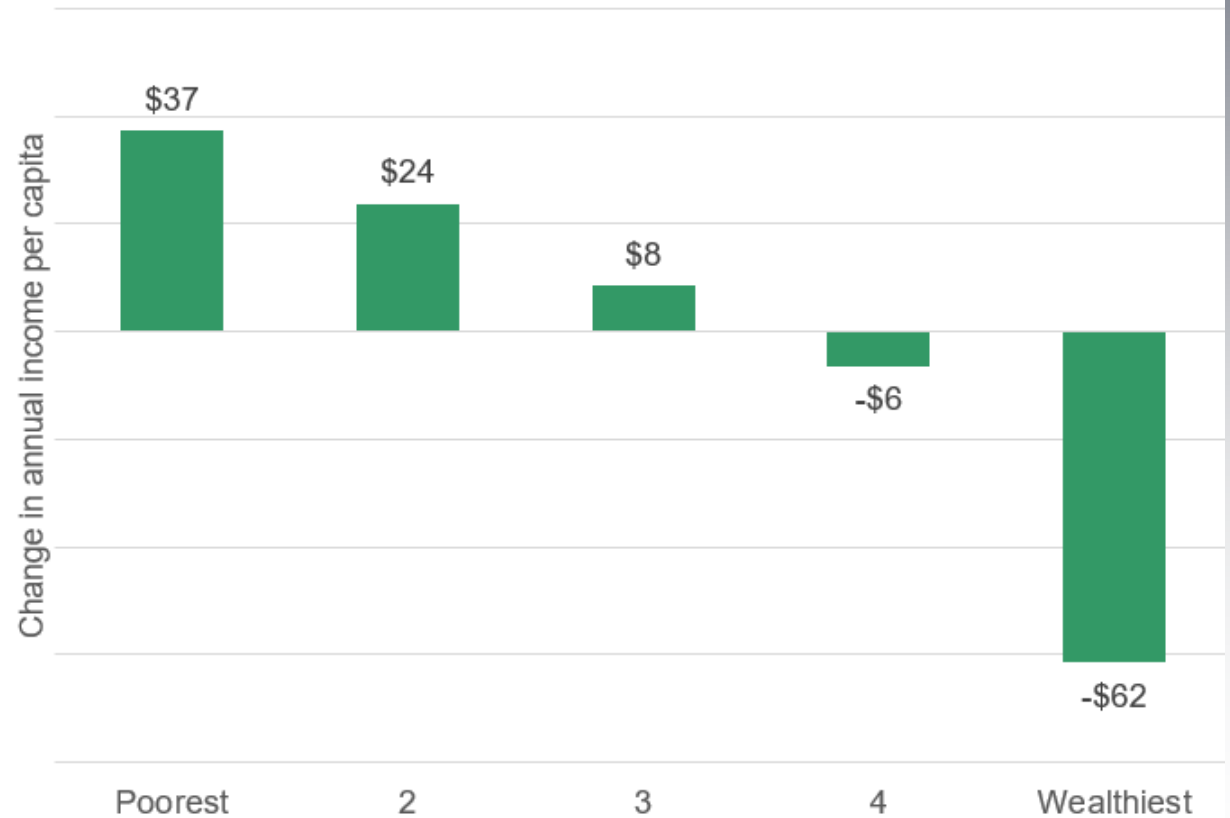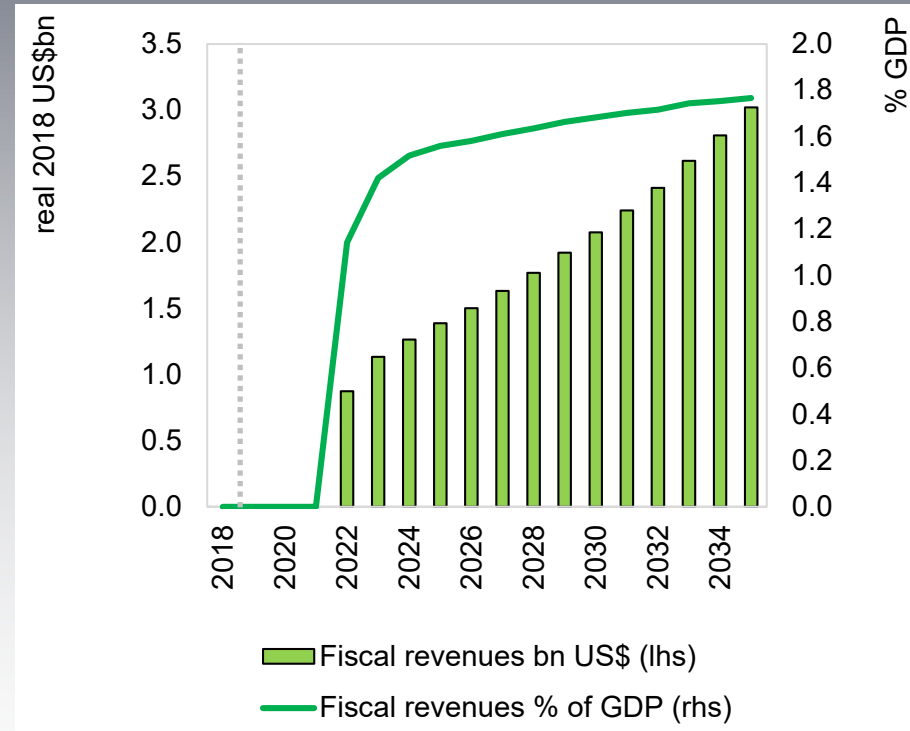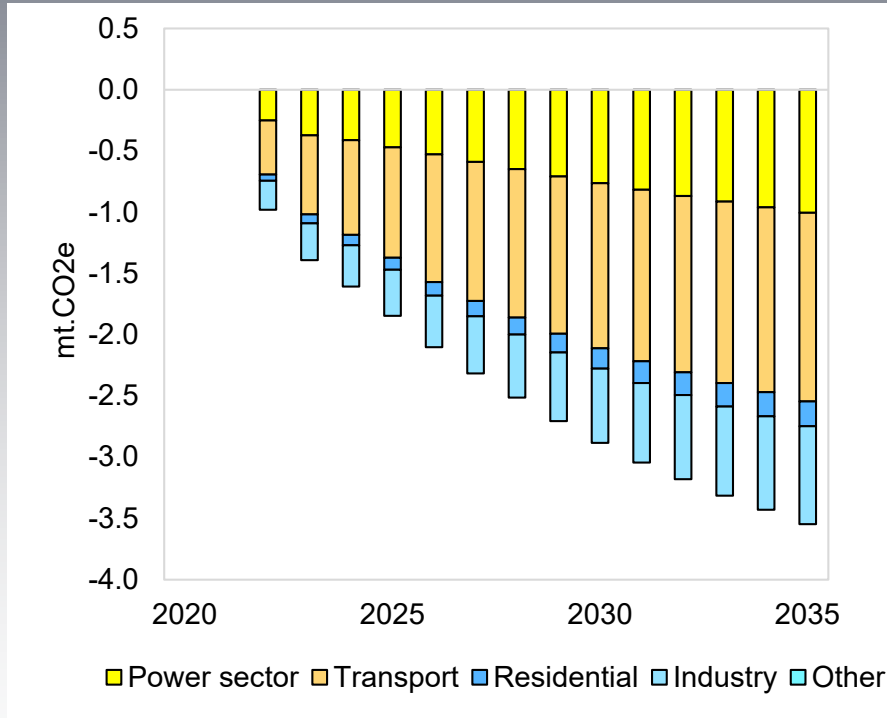

Source: Dorband et al. using CPAT

Productivity and efficiency

Raising tax revenues **more** efficiently (and without tax evasion)

Is a carbon tax a tool to reduce emissions in Ghana?

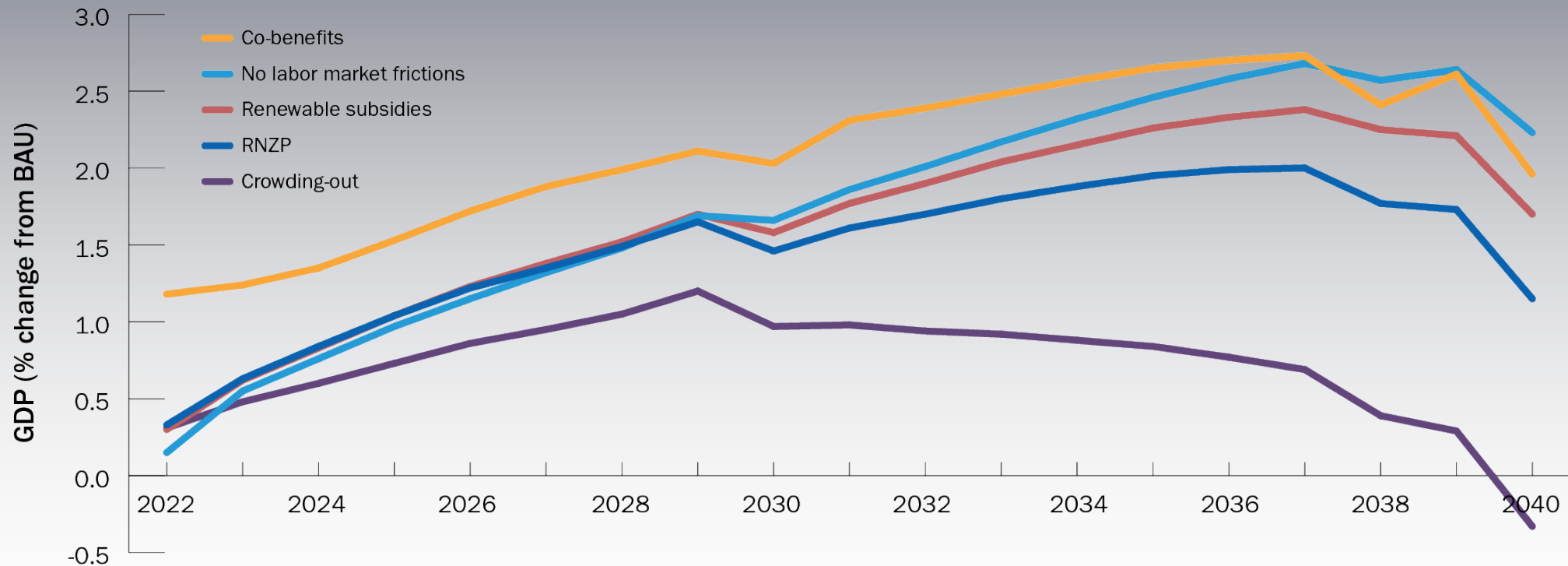Or rather a tool to raise revenues for Ghana?

Source: CPAT (World Bank and IMF collaboration)

All together: well-designed decarbonization policies can boost growth

… but only if the policy package is well-designed

Change in economic growth by shifting to a resilient net zero pathway in Türkiye

Legend:
- Co-benefits
- No labor market frictions
- Renewable subsidies
- RNZP
- Crowding-out

Y-axis: GDP (% change from BAU), ranging from -0.5 to 3.0
X-axis: 2022 to 2040

Source: Türkiye CCDR

If these opportunities are so large, why did not we capture them earlier?

What's blocking us? Where are the trade-offs?

Challenge 1

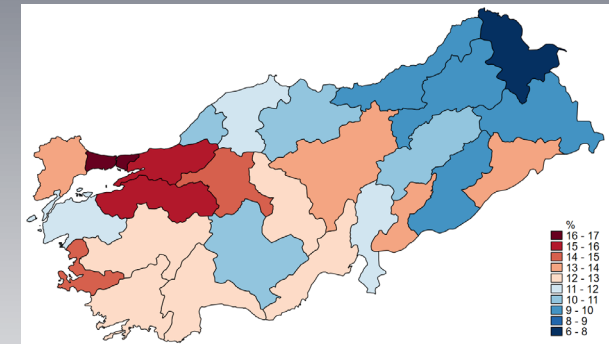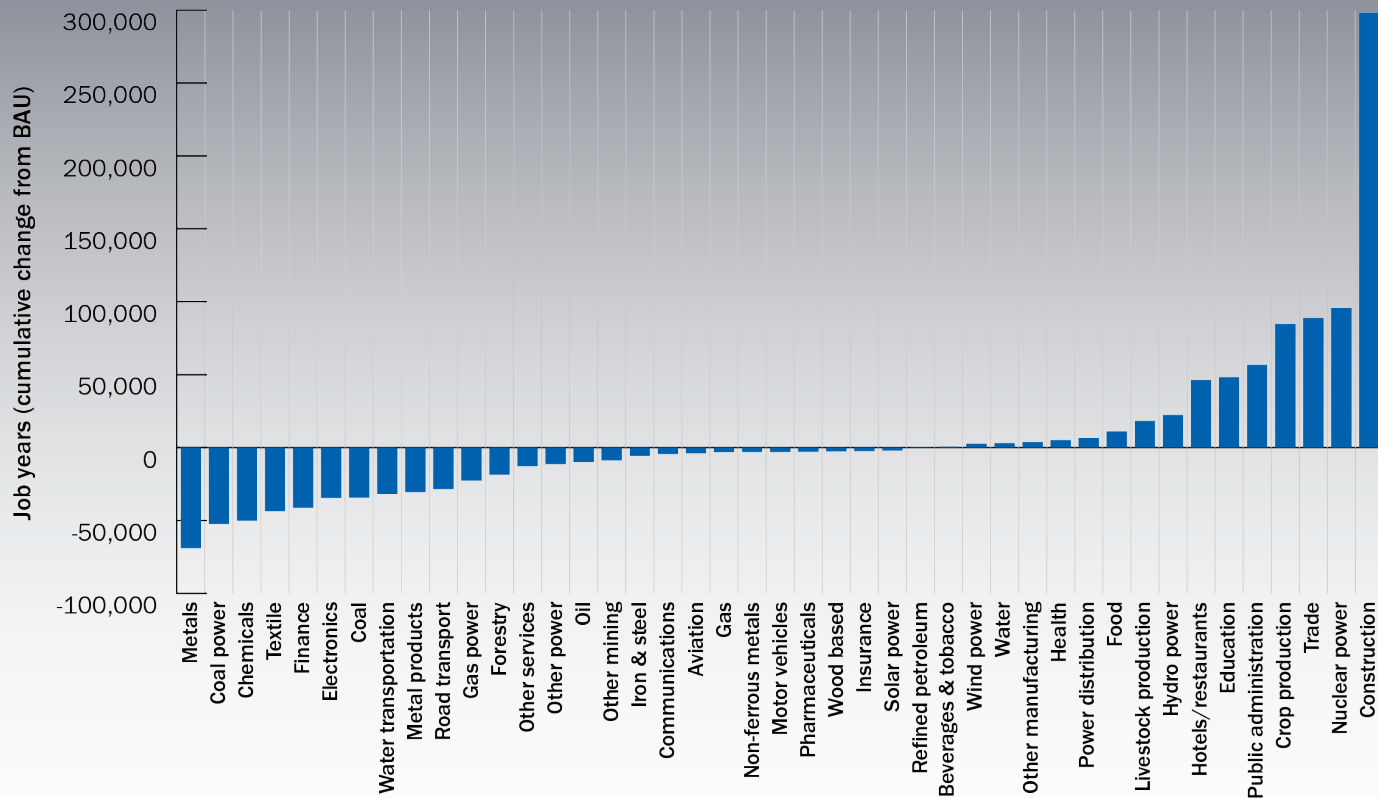## Trade-offs around distributional impacts and the political economy

- Education and retraining
- Social protection

- Active labor policies
- Enabling environment for private investment

Source: Türkiye CCDR

Challenge 2

The large financing investment needs

- Reforms of the financial sector (e.g., disclosure, green taxonomy)
- De-risking and blending with concessional resources (domestic or international)
- Grants and direct support for poorest and most vulnerable countries and communities

Legend:
- Private sector
- Public sector

Bar chart (US$, billions):
- 2022-2025
- 2026-2030
- 2031-2035
- 2035-2040
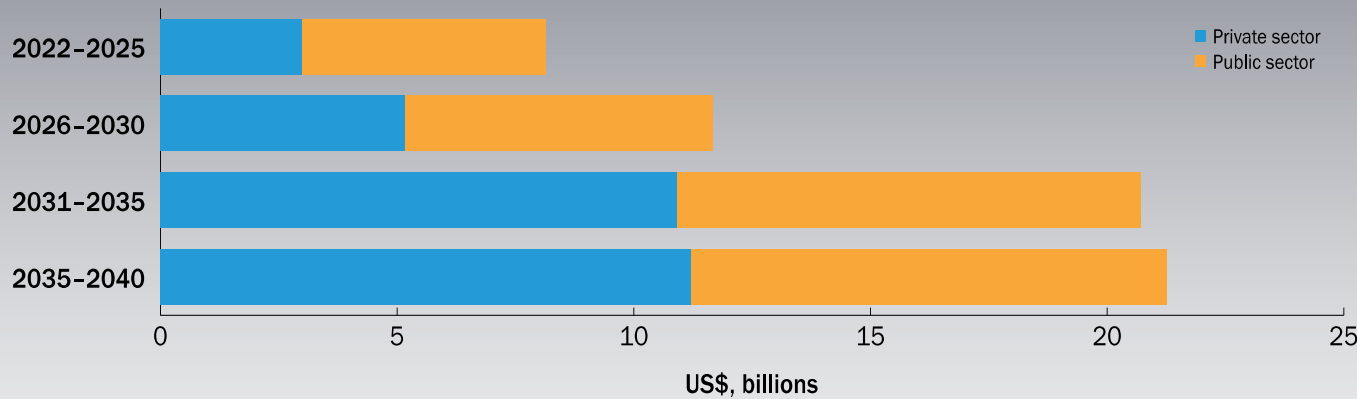
Financing needs
$368 billion
Resilient: 4.7 % of GDP per year
Decarbonizing: 2.1 % of GDP per year

Private
$184 billion
~3.4%% of GDP per year

Public
$130 billion
~2.4% of GDP per year

External
$54 billion
~1.0 % of GDP per year

Left: Additional investment needs in the Türkiye resilience and net zero pathway

Right: Vietnam investment needs

Sources: Türkiye and Vietnam CCDR

23

Challenge 3
Governance challenges and the need to strengthen institutions

Bogotá. Dominic Chavez/ World Bank

Identifying the barriers

Designing the policy packages
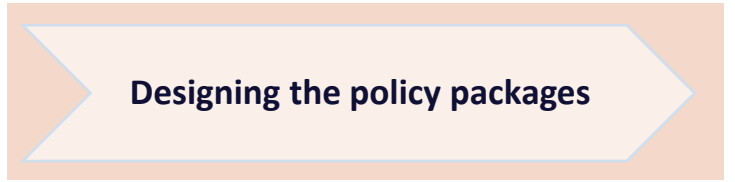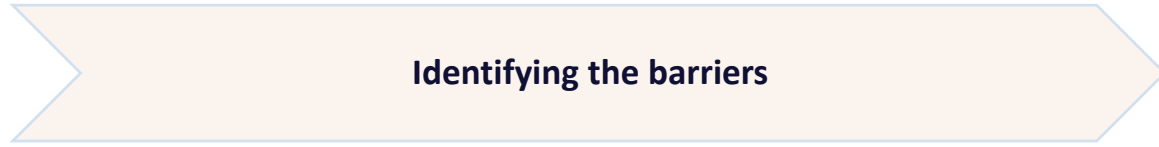
Enabling environment

Resources

Imple-mentation

A simple tool to create policy packages and capture synergies

	Identifying the barriers	**Designing the policy packages**

Enabling environment

Incentives
- >> Do decision-makers face appropriate **incentives**?
- >> Are incentives distorted by **market failures** (e.g., subsidies, unpriced externality, Principal-agent issues)
- >> Are incentives distorted by **governance failures** (dysfunctional or incomplete markets, lack of enforcement of regulations or contracts)

Information and Behaviors
- >> Are decision-makers **informed** about solutions and options?
- >> Do decision-makers have access to **data and information**?
- >> Do decision-makers fail to respond due to preference of status quo, lack of saliency, or other **behavior biases**?

Capacity
- >> Do actors possess the necessary **technical and managerial skills**?
- >> Do **administrative processes and institutional capacity** allow smooth implementation?
- >> Do **red tape and corruption** create barriers to implementation?

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| | **Identifying the barriers** | **Designing the policy packages** |

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>> **Examples of solutions**: subsidy reform, carbon pricing, energy market reform, housing regulations.

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>> Are technological solution available **in the country**? Or is access limited by **trade policies or IP constraints**?

>> Are technologies limited by available **worker skills** or **infrastructure** (e.g., reliable electricity, EV charging stations)?

Financing

>> Can economic actors access **financing** to respond to incentives and mobilize solutions (including new technologies)?

>> Is access to financing limited by lack of **financial inclusion**?

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Implementation

Managing social consequences and the political economy

>> Would actions have **undesired or unfair consequences** on some regions, sector, occupation, community or group (e.g., coal mine workers, low-income household in low-efficiency buildings)?

>> Is the **social protection system** able to support affected populations?

>> Can **affected sectors** transition to greener options? Or could they be replaced?

>> **Examples of solutions:** social protection systems, coordinated capacity reduction, investment in communities.

Success depends on the right sequencing and prioritization of actions

A matrix for prioritizing climate actions, used in several CCDRs

	URGENT (delay in action increases the cost of achieving the same end point)	**LESS URGENT** (delay in action does not increase the cost of achieving the same end point)
SYNERGIES (action facilitates the achievement of other development objectives)	**Synergetic and urgent actions are to be prioritized** and should be part of the recommendations (but important to identify the obstacles that explain why it has not been done already)	**Synergetic actions that can be delayed should be implemented,** but only if implementation capacity allows it. With limited capacity and political capital, it may be preferable to delay them (especially if net benefits are small or uncertain)
TRADE-OFFS (cost of action makes the achievement of development objectives more difficult)	**Actions that create trade-offs but are urgent are the most challenging.** Options to explore include: » **Specific designs** to minimize or reverse trade-offs, or protect the poor (e.g., recycling options with carbon tax) » Opportunities to mobilize **concessional financing** (e.g., climate or development finance) to manage the trade-offs	**Actions that create trade-offs with other development objectives and can be delayed should be delayed**

Tending to fields in in Kieryaghin village, Burkina Faso. –Dominic Chavez/ World Bank