Climate Change Development Series

REALITY CHECK

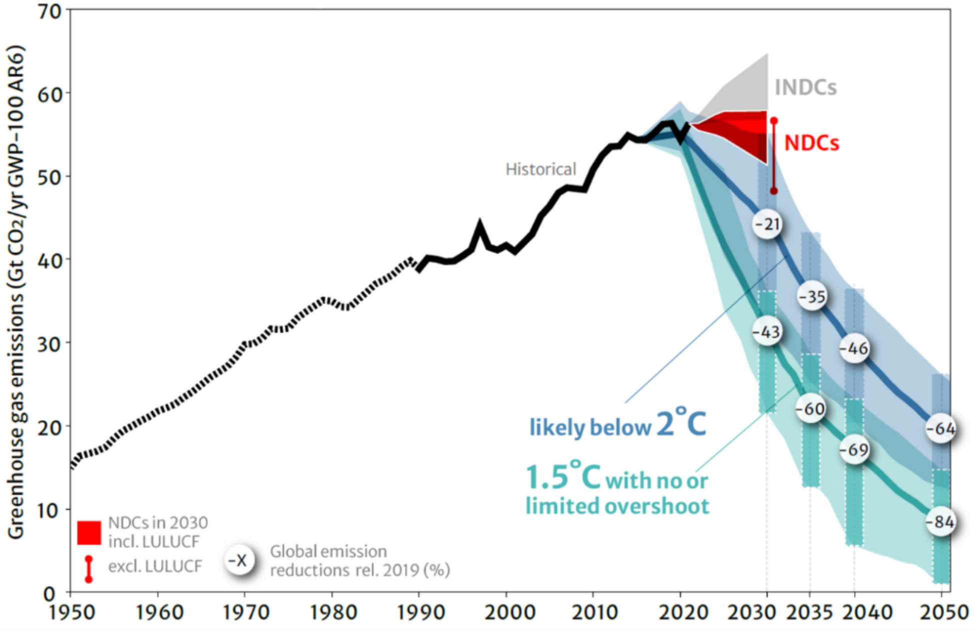
Lessons from 25 Policies Advancing a Low-Carbon Future

WORLD BANK GROUP

Despite more than 70 national Net Zero pledges, we are not on track

- The 2018–22 global mean temperature average is rapidly approaching the 1.5°C target of the Paris Agreement.
- Although global energy-related CO2 emissions dipped slightly in 2020 due to the COVID-19 pandemic, they rebounded in 2021, reaching the highest-ever annual level of 36.3 gigatons (Gt).
- Models estimate that current policies are insufficient and would likely lead to a temperature increase of 2.6–2.9°C.

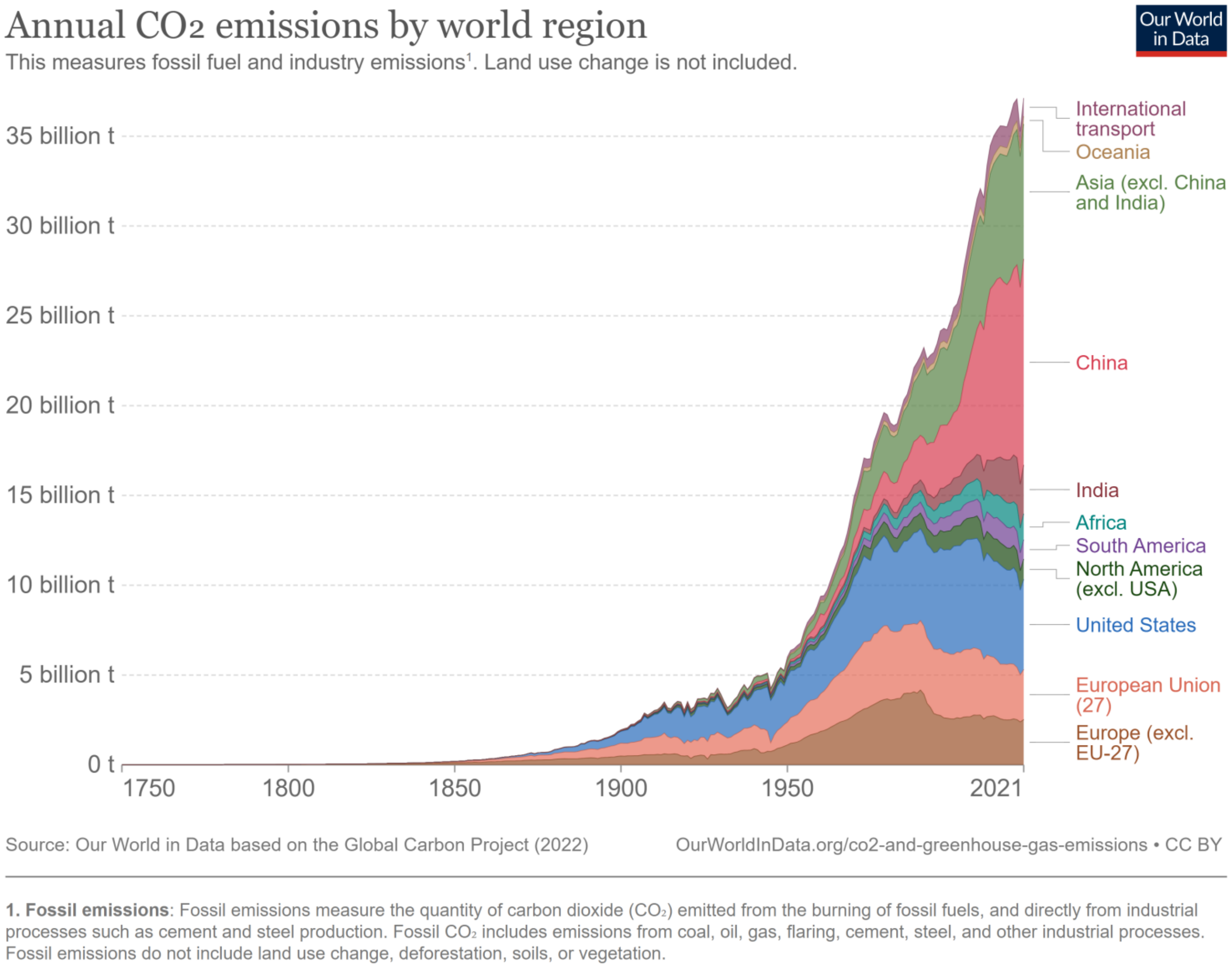
Historic emissions from 1950, projected emissions in 2030 based on NDCs and emission reductions required by the IPCC



		Reductions from 2019 emission levels (%)			
		2030	2035	2040	2050
Limit warming to1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO_2	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO_2	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

Sources: Upper panel: Historical data from the IPCC for 1950–1989 and from the 2022 NDC synthesis report for 1990–2020; 2030 projections from NDCs; and the reduction scenarios from the AR6 Synthesis Report (IPCC. 2023. *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Core Writing Team, H Lee, and J Romero (eds.). Geneva: IPCC. Available at https://www.ipcc.ch/report/ar6/syr/). Lower panel: table SPM.5 in the AR6 Synthesis Report.
Abbreviation: LULUCF = land use, land-use change and forestry.

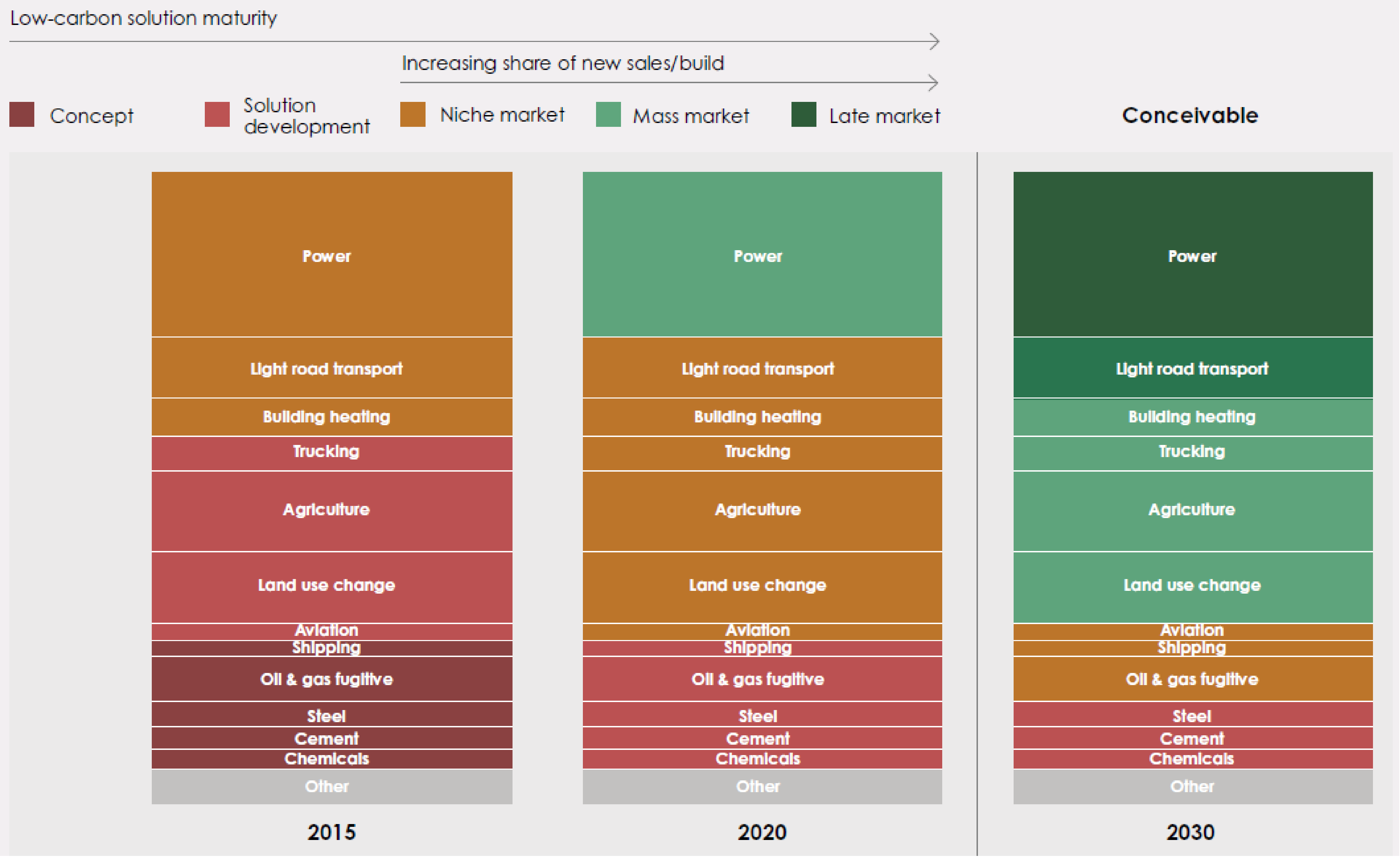
While rich countries must lead, all countries need to reduce emissions



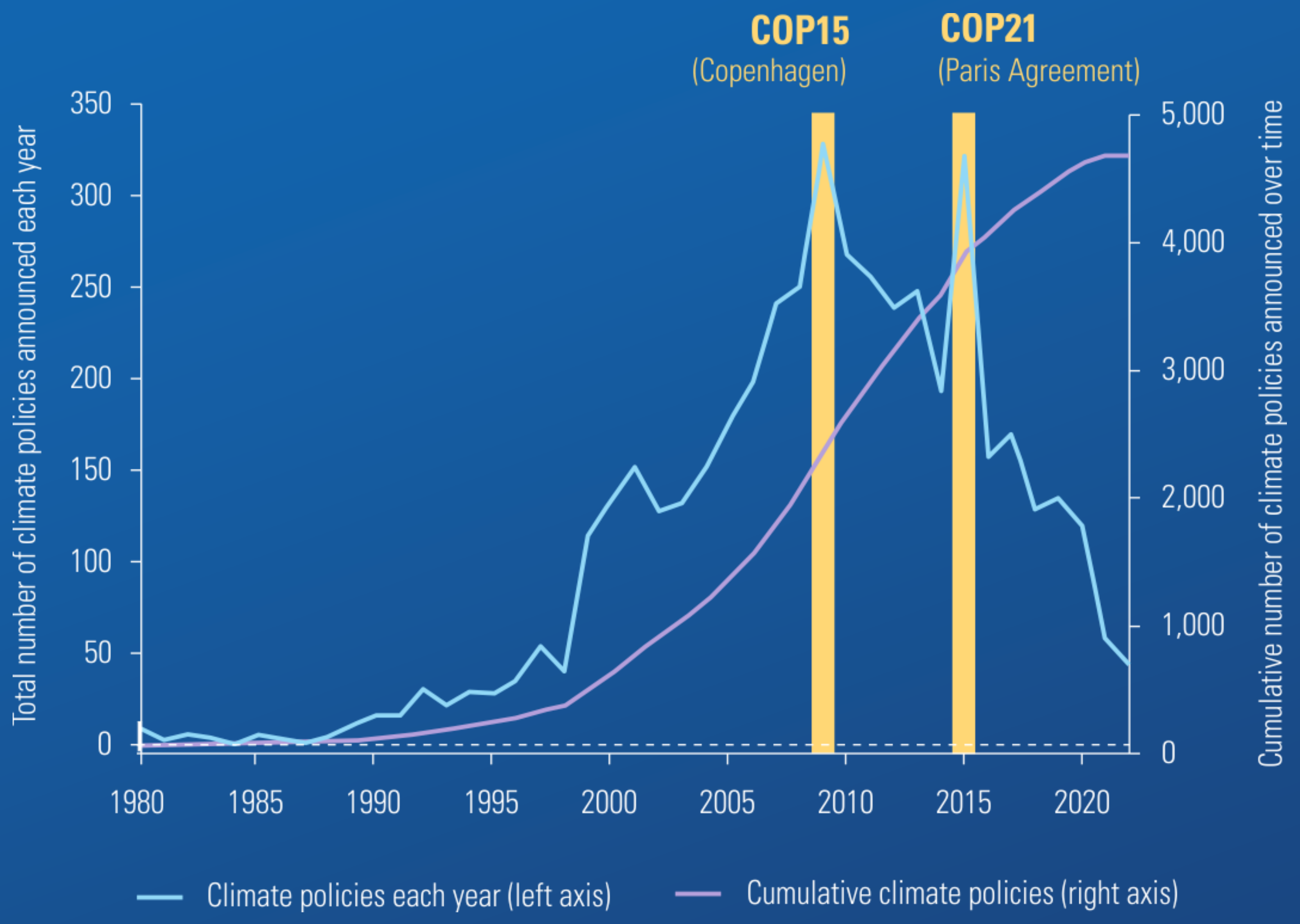
If LIC/LMICs follow a business-as-usual path while the rest of the world transitions to net zero, GHG emissions would likely level out at ~20 GtCO2e in 2050, or 40% of current emissions.

Global temperatures would rise to well above 2.5 degrees C.

Some good news: policies are leading to increasing penetration of low-carbon solutions



Source: SystemIQ (2021), *The Paris Effect*



Climate Policies Announced Globally,

1980-2020

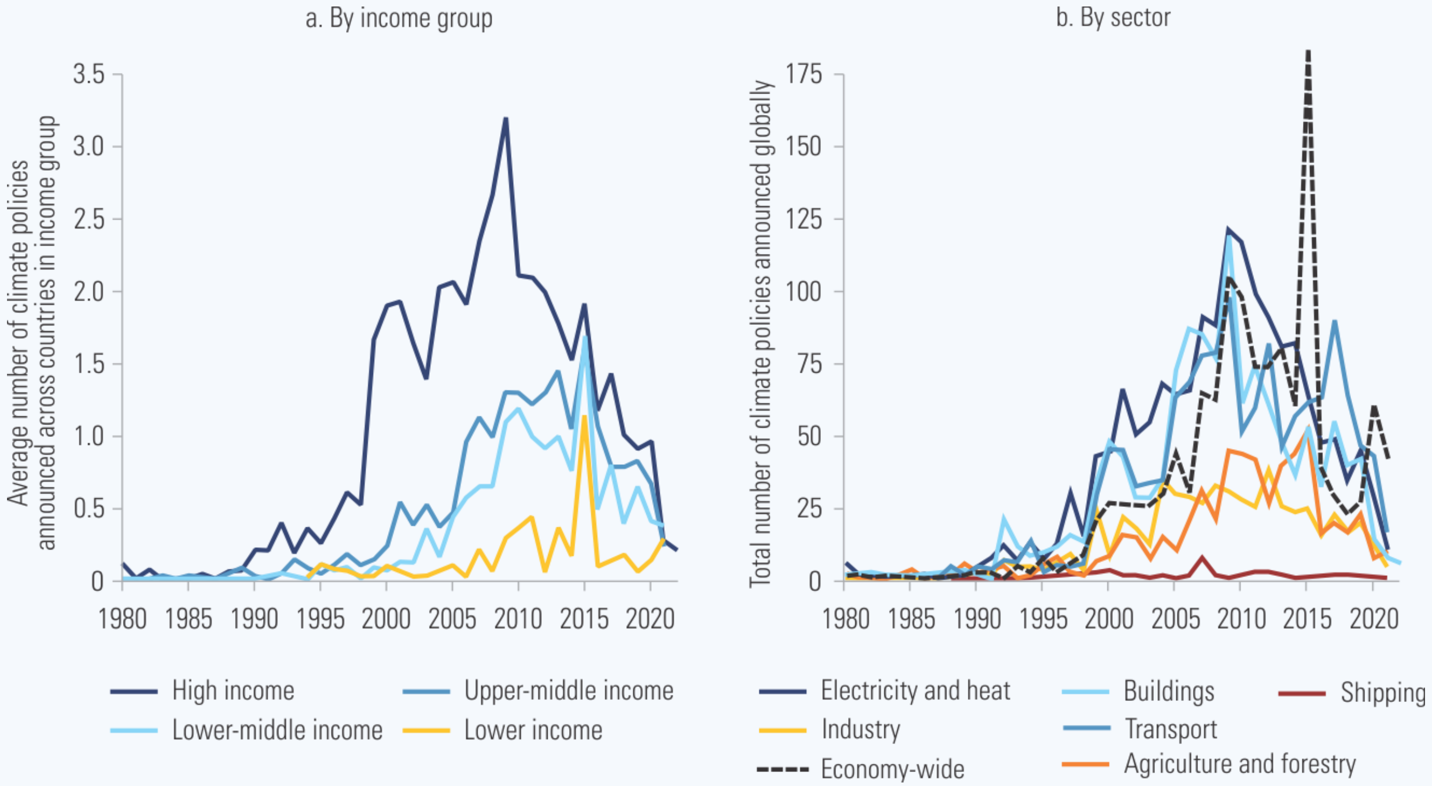
Source: World Bank calculations based on data from the Climate Policy Database 2022.
Note: COP15 = the 15th Conference of the Parties in Copenhagen; COP21 = the 21st Conference of the Parties in Paris.

Climate Policy trends

- Higher-income countries move sooner on climate policy, but other countries are stepping up, especially big emitters like China, India, and Indonesia.
- Climate policies relating to electricity and heat account for the largest share of climate policies, but agriculture and forestry-related climate policies are prevalent in lower-income countries.
- Announcements of sector-specific climate policies have slowed down, but economy-wide policy announcements remain high.

Countries have introduced more than 4,500 climate policies over the past three decades

Climate Policy Announcements, by Country Income Group and by Sector



Source: World Bank calculations based on data from the Climate Policy Database 2022.

Five Types of Decarbonization Policies

01 Planning for a future with zero net emissions

- Set up **long-term** objectives
- Design **sector-specific, shorter-term** targets
- Establish a way to **track progress** over time
- Build in **learning and feedback**

02 Getting the prices right

- Implement policy reforms, including on **pricing and tax**
- Develop **economic incentives** that encourage efforts toward decarbonization
- Progress on **market-based mechanisms** such as carbon pricing schemes and emissions trading systems (ETSs)

03 Facilitating, enabling, and triggering sectoral transitions

- **Supply-push** policies to reduce the cost of technology development through funding for research and development activities
- **Demand-pull** policies to stimulate demand for innovative solutions through financial incentives for adopters or by developing codes and standards

04 Getting the finance flowing

- Policies to **incentivize and attract financing** and involvement from the private sector
- Policies to encourage **green investment** and help **manage climate-related risks**

05 Ensuring a just transition

- Ensure the most **vulnerable populations** are protected
- Effective **civic engagement, communication,** and actively **managing distributional impacts** can help build support for unpopular policies

Development Impacts Can Be More Important than GHG Reductions

Country	Climate action	Development impacts
Mexico	**Climate-smart solid waste management:** **700 $ktCO_2e$** reduction in methane emissions in 3 years; Reduced GHG emissions by another **5.7 $MtCO_2e$** from 2004–20	Cost savings; reduced pollution; community benefits
India	**Public transport systems:** 5,450 buses are anticipated to deliver GHG emissions savings of over **1 $MtCO_2e$** over their 12-year lifecycle	Improved access to mobility; reduced air pollution; job creation
Brazil	**Reducing deforestation:** Between 2004-12, deforestation reduced by **82%,** land-use change emissions down by **65%**	Promotion of sustainable production activities; Socioeconomic outcomes; improved food security
Egypt	**Fleet renewal and recycling program:** Reduced GHG emissions by **311 $ktCO_2e$** as of 2017	Reduced air pollution; improved traffic safety; job creation
Japan	**Industrial energy efficiency :** Industrial emissions have decreased by **28%** since 1990	Improved resource productivity
Kenya	**Power sector reform:** Reduced carbon intensity of power by **62%** between 2010-19	Improve macroeconomic and enabling environment
China	**Climate-smart agriculture in Guangdong:** Reduced annual average GHG emissions by almost **84,000tCO_2e**	Reduce pollution from agriculture

Lessons learned and next steps

- Climate policies are shifting from **sector-specific to economy-wide** approaches.

- **Long-term targets** and planning aid coordination, with **short-term milestones** guiding sector-level actions.

- Not all policies can be considered best practice due to compromises needed to obtain **public and political support**. Successful efforts require **strong institutions** and **collaboration** across stakeholders.

- **Capacity building** aids policy design and execution, with **contextual adaptations** necessary for success.

- Despite progress in implementing climate policies, the transition to a net zero future continues to face barriers, including the need for **large investments**, a lack of **institutional capacity**, and challenging **political economy** issues.

- Credible **post-implementation analyses** of decarbonization policies are needed. Connecting emissions reductions and economic benefits with specific policies is challenging, and emission reductions are not always the best **result indicator for climate action**.

- The World Bank will continue collecting, analyzing, and sharing examples of successful (and less successful) climate policies or interventions to **inform decision-making** across the world.

SAMPLE CASE STUDIES

Planning for a future with zero net emissions: Costa Rica's National Decarbonization Plan

Getting the prices right: Energy subsidy reform in Egypt

Facilitating, enabling and triggering sectoral transitions: Solar Power in India

Getting the finance flowing: Power Sector Reform in Kenya

Ensuring a just transition: South Africa's Coal Sector

Planning for a future with zero net emissions: Costa Rica's National Decarbonization Plan

Policy instrument/program details

Economy-wide

Long-Term Strategy and National Decarbonization Plan

Primary objectives and co-benefits

Primary objectives: Decarbonize all sectors; governance

Co-benefits: Macroeconomic benefits: employment; poverty reduction

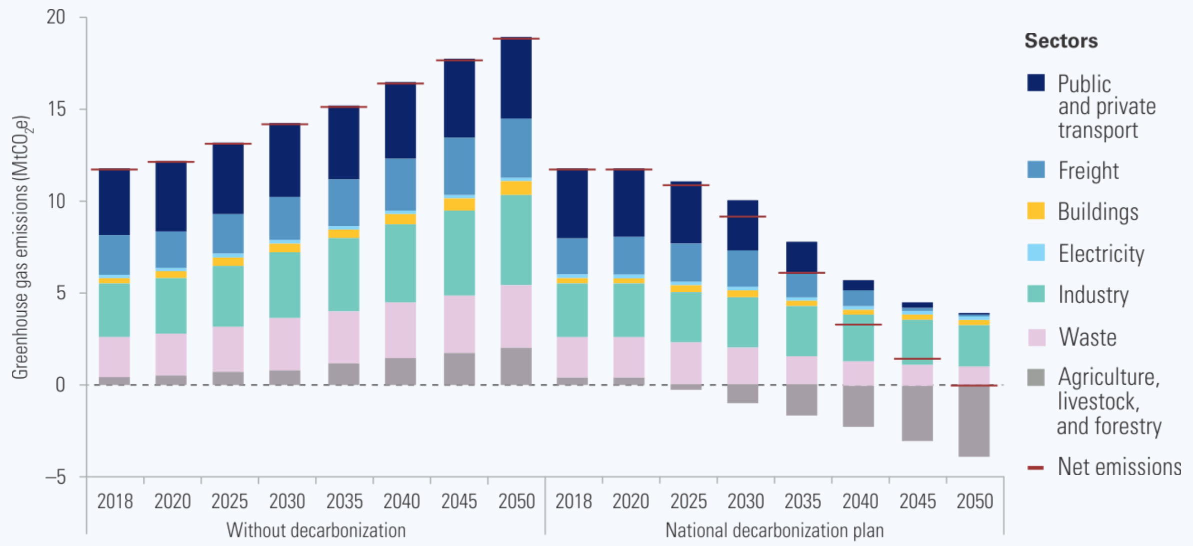
Political economy considerations

Policy development process strongly engaged technical and nontechnical stakeholders, including for climate justice and just transition considerations

Key Takeaways

- Clear transformation pathways are crucial for LTS success.
- Stakeholder buy-in over short, medium, and long terms is vital.
- Political support at the highest level is necessary for LTS coordination.
- Strong institutional arrangements are needed for financing and accountability.
- Private sector involvement is crucial for financing decarbonization.
- Local partnerships can help drive low-carbon development at the grassroots level

Costa Rican GHG Emissions over Time, without Decarbonization and with the NDP



Source: Groves et al. 2020.
Note: Emissions from the electricity sector are negligible in Costa Rica under baseline assumptions. GHG = greenhouse gas; $MtCO_2e$ = metric megatons of CO_2 equivalent (million tons); NDP = national decarbonization plan.

Getting the prices right: Energy subsidy reform in Egypt

Policy instrument/program details

Egypt, Arab Rep **Energy**

Energy subsidy reform with support from WB and Energy Sector Management Assistance Program (2014–16)

Primary objectives and co-benefits

Primary objectives: Improve macroeconomic and enabling environment

Co-benefits: Reduced GHG emissions; growth of solar and wind power generation; creating fiscal space for social spending; reduced air pollution

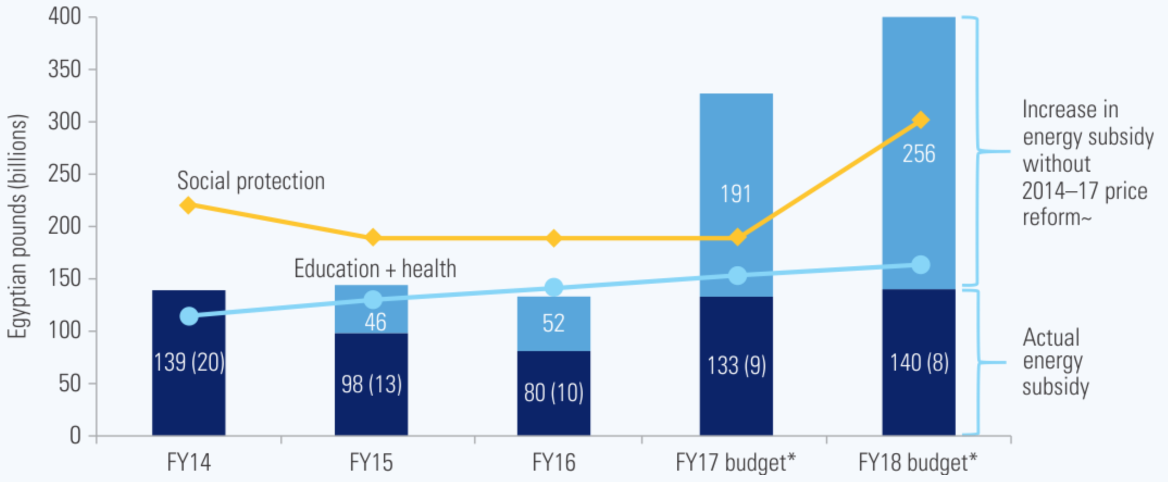
Political economy considerations

Included a public outreach campaign; strengthened social protection mechanisms; used targeted mechanisms with cash transfers; used fiscal savings to increase health and education spending

Key Takeaways

- Gradual, comprehensive reforms reduced the fiscal burden and attracted private investment.
- Strong government ownership and cross-sectoral coordination were crucial.
- Transparent communication engaged the public and supported evidence-based debate.
- Social assistance measures protected vulnerable households by redirecting savings.
- Broader energy sector reforms included policy improvements, fuel switching, debt resolution, efficiency enhancements, and better controls.

Energy Subsidy and Health, Education, Social Protection Expenditure in Egypt, FY2014-18



Source: World Bank 2017.
Note: ~ = World Bank estimate; * = Ministry of Finance budget for energy subsidy.
Numbers in parentheses are in $, billions.

Facilitating, enabling and triggering sectoral transitions: Solar Power in India

Policy instrument/program details

Power

The National Solar Mission (2010), feed-in tariff and utility power purchase obligations, fiscal incentives including solar project subsidies and tax incentives

Primary objectives and co-benefits

Primary objectives: Decarbonize energy

Co-benefits: Avoided air pollutant emissions; improved electricity access; green jobs

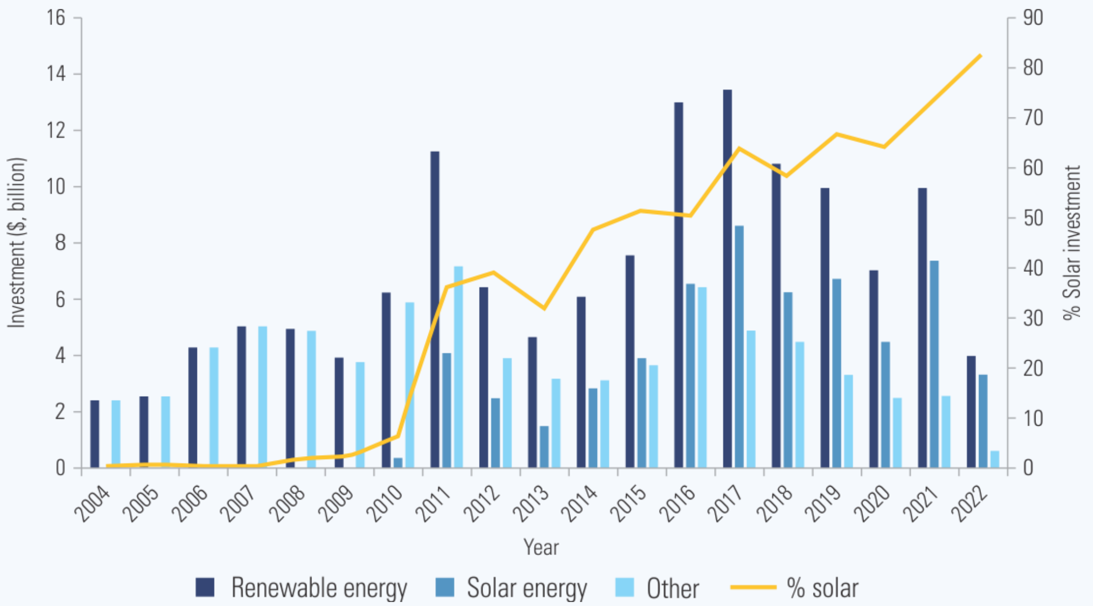
Political economy considerations

Platform for broad communication and engagement; placed emphasis on local production of solar panels and equipment to enhance self-sufficiency and promote domestic manufacturing

Key Takeaways

- India achieved rapid scale-up of climate-smart solutions through collaboration among stakeholders.
- The government set ambitious national targets, provided stable policies, and offered incentives.
- Development finance institutions provided concessional financing and risk mitigation support.
- Private sector investments in solar energy and technology advancements played a significant role.

Renewable Energy Investment in India, 2004-22



Source: BloombergNEF 2022.

Getting the finance flowing: Power Sector Reform in Kenya

Policy instrument/program details

Power

Revising the Energy Act (2006), Kenya's Energy Regulatory Commission initiated a Least Cost Power Development Plan for the power sector; this introduced institutional and regulatory reforms to attract private investment and support privately financed independent power producers

Primary objectives and co-benefits

Primary objectives: Improve macroeconomic and enabling environment

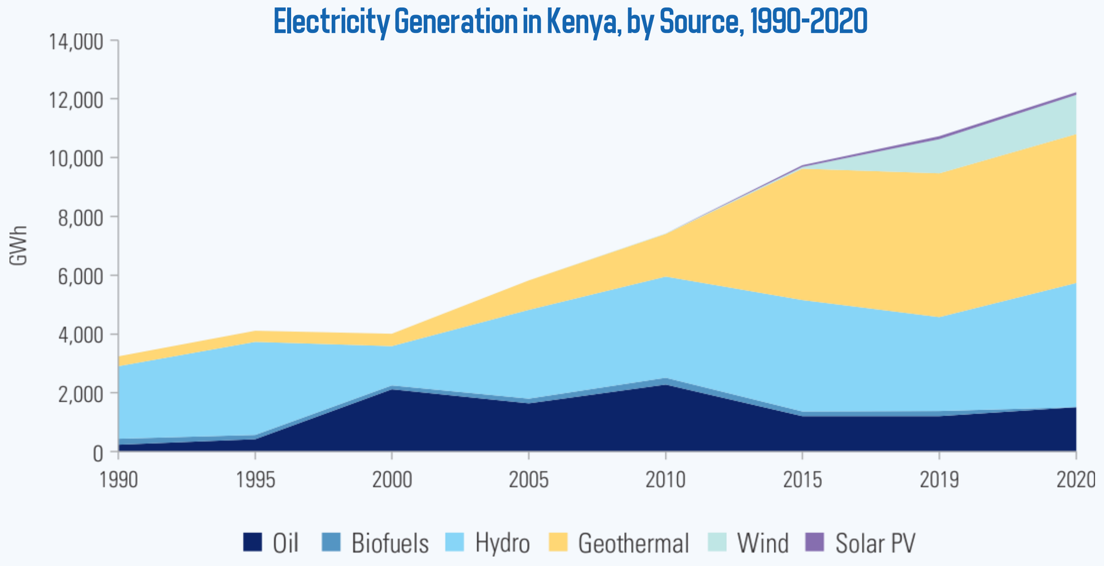
Co-benefits: Energy transition to renewable sources; increased access to electricity, economic growth, jobs, productivity, incomes, health outcomes, and human capital development

Political economy considerations

Planning involved multi-stakeholder steering and technical committees

Key Takeaways

- Developing technical capacity for power system planning and adhering to a least-cost development plan are critical.
- A modern regulatory framework supports privately financed Independent Power Producers (IPPs), especially for renewable energy.
- State actors play a crucial role in addressing early development risks of new technologies, like geothermal.
- Listing state-owned enterprises facilitates access to significant private-sector finance.



Source: World Bank calculations based on data from IEA 2019 and Kenya National Bureau of Statistics 2021a.
Note: GWh = gigawatt hours; PV = photovoltaic.

Ensuring a just transition: South Africa's Coal Sector

Policy instrument/program details

Coal

Created a Presidential Climate Commission (2021) that has developed national, sectoral, and regional Just Energy Transition strategies to start decommissioning/retrofitting coal power stations while also increasing RE sources

Primary objectives and co-benefits

Primary objectives: Just transition; decarbonize energy

Co-benefits: Environmental; air pollution reduction; improved domestic energy supply; attract foreign investment; job protection

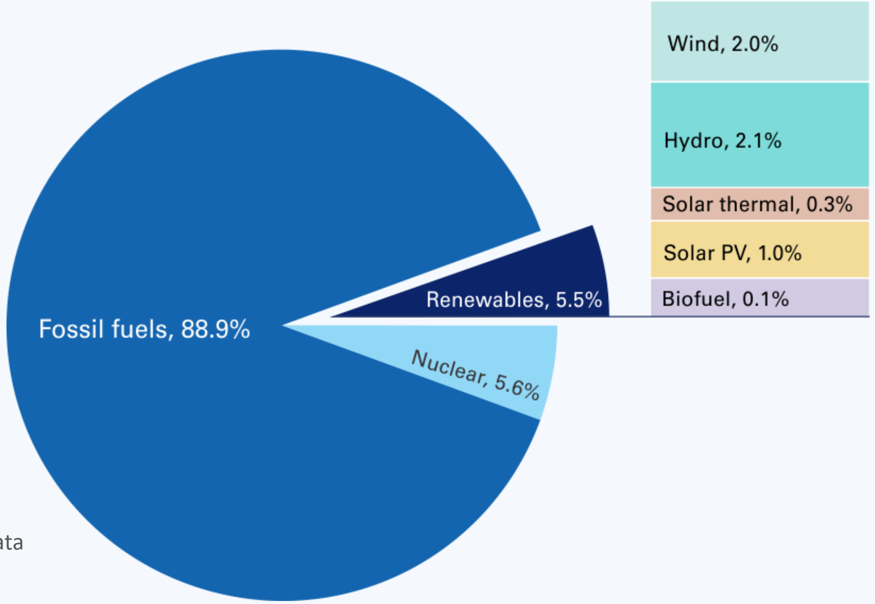
Political economy considerations

In 2012, the PCC launched the Social Partner Dialogues on Pathways for a Just Transition with government, labor workers/unions, business, and civil society to build a common vision for the Just Transition and create pathways to achieve this vision

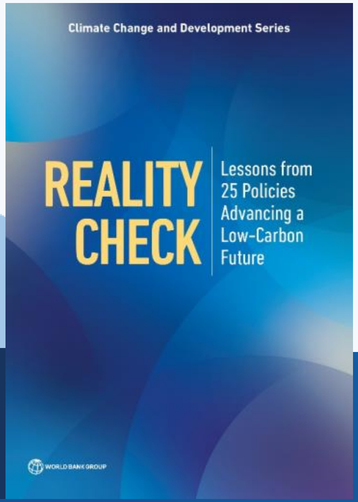
Key Takeaways

- Speeding up the move away from coal is crucial, requiring early planning and fairness for affected coal communities.
- An independent body with diverse representation is vital for steering the transition and engaging stakeholders.
- Collaboration between various sectors is necessary for impact management and securing commitments.
- A just transition benefits people and the environment by creating new opportunities and providing support.
- Proper planning is essential to build public support and unlock opportunities during the transition.

Breakdown of South Africa's Energy Mix



Source: Akinbami, Oke, and Bodunrin 2021, based on data in IEA 2023.
Note: PV = photovoltaic.



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