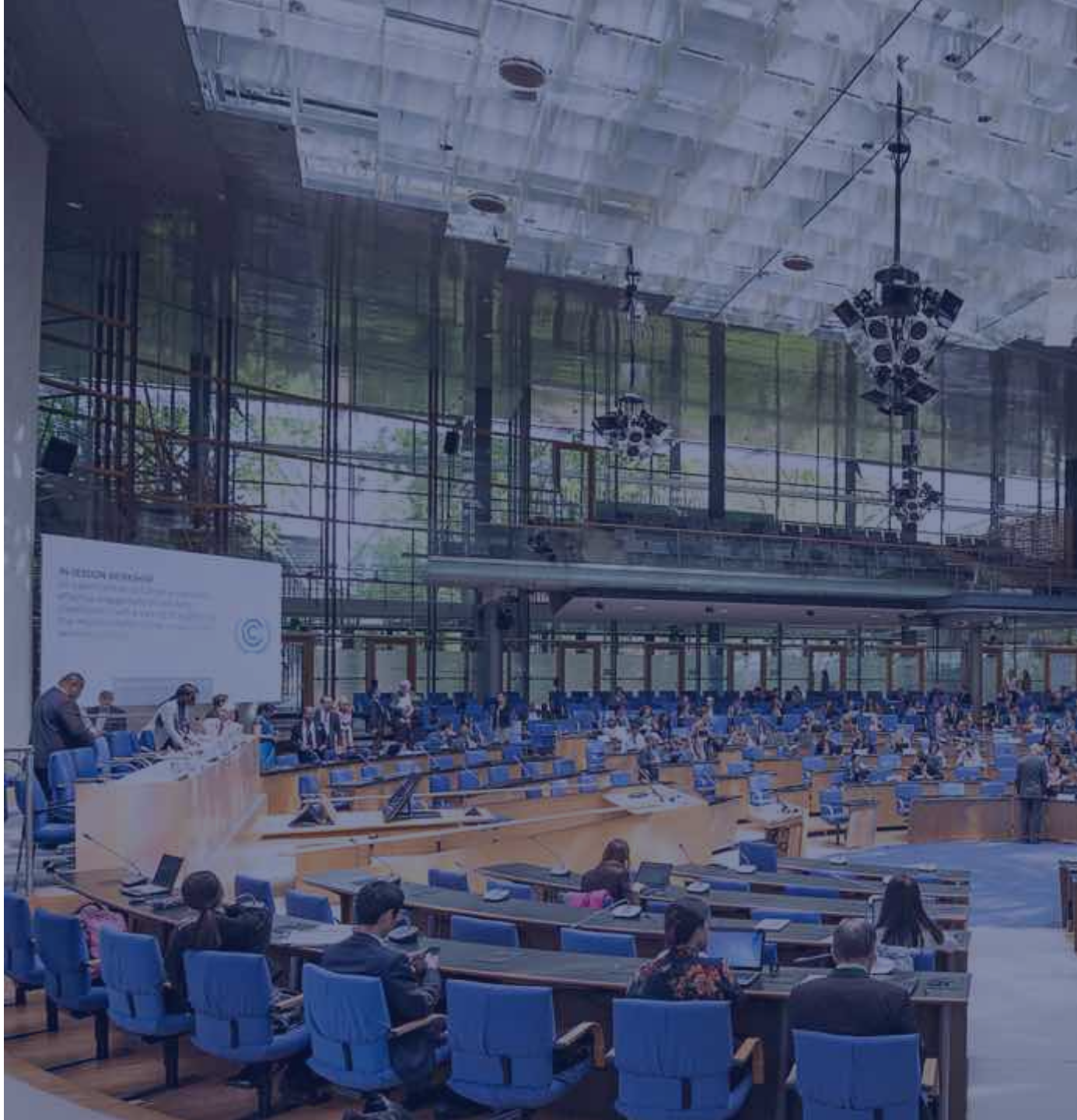
INSIGHTS FOR THE GLOBAL STOCKTAKE:

System Transformations & International Cooperation

SYSTEMS CHANGE LAB

NDC ASPECTS



An Urgent Call for Transformational Change

Power

Buildings

Industry

Transport

Forests
& Land

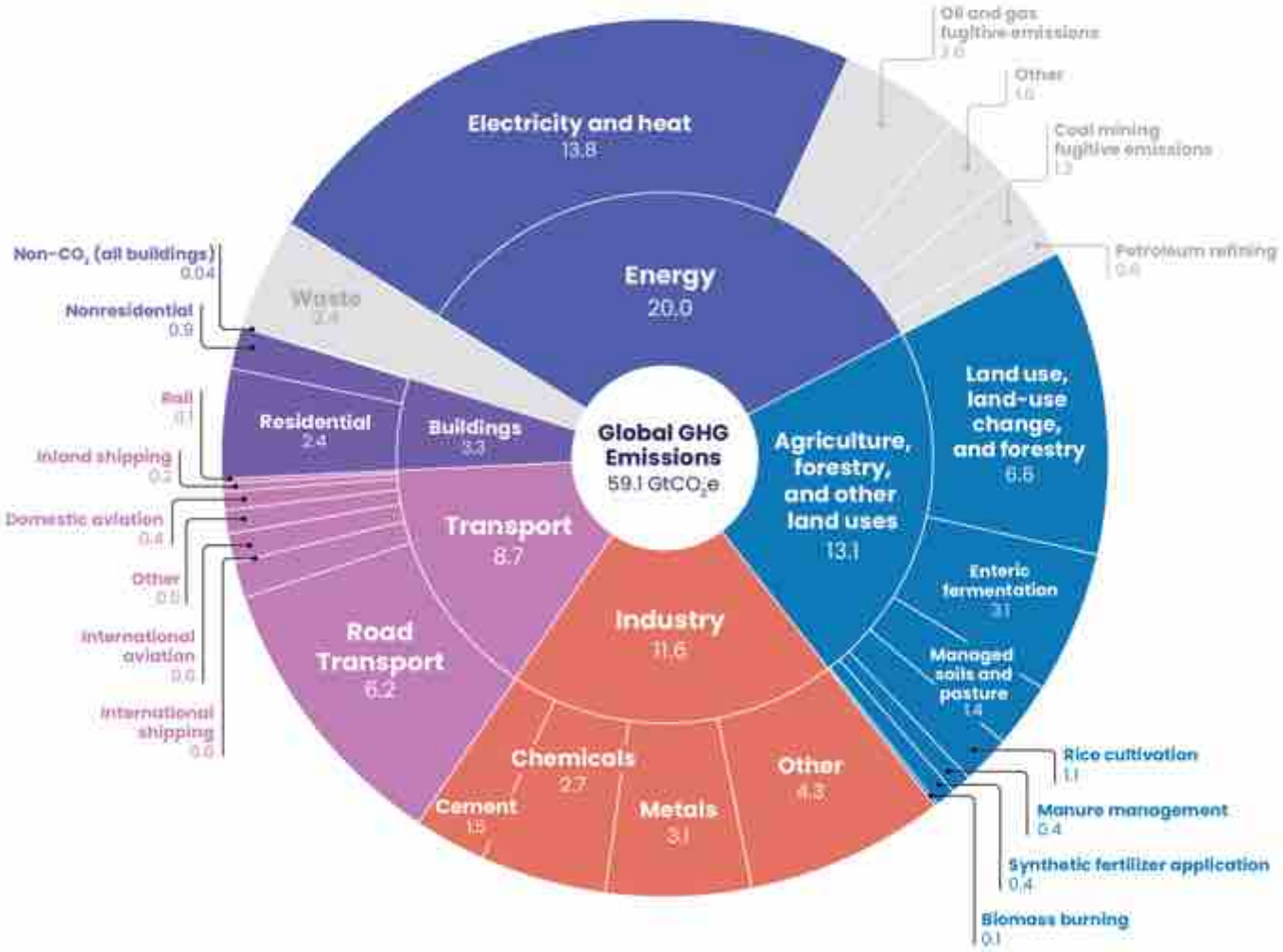
Food & Agriculture

Technological
Carbon Removal

Finance

State of Climate Action

Sectors Emitting ~85% of GHGs Globally



Source: Boehm et al. 2022

Assessing Progress toward 2030 Targets

ON TRACK: Change is occurring at or above the pace required to achieve the 2030 targets

No indicators assessed exhibit a recent historical rate of change that is at or above the pace required to achieve their 2030 targets.

OFF TRACK: Change is heading in the right direction at a promising, but insufficient pace

For **6 indicators**, this rate of change is heading in the right direction at a promising but insufficient pace to be on track for their 2030 targets.

WELL OFF TRACK: Change is heading in the right direction, but well below the required pace

For **21 indicators**, the rate of change is heading in the right direction at a rate well below the required pace to achieve their 2030 targets.

WRONG DIRECTION: Change is heading in the wrong direction, and a U-turn is needed

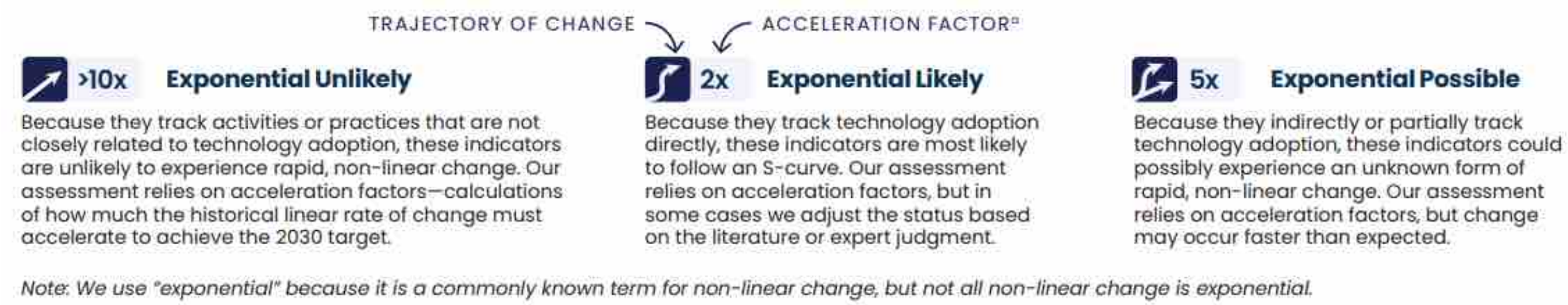
For **5 indicators**, the rate of change is heading in the wrong direction entirely.

Insufficient Data: Data are insufficient to assess the gap in action required for 2030

For **8 indicators**, data are insufficient to assess the rate of change relative to the required action.

Source: Boehm et al. 2022

Assessing Progress toward 2030 Targets



Source: Boehm et al. 2022

Assessing Progress toward 2030 Targets

Source: Boehm et al. 2022

Enabling Actions for Transformation

For each sector, we identify a critical set of **barriers, as well as actions that can enable change** across five categories.

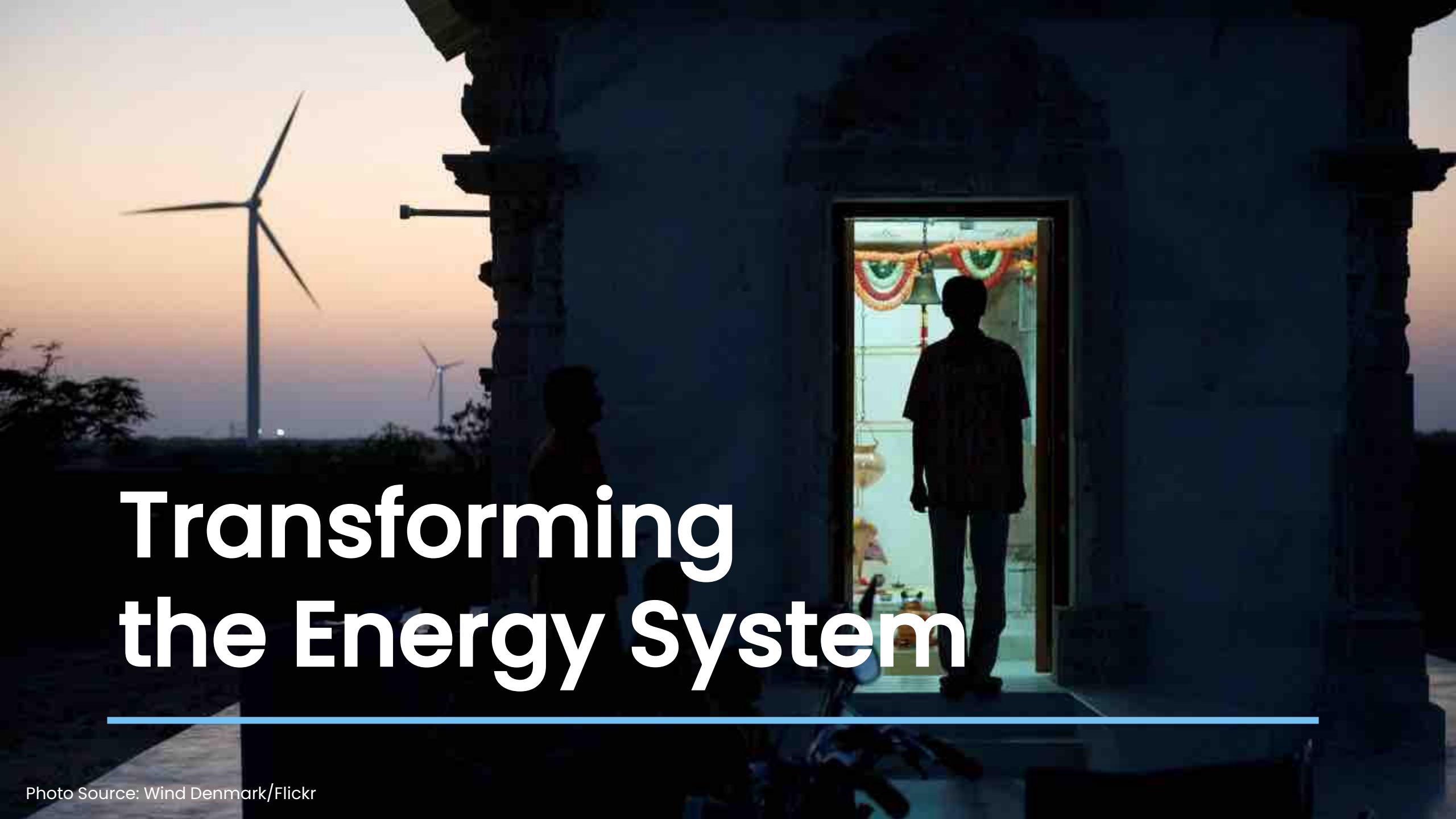
Innovations in Technologies, Practices and Approaches

Leadership from Change Agents

Regulations and Incentives

Strong Institutions

Behavior Change and Shifts in Social Norms



Transforming the Energy System

Photo Source: Wind Denmark/Flickr

A 1.5°C Roadmap for Power

- Phase out unabated coal and fossil gas from electricity generation.
- Rapidly scale up zero-carbon electricity generation.
- Modernize power grids, scale energy storage and manage power demand.
- Ensure energy access and a just and equitable transition for all.

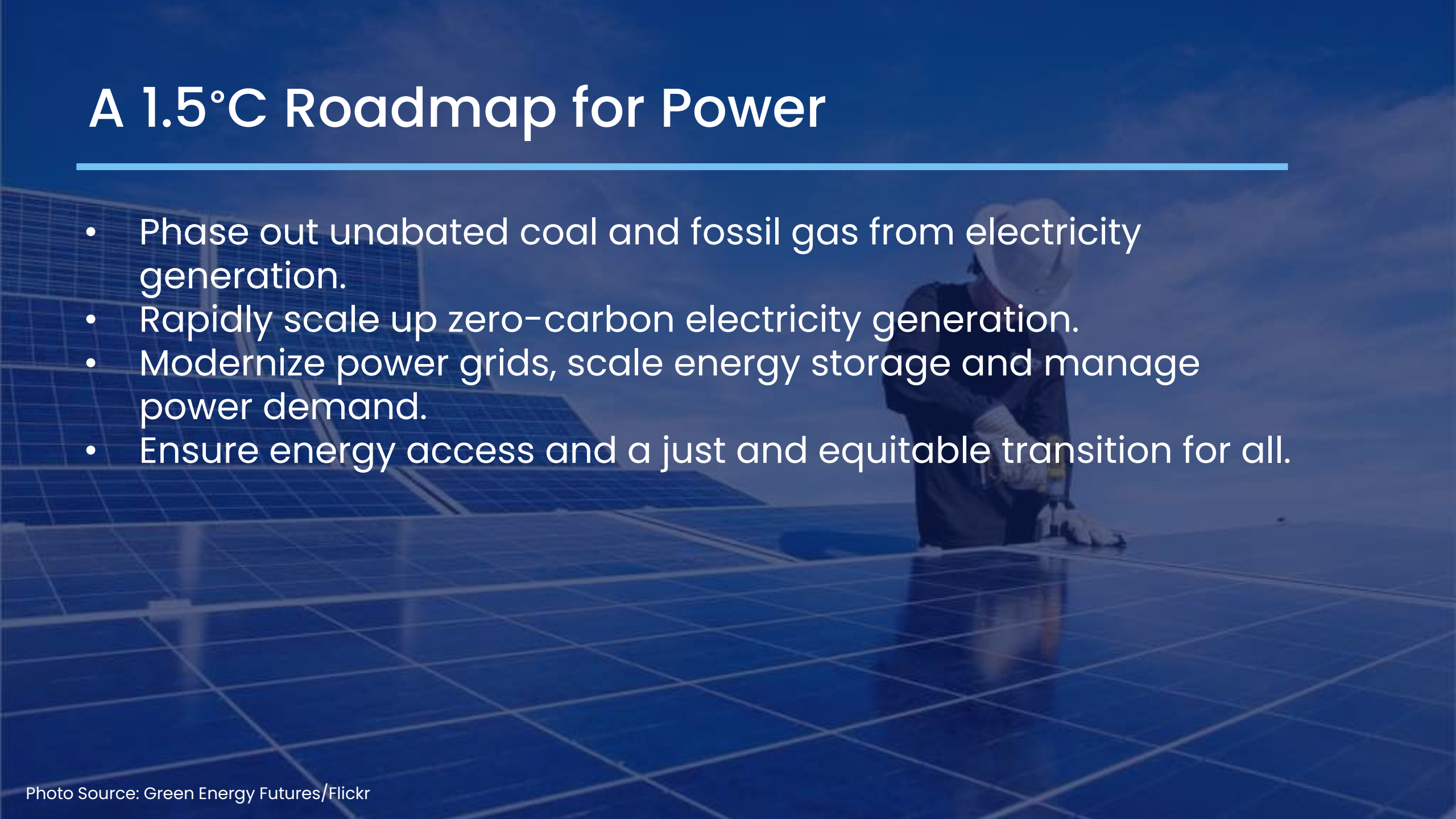


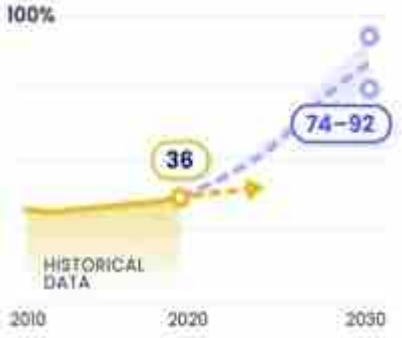
Photo Source: Green Energy Futures/Flickr

Power: 2030 Targets & Progress

OFF TRACK:

POWER 6x[b]

Increase the share of zero-carbon sources in electricity generation to 74–92%



WELL OFF TRACK:

POWER 5x

Reduce the carbon intensity of electricity generation to 50–125 gCO_2/kWh

POWER 6x

Reduce the share of unabated coal in electricity generation to 0–2.5%

WRONG DIRECTION:

POWER N/A

Reduce the share of unabated fossil gas in electricity generation to 17%

Source: Boehm et al. 2022

Enabling Actions for Transforming Power

To transform the global power system, we identify **8 enabling actions** that can help overcome long-standing barriers and accelerate change.

- Increase RD&D investments in grid-scale batteries.
- Scale up complementary and technologies (e.g., transmission and distribution network upgrades and expansion).

- Improve market conditions (e.g., through carbon pricing mechanisms) to accelerate renewable uptake.
- Adopt regulations that incentivize and/or mandate decarbonization.

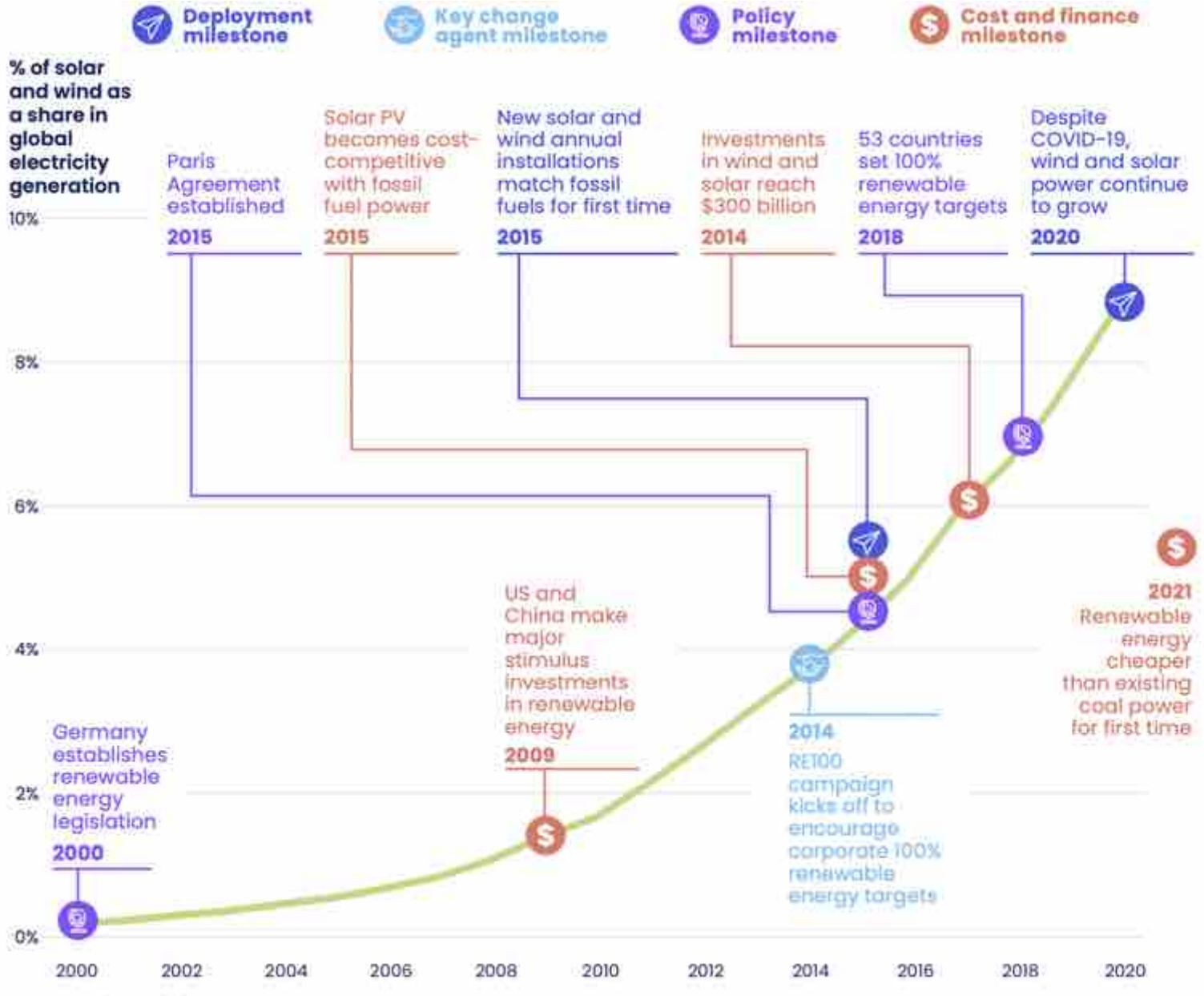
- Create social and economic protections to sustain just and equitable transitions.
- Tackle vested interests to achieve fossil fuel phaseout (e.g., increased support for climate-focused political parties and organizations seeking to counterbalance the fossil fuel industry's political power).

- Set ambitious targets to scale up renewable energy and phase out fossil fuels.

- Promote demand-side flexibility and management (e.g., through energy efficiency programs, national demand-response programs).

The Rapid Rise of Wind and Solar

- In 2022, four times more investments were made in renewables than fossil fuels.
- Over 44 countries have regulatory frameworks for renewables.
- Denmark and South Australia have reached >50% power from variable renewables.



Source: Boehm et al. 2022

A 1.5°C Roadmap for Energy End Uses

BUILDINGS

- Optimize buildings' energy use.
- Decarbonize heating, cooling and appliances.
- Reduce embodied emissions.
- Integrate buildings into energy systems.

INDUSTRY

- Reduce demand for cement, steel and plastics.
- Improve industrial energy efficiency.
- Electrify industry.
- Commercialize new solutions for cement, steel and plastics.

TRANSPORT

- Reduce avoidable vehicle and air travel.
- Shift to public, shared and non-motorized transport.
- Transition to zero-carbon cars, trucks, shipping and aviation.
- Guarantee reliable access to safe and modern mobility for all.

Photo Source: william william/Unsplash

Buildings: 2030 Targets and Progress

WELL OFF TRACK:

BUILDINGS — 5x Commerical 7x Residential

Decrease the energy intensity of operations in by 20–30% in residential buildings and by 10-30% in commercial buildings, relative to 2015[a]

140% of 2015 levels

Insufficient Data:

BUILDINGS — Ins. data

Reduce the carbon intensity of operations in select regions by 45-65% in residential buildings relative to 2015

35 $kgCO_2/m^2$

BUILDINGS — Ins. data

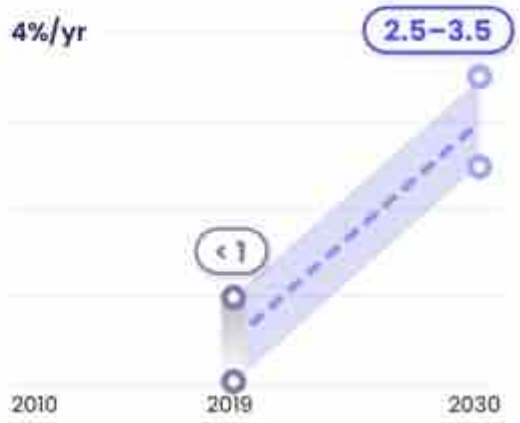
Reduce the carbon intensity of operations in select regions by 65-75% in commercial buildings, relative to 2015

70 $kgCO_2/m^2$

BUILDINGS — Ins. data

Increase the annual global deep retrofitting rate of buildings to 2.5–3.5%

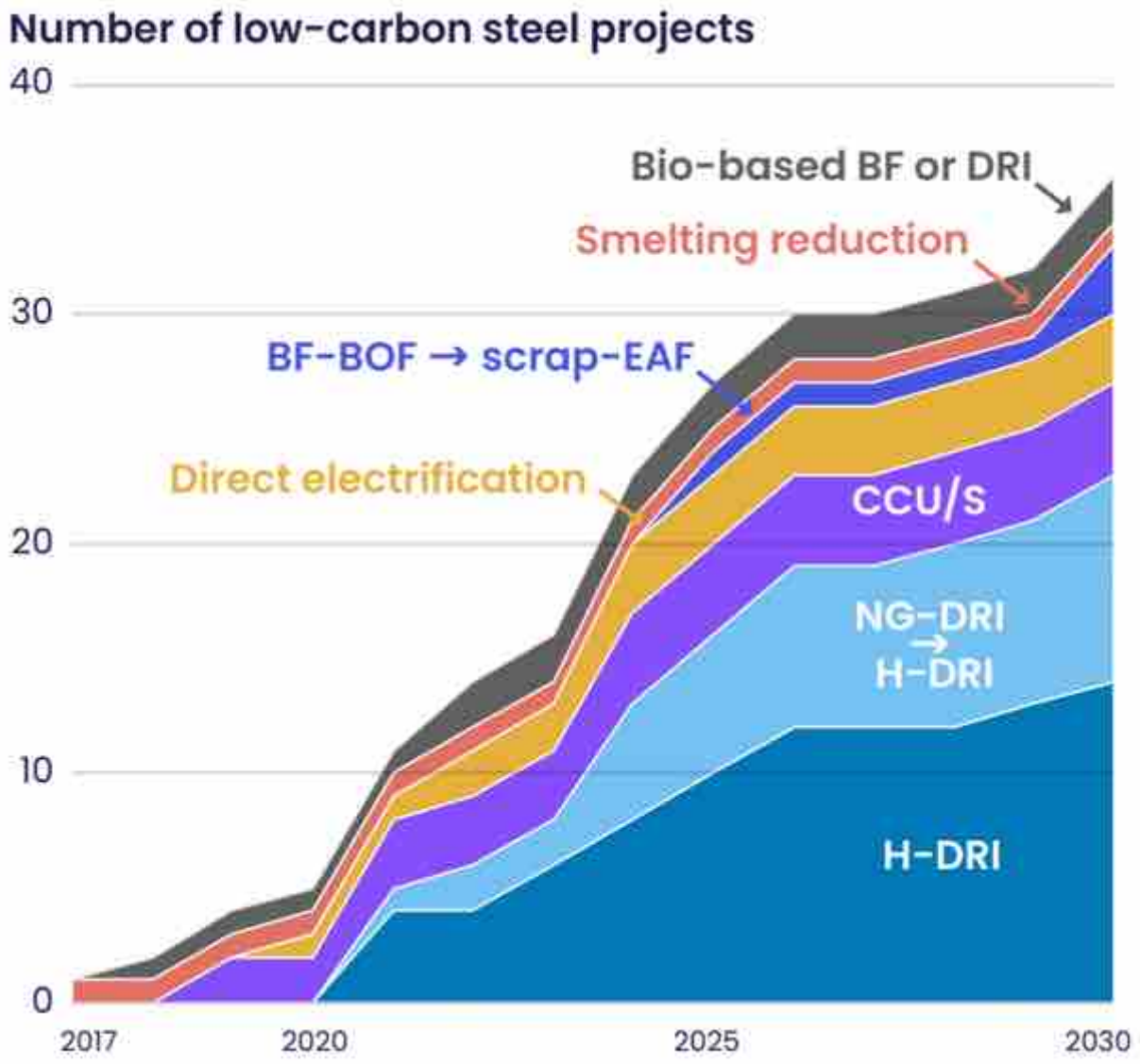
4%/yr



Source: Boehm et al. 2022

Industry: 2030 Targets & Progress

Source: Boehm et al. 2022



Advances in Low-Carbon Steel

Additional investments, policy support, and regulation are now needed to improve technologies and bring down costs for both steel and green hydrogen production.

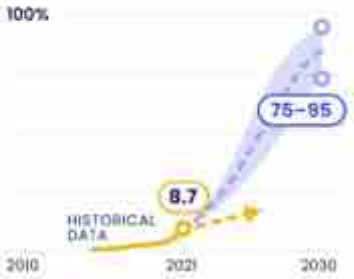
Source: Boehm et al. 2022

Transport: 2030 Targets & Progress

OFF TRACK:

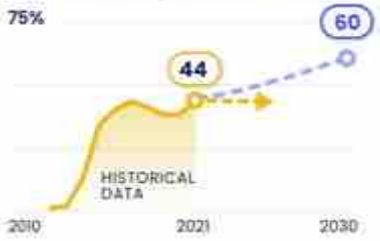
TRANSPORT 5x[h]

Increase the share of EVs in total annual LDV sales to 75–95%



TRANSPORT >10x[e]

Boost the share of BEVs and FCEVs to 60% of annual global bus sales



WELL OFF TRACK:

TRANSPORT 6x[i]

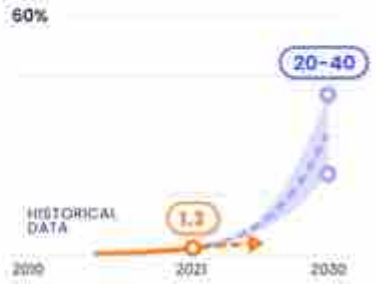
Double the capacity of public transport infrastructure from 2021 levels

TRANSPORT >10x[ii]

Install two kilometers of high-quality, safe bike lanes per 1,000 inhabitants in urban areas

TRANSPORT >10x

Expand the share of EVs to account for 20–40% of the total LDV fleet



WELL OFF TRACK:

TRANSPORT Ins. data[h]

Increase the share of BEVs and FCEVs to 30% of global annual MHDV sales

TRANSPORT Ins. data[h]

Increase SAF's share of global aviation fuel supply to 13–18%

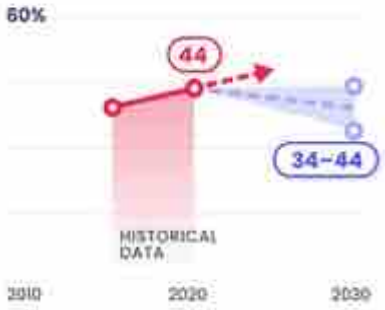
TRANSPORT Ins. data[ii]

Raise the share of zero-emission fuels in maritime shipping fuel supply to 5–17%

WRONG DIRECTION:

TRANSPORT N/A[g]

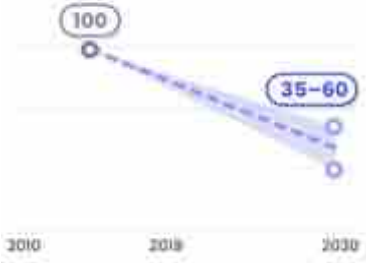
Reduce the percentage of kilometers traveled by passenger cars to 4–14 percent below business-as-usual levels



Insufficient Data:

TRANSPORT Ins. data

Reduce the carbon intensity of land-based passenger transport to 35–60 gCO_2/pkm



Source: Boehm et al. 2022

Enabling Actions for Transforming Energy End-Use

To transform the global buildings, industry and transport systems, we identify **10 enabling actions** that can help overcome long-standing barriers and accelerate change.

- Increase RD&D investments into nascent technologies for transport and industry (e.g., SAFs, alternative cements).
- Build out complementary infrastructure for decarbonizing industry and transport (e.g., charging stations).
- Increase technology transfers and invest in the deployment of existing zero- and low-carbon technologies.

- Adopt energy efficiency regulations and fuel efficiency standards across energy end-use sectors.
- Incentivize uptake of zero- and low-carbon technologies (e.g., subsidies, public procurement, carbon pricing).
- Reverse policies that incentivize emissions-intensive development (e.g., urban expansion).
- Scale up public finance for decarbonizing energy end-use sectors (e.g., building retrofits, public transit networks).

- Strengthen institutional capacity to enforce regulations.

- Establish government and corporate decarbonization roadmaps for buildings, industry and transport.
- Set green hydrogen targets.

Transforming the AFOLU System

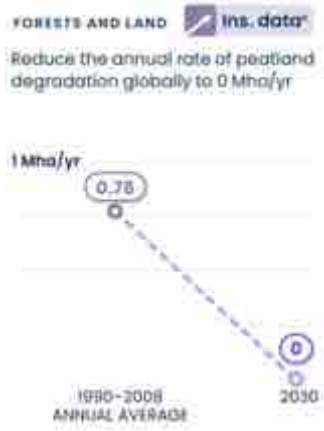
Photo Source: Neil Palmer for CIAT and CCAFS/Flickr

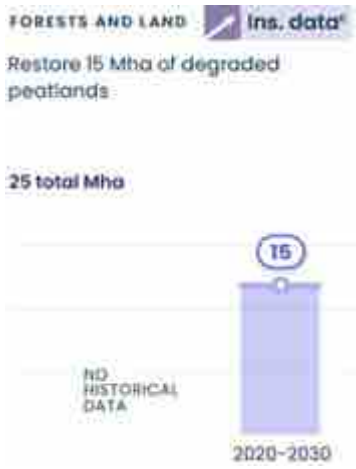
A 1.5°C Roadmap for AFOLU

- Reduce the GHG emissions intensity of agricultural production.
- Increase crop productivity sustainably.
- Increase livestock productivity sustainably.
- Increase aquaculture productivity sustainably.
- Reduce food loss and waste.
- Shift to healthier, more sustainable diets for all.
- Protect the world's ecosystems, particularly forests, peatlands, coastal wetlands and grasslands.
- Restore deforested and degraded ecosystems, particularly forests, peatlands, coastal wetlands and grasslands.
- Sustainably manage these ecosystems.

Photo Source: USAID Biodiversity & Forestry/Flickr

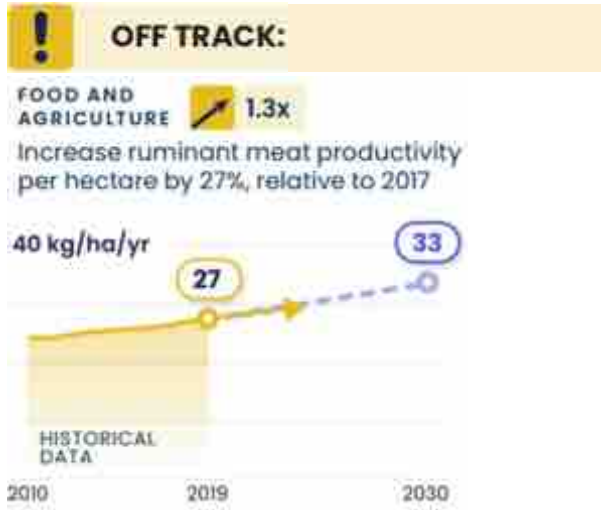
Forests & Land: 2030 Targets & Progress

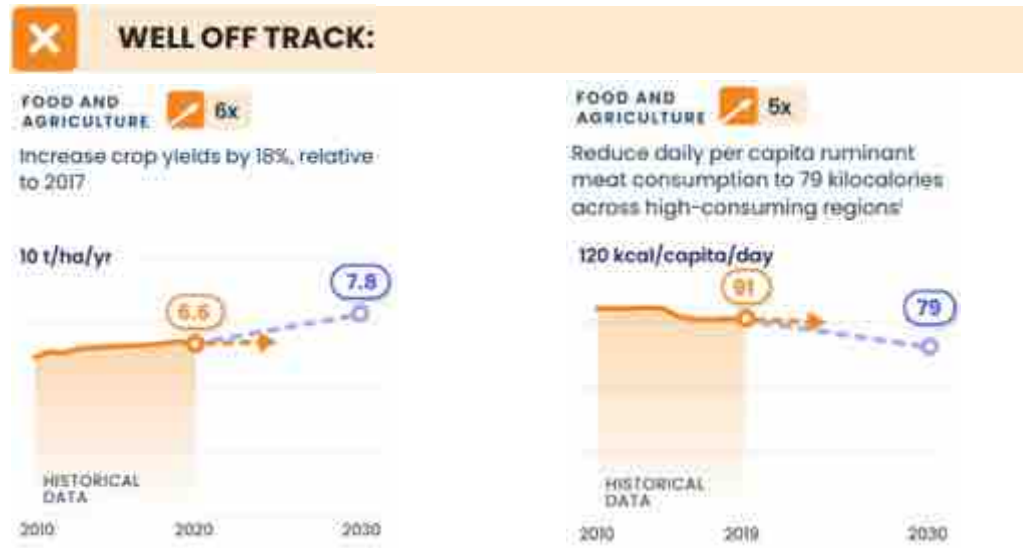


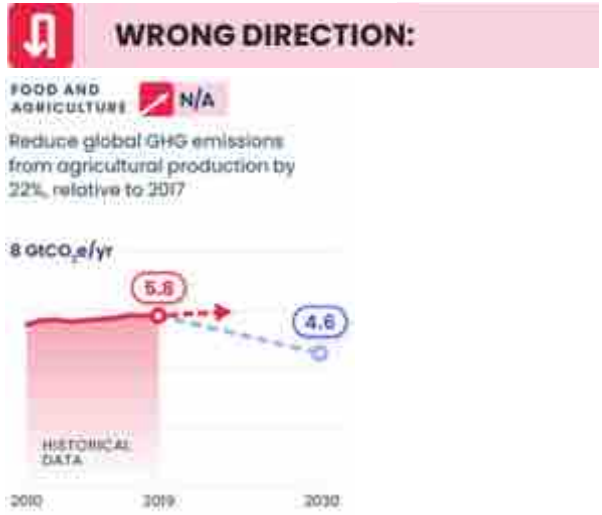


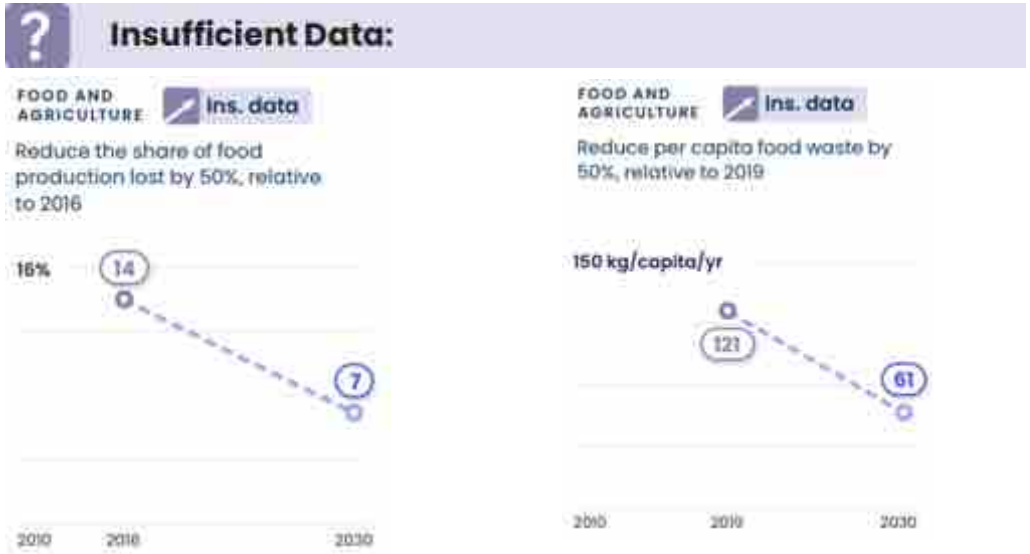
Source: Boehm et al. 2022

Food & Agriculture: 2030 Targets & Progress









Source: Boehm et al. 2022

Enabling Actions for Transforming AFOLU

To transform the global AFOLU system, we identify **11 enabling actions** that can help overcome long-standing barriers and accelerate change.

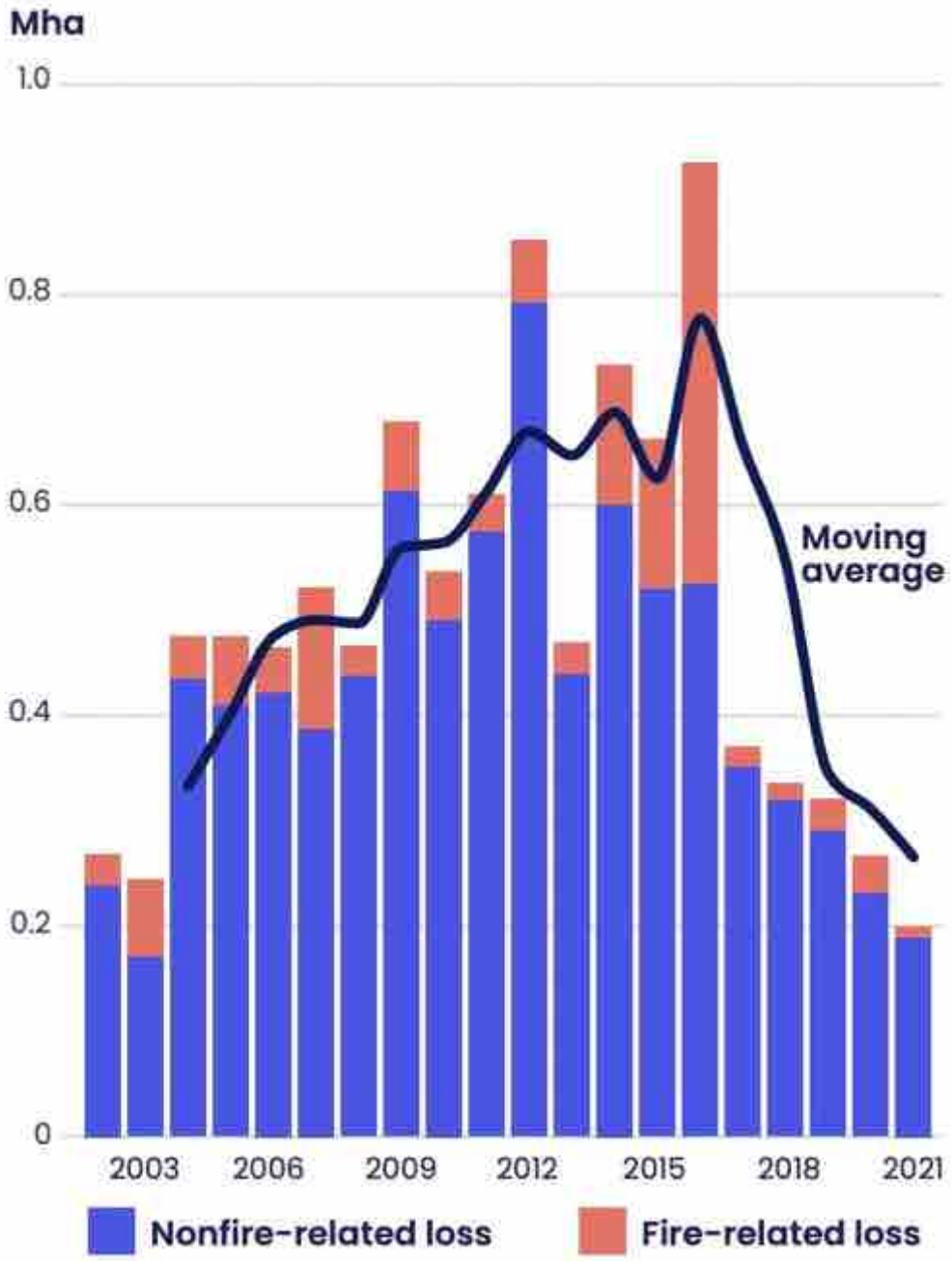
- Increase RD&D investments into climate-smart agriculture and effective interventions to shift demand.
- Advance ecosystem monitoring, particularly for peatlands.

- Strengthen national conservation policies.
- Align public and private finance with efforts to increase productivity sustainably and conserve ecosystems.
- Adopt policies, laws and regulations that incentivize the shift to more climate-smart agricultural practices.

- Enhance policy coherence.
- Improve national and subnational governance to step up enforcement.
- Clarify, secure and uphold land rights.

- Improve supply chain interventions.
- Set targets to reduce food waste in line with SDG 12.3, as well as lead the way in measuring food waste.

- Implement behavioral change interventions, as well as those that rely on social norms, to shift demand.



Spotlight on Indonesia: Sustained Declines in Primary Forest Loss

Following devastating fires, the Government of Indonesia, adopted a portfolio of policies that have helped reduce rates of primary forest loss since 2017.

Source: Boehm et al. 2022

Transforming the Financial System

Photo Source: UNclimatechange/Flickr

A 1.5°C Roadmap for Finance

- Scale up public and private finance for climate.
- Measure, disclose and manage climate-related financial risks.
- Price greenhouse gas emissions.
- Eliminate harmful subsidies and financing.
- Extend economic and financial inclusion to underserved and marginalized groups.

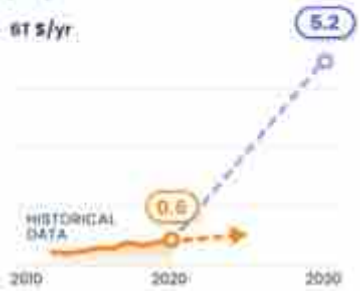
Photo Source: Daniel Foster/Flickr

Finance: 2030 Targets & Progress

WELL OFF TRACK:

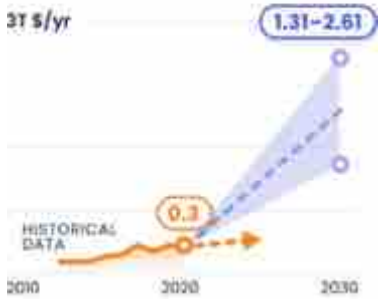
FINANCE >10x

Increase global climate finance flows (public and private, domestic and international) to US$5.2 trillion per year



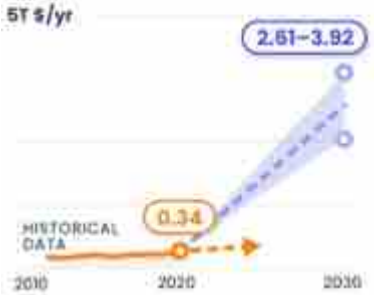
FINANCE >10x

Increase global public climate finance flows (domestic and international) to US$1.31-2.61 trillion per year



FINANCE >10x

Increase global private climate finance flows (domestic and international) to $2.61-3.92 trillion per year



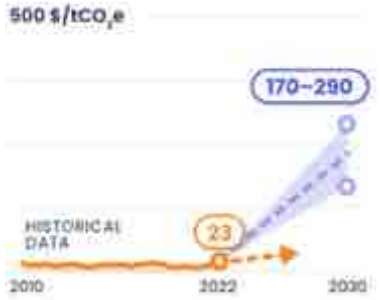
WELL OFF TRACK:

FINANCE >10x

Mandate alignment with the TCFD's recommendations on climate risk reporting in jurisdictions representing 75% of global emissions

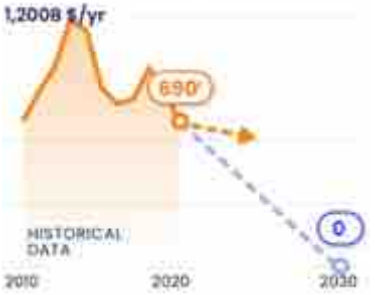
FINANCE 8x

Raise the median carbon price in jurisdictions with pricing systems in place to $170–$290/tCO$_2$e[4]



FINANCE 5x

Phase out public financing for fossil fuels, including subsidies, with G7 countries and international financial institutions achieving this by 2025



Source: Boehm et al. 2022

Enabling Actions for Transforming Finance

To transform the global finance system, we identify **8 enabling actions** that can help overcome long-standing barriers and accelerate change.

Establish policies, laws and regulations that shift misaligned public and private investment flows.

Adopt policies that increase fiscal space (e.g., carbon pricing mechanisms, debt relief) and address equity impacts.

Strengthen institutions to reduce the influence of special interests

Remove institutional barriers to climate investments.

Reform government institutions to be more transparent, responsive and representative.

Demonstrate government and corporate leadership in support of financial reforms.

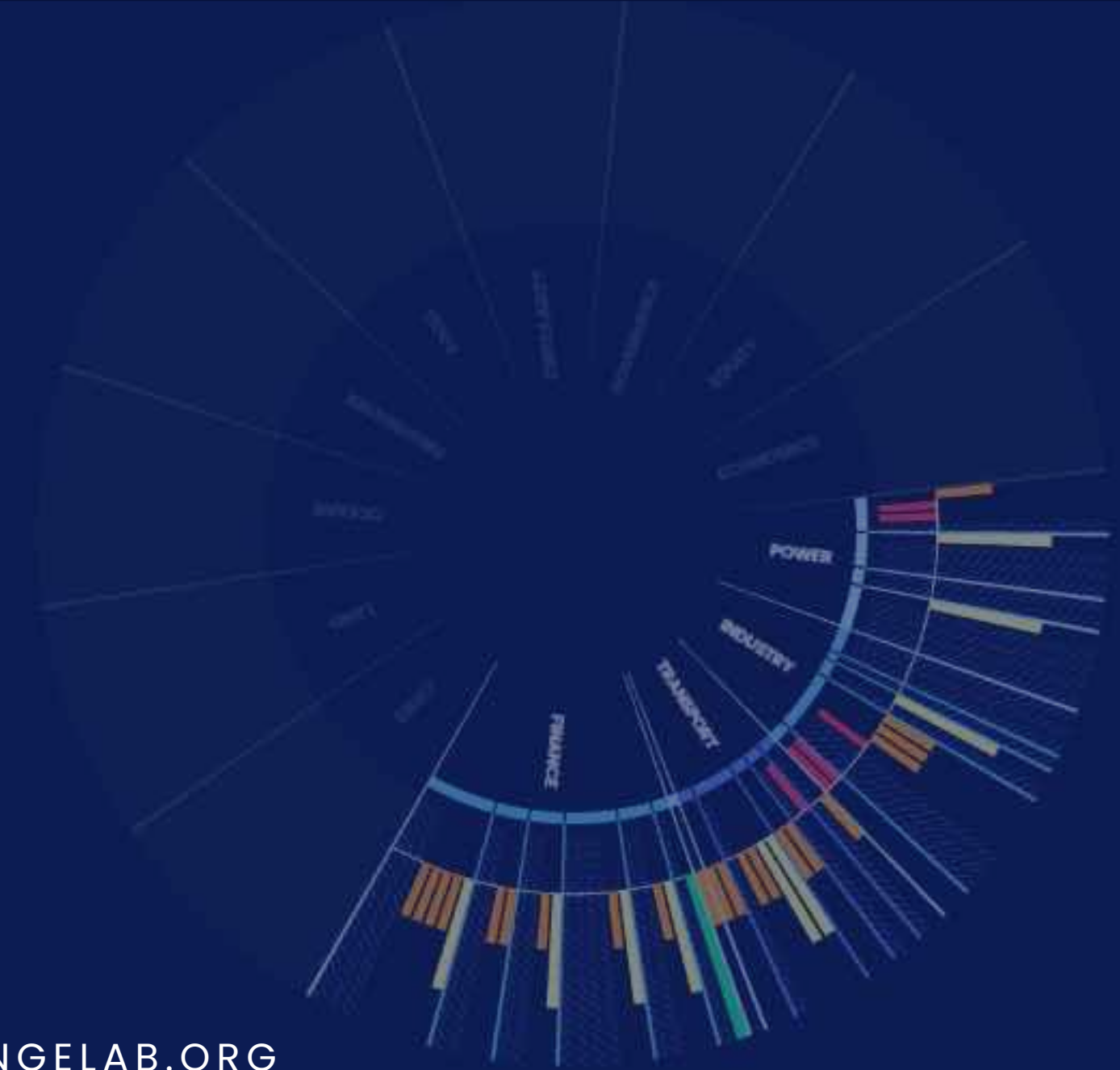
Set ambitious climate finance targets, particularly targets from wealthier countries focused on increasing international funding to developing countries.

Increase public support for financial reforms that raise revenues for climate action.

Assessing Progress toward 2030 Targets

Source: Boehm et al. 2022

For More Information



VISIT: SYSTEMSCHANGELAB.ORG

EMAIL: CONTACT@SYSTEMSCHANGELAB.ORG