March 2025

OpenMinds

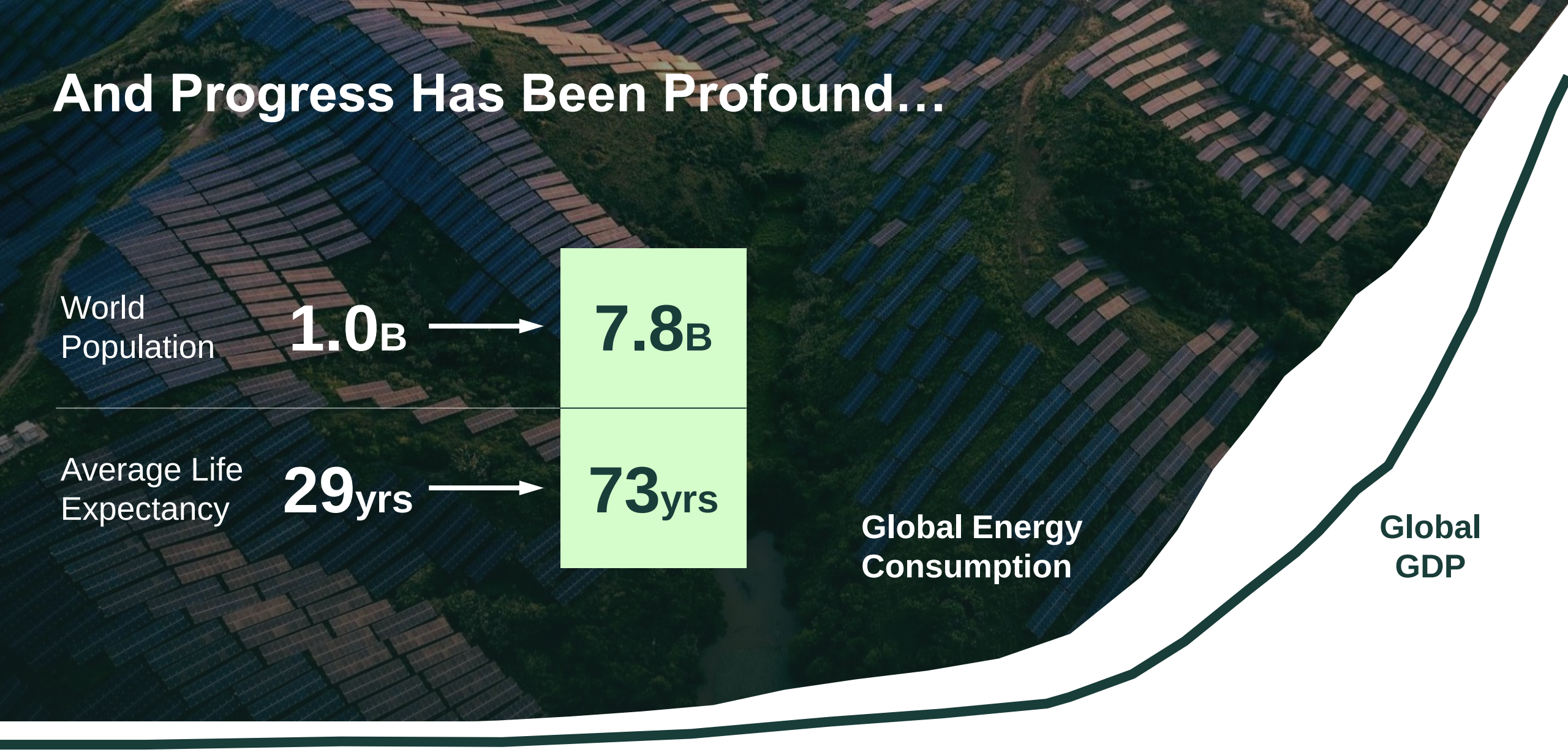
Accelerating Energy and Climate Progress

OpenMinds

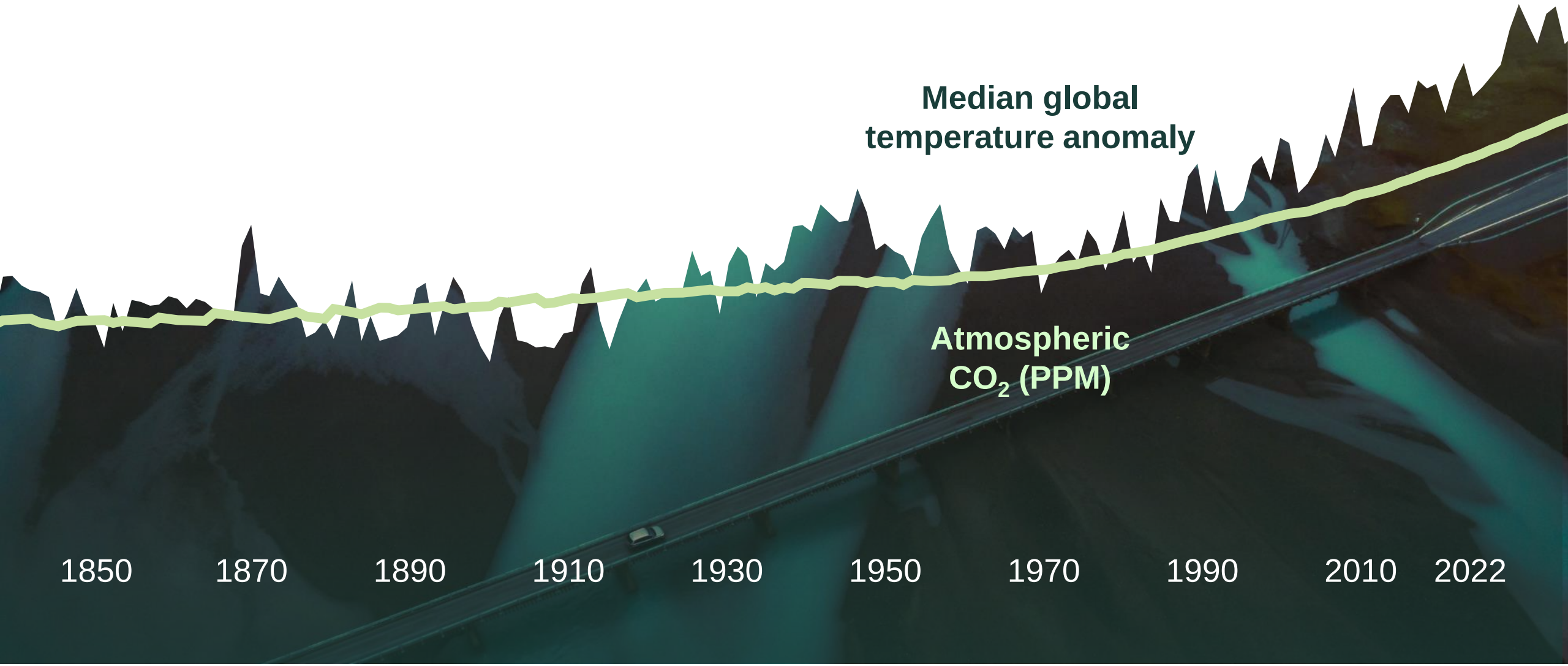
Access to Energy Enables Progress

And Progress Has Been Profound…

World Population	1.0B	7.8B
Average Life Expectancy	29yrs	73yrs



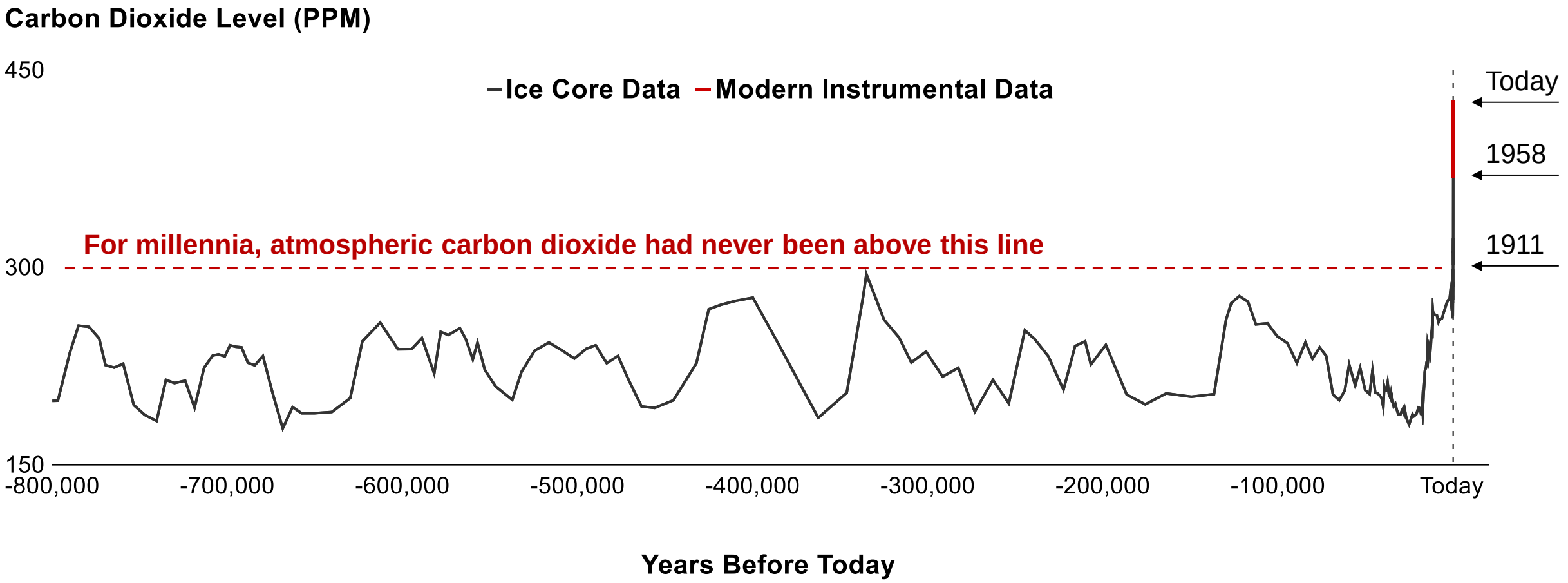
But CO_2 Concentrations and Temperatures Are Increasing



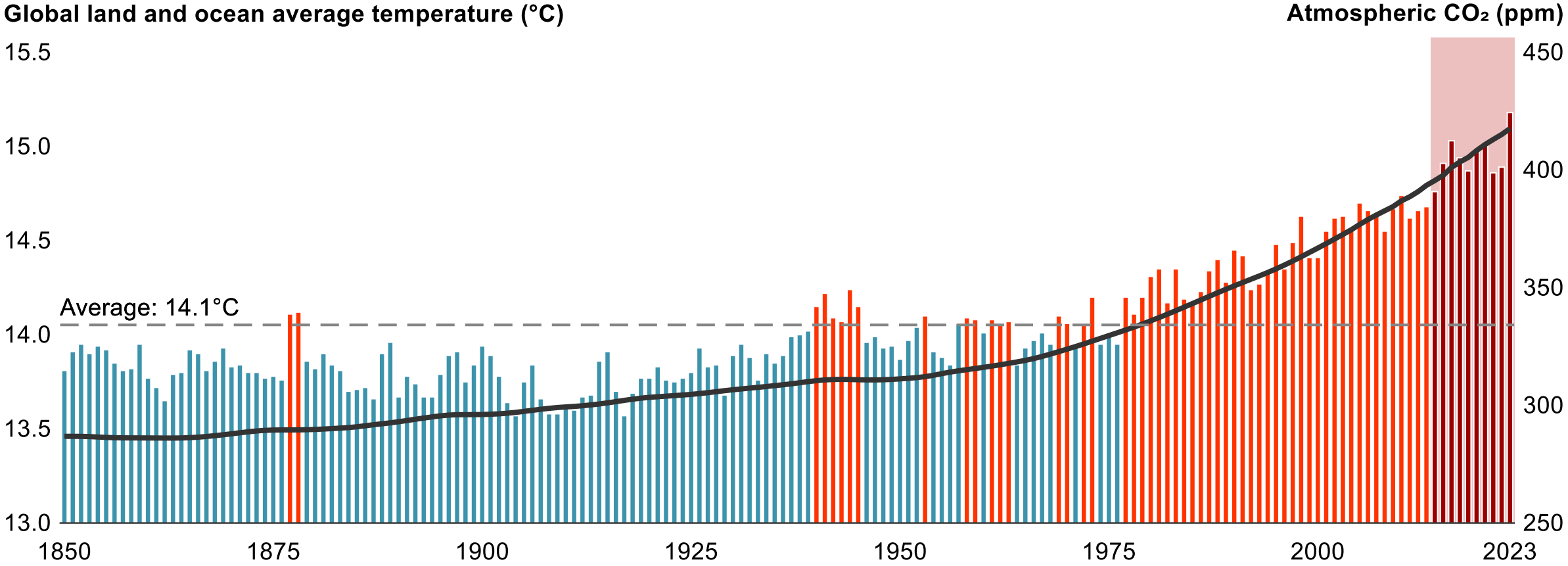
How “The Greenhouse Effect” Leads to Warming

house
more
raising

Atmospheric CO2 Has Skyrocketed in the Past Century



The Last 10 Years Were the 10 Warmest on Record



Last Ice Age

when ~25% of Earth's land area was covered in glaciers

6°C

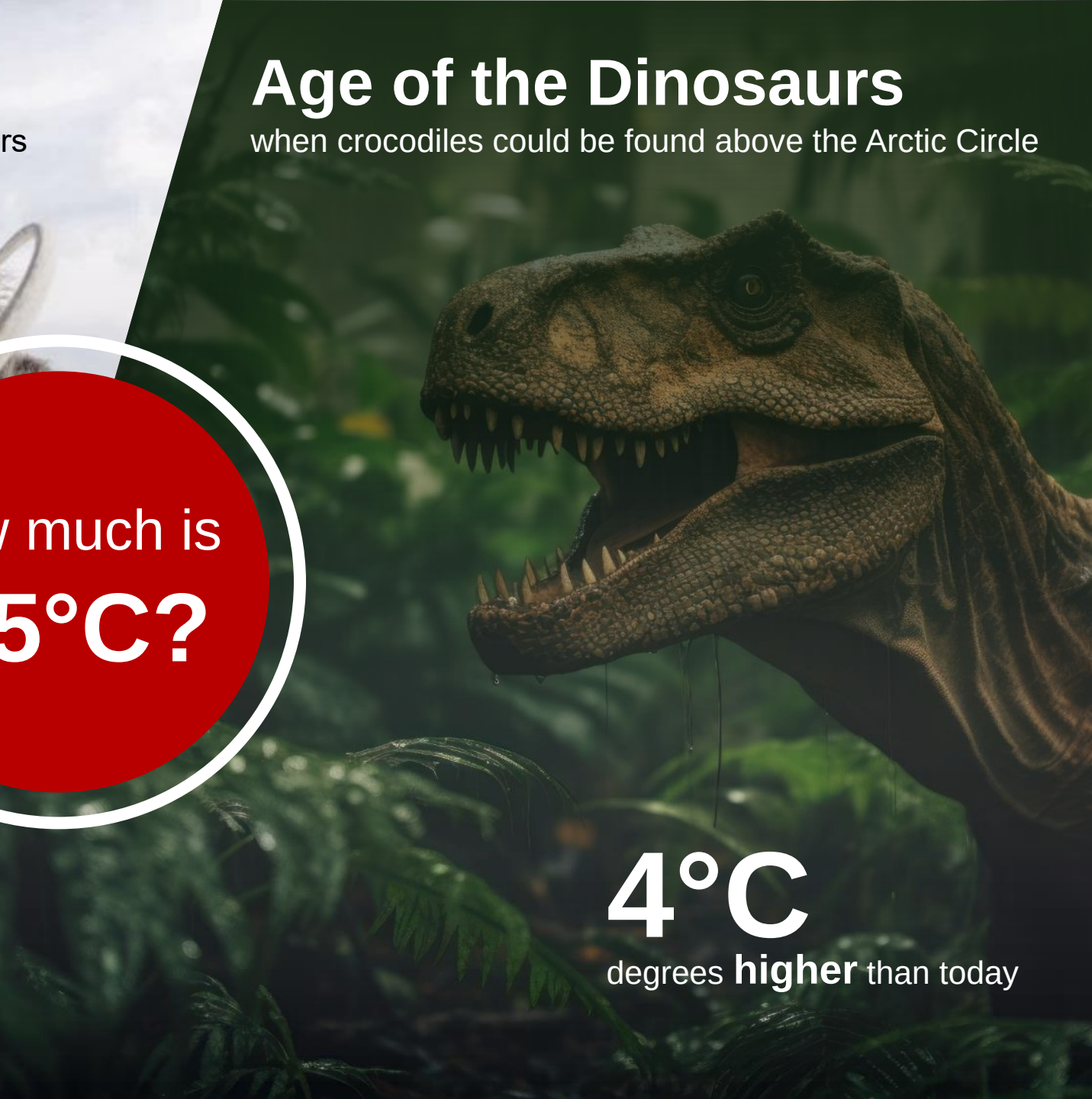
degrees **lower** than today

How much is

1.5°C?

Age of the Dinosaurs

when crocodiles could be found above the Arctic Circle

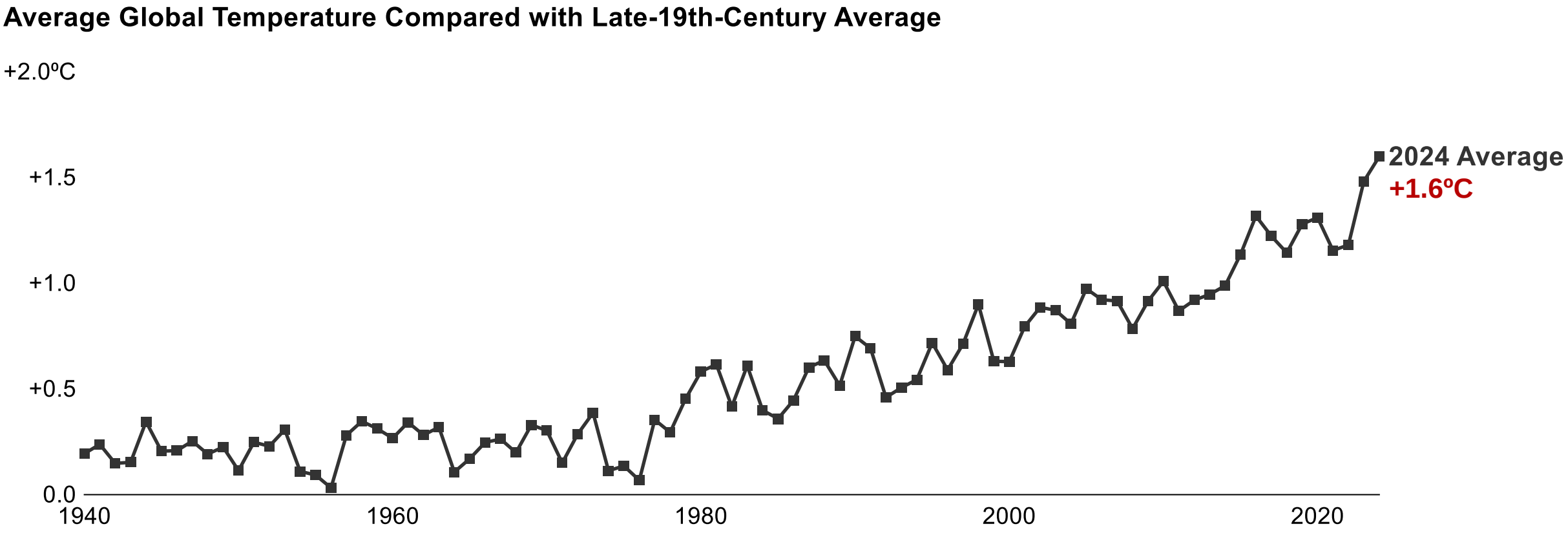


4°C

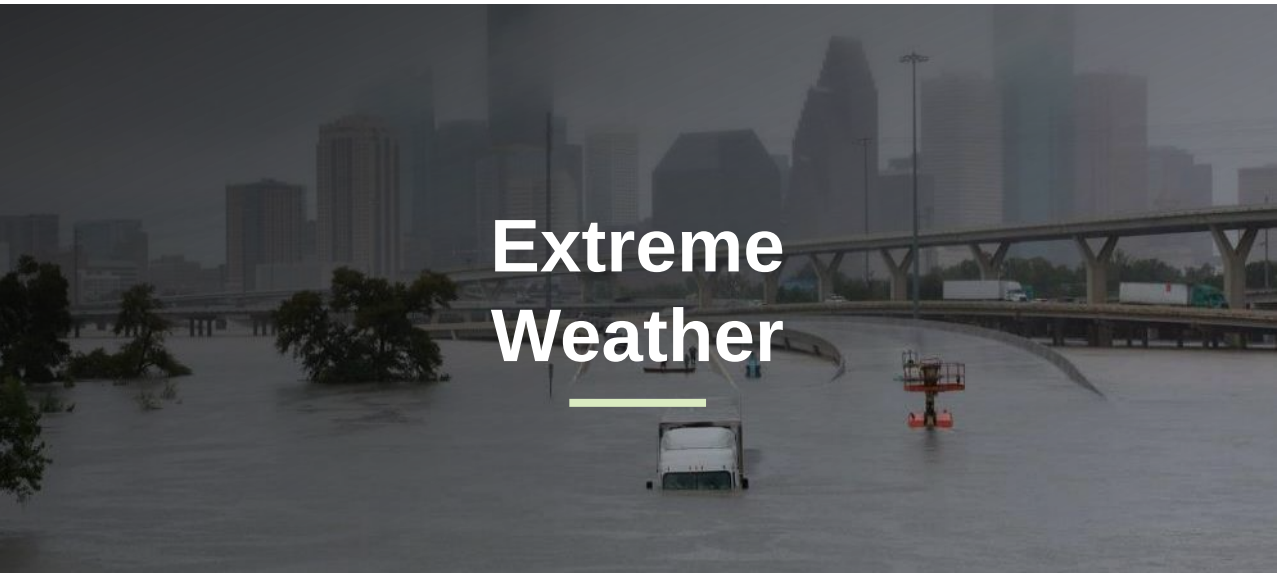
degrees **higher** than today

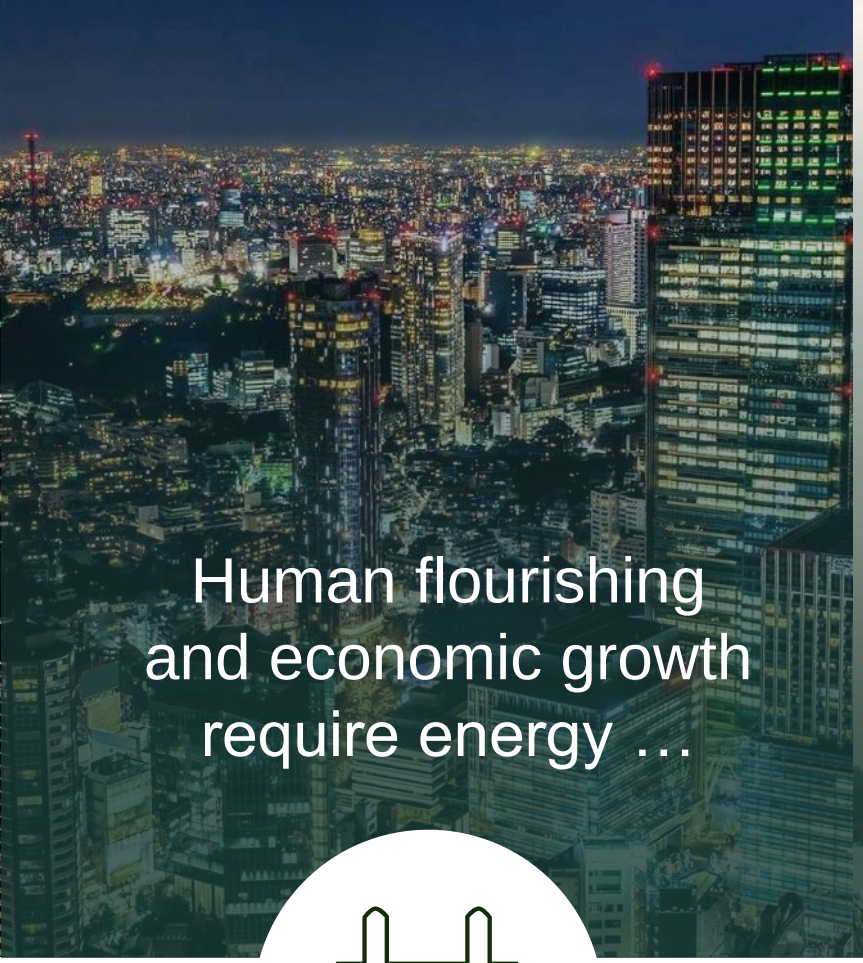
Source: Bill Gates, How to Avoid a Climate Disaster (2021); USGS

Global Temperature Increase Averaged +1.6ºC in 2024

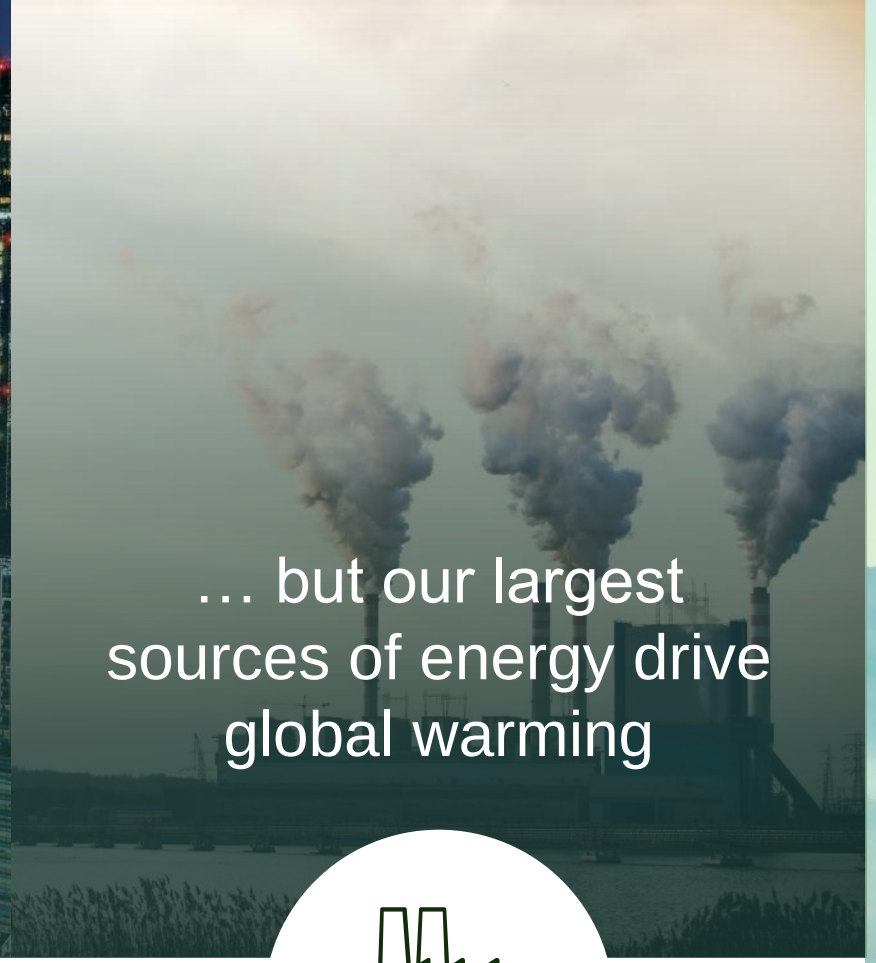


The Consequences of Warming are Real





Human flourishing and economic growth require energy …



… but our largest sources of energy drive global warming

This is the Dual Challenge

More energy

+

Less emissions

Agenda

1 Defining the Dual Challenge

2 Introduction to OpenMinds

3 Current Trajectory of Energy, Emissions & Warming

4 Our Solutions to Accelerate Progress

5 OpenMinds Taking Action

OpenMinds’ Mission & Identity

OUR MISSION

More energy. Less emissions. Fast.

- 125+ volunteer experts
- 501(c)(3)
- Disciplined non-partisan selection process
- 360° systems engineering approach

WHAT MAKES US UNIQUE

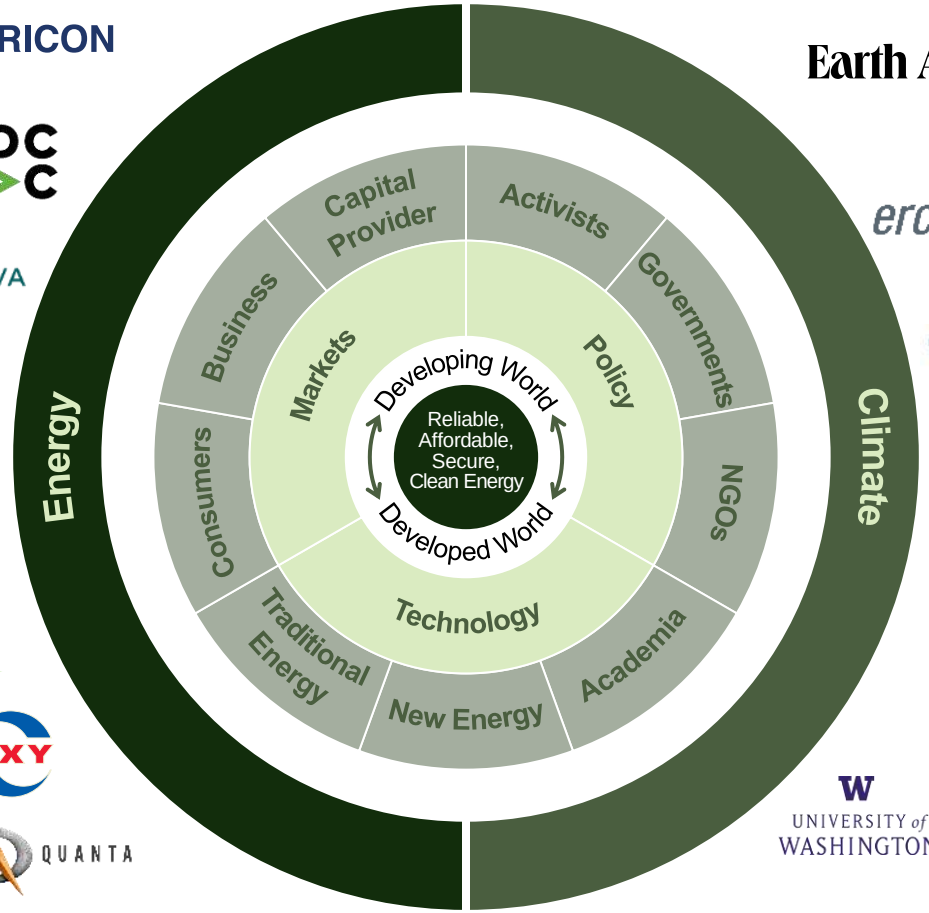
Energy AND climate

Cross-functional expert team

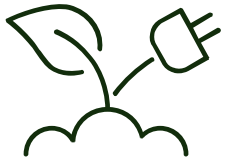
Detailed solutions framework

Impact progress by 203X

The OpenMinds Team… Energy AND Climate Experts

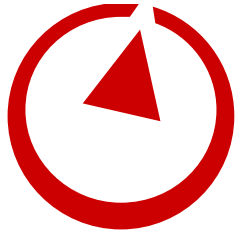


OpenMinds + Bain = Differentiated Impact

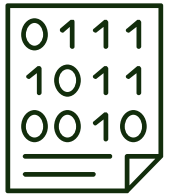


Energy and Climate

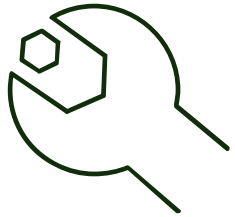
125+ Experts Across Key Energy and Climate Sectors



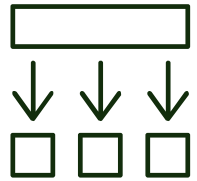
Bain Collaboration



Data-Driven



Practical Solutions Framework and 10-Year Horizon



Impact Projects Targeting Key Bottlenecks

Agenda

1 Defining the Dual Challenge

2 Introduction to OpenMinds

3 Current Trajectory of Energy, Emissions & Warming

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OpenMinds ‘P50’ Outlook – Projecting Our Current Path

2035 forecasts included in the ‘P50’ Outlook

	Global	US
Energy Demand	✓	✓
Supply Mix	✓	✓
Emissions	✓	✓

Developed and reviewed by industry leaders

MODEL CREATION

Intersect℠ BAIN & COMPANY

Copenhagen Economics CE

EXPERT REVIEW

GE VERNOVA

CLEAN AIR TASK FORCE

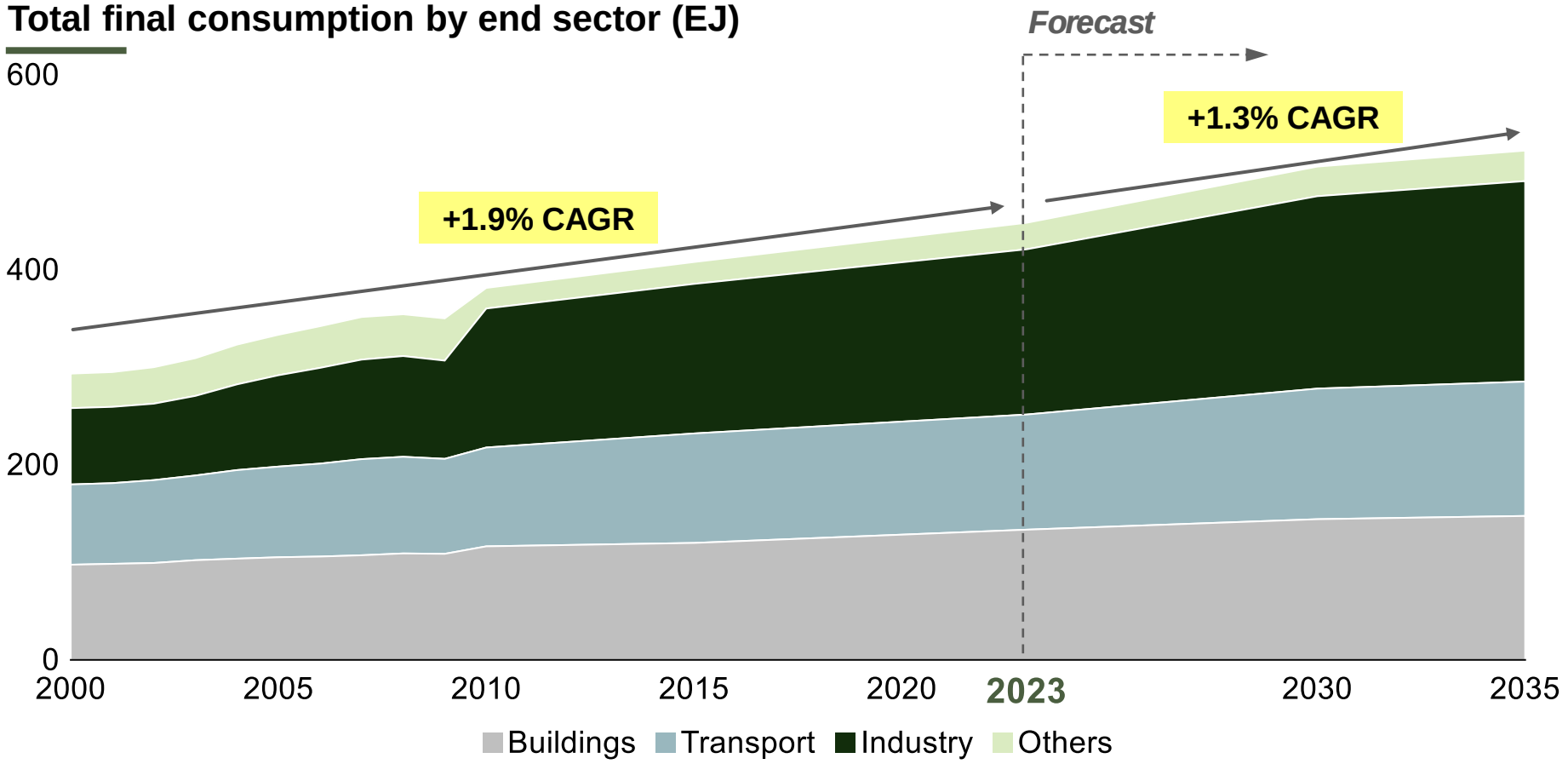
tpi

SCF PARTNERS
HOUSTON | CALGARY | ABERDEEN | SINGAPORE

NEW ENERGY CAPITAL

Global Energy Demand Continues to Grow

Total final consumption by end sector (EJ)



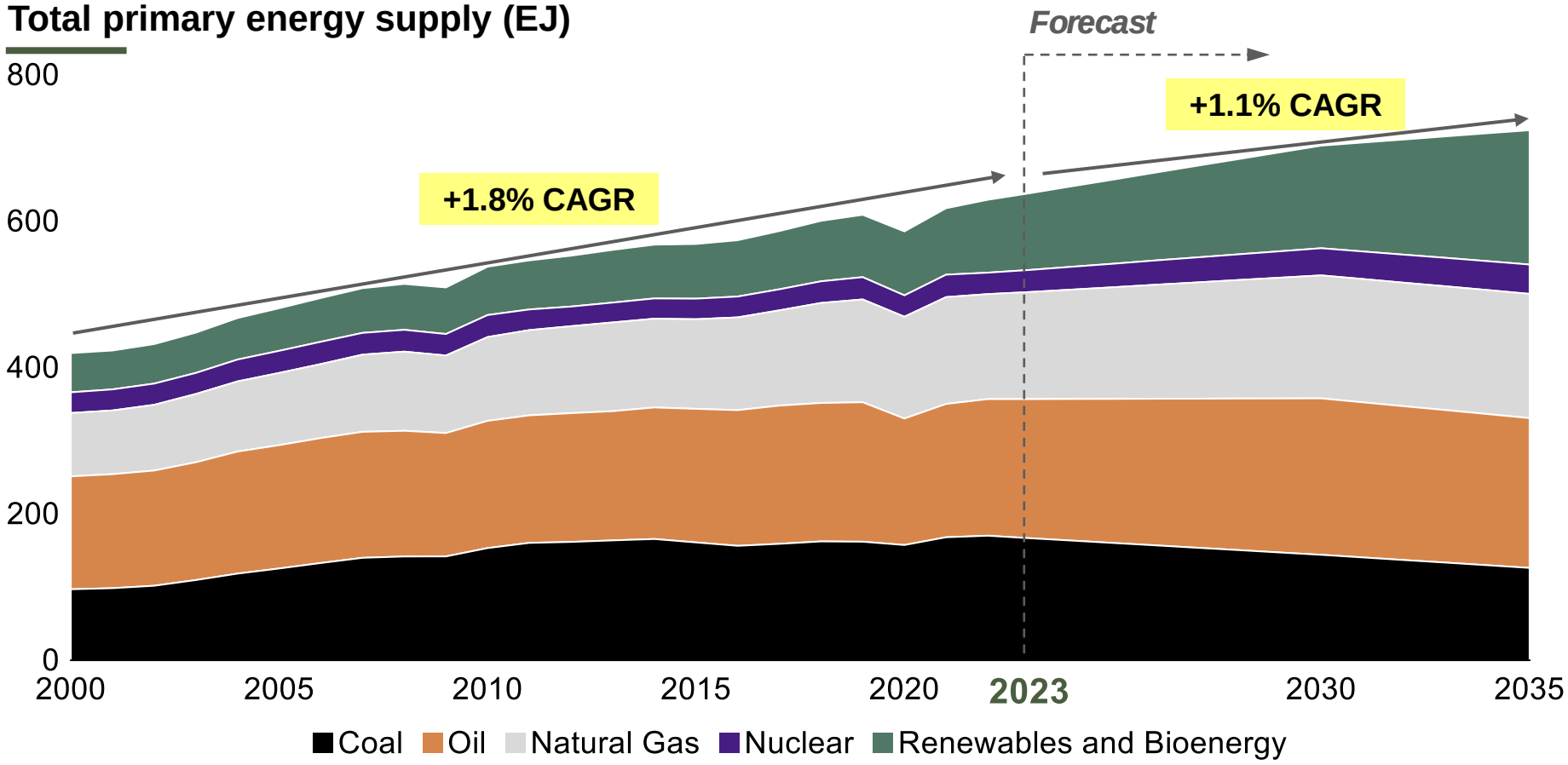
Outlook through 2035

+17% growth

- ...driven by **developing economies**
- …partially offset by **reduced energy intensity**
- …with **largest share from Industry**

The Global Energy Supply Mix is Shifting

Total primary energy supply (EJ)



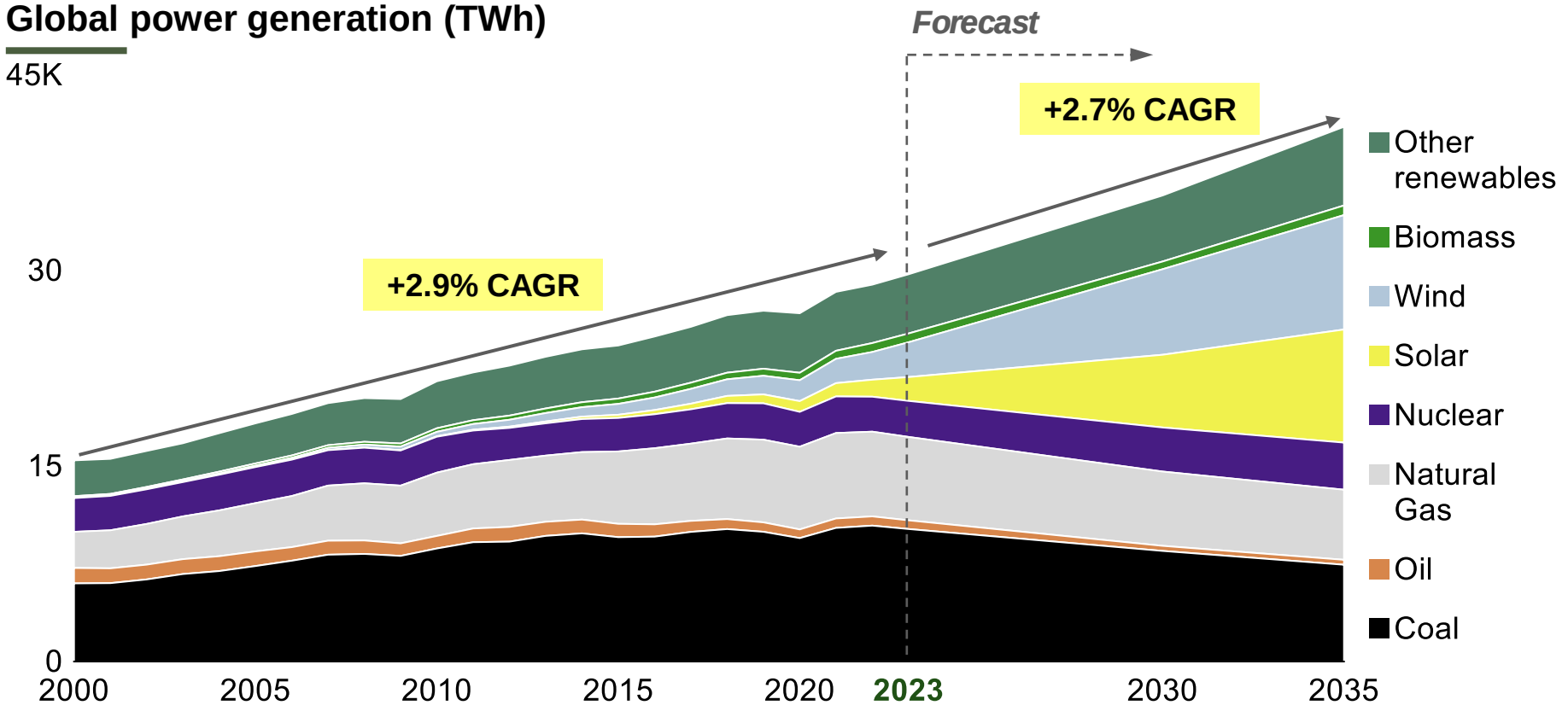
Outlook through 2035

+14% growth

- …as **renewables surge to 25% of energy mix**
- ...while **oil peaks in 2030** and **natural gas share holds steady**
- …partially offset by **efficiency from electrification**

Electricity is Growing Even Faster Than Primary Energy

Global power generation (TWh)



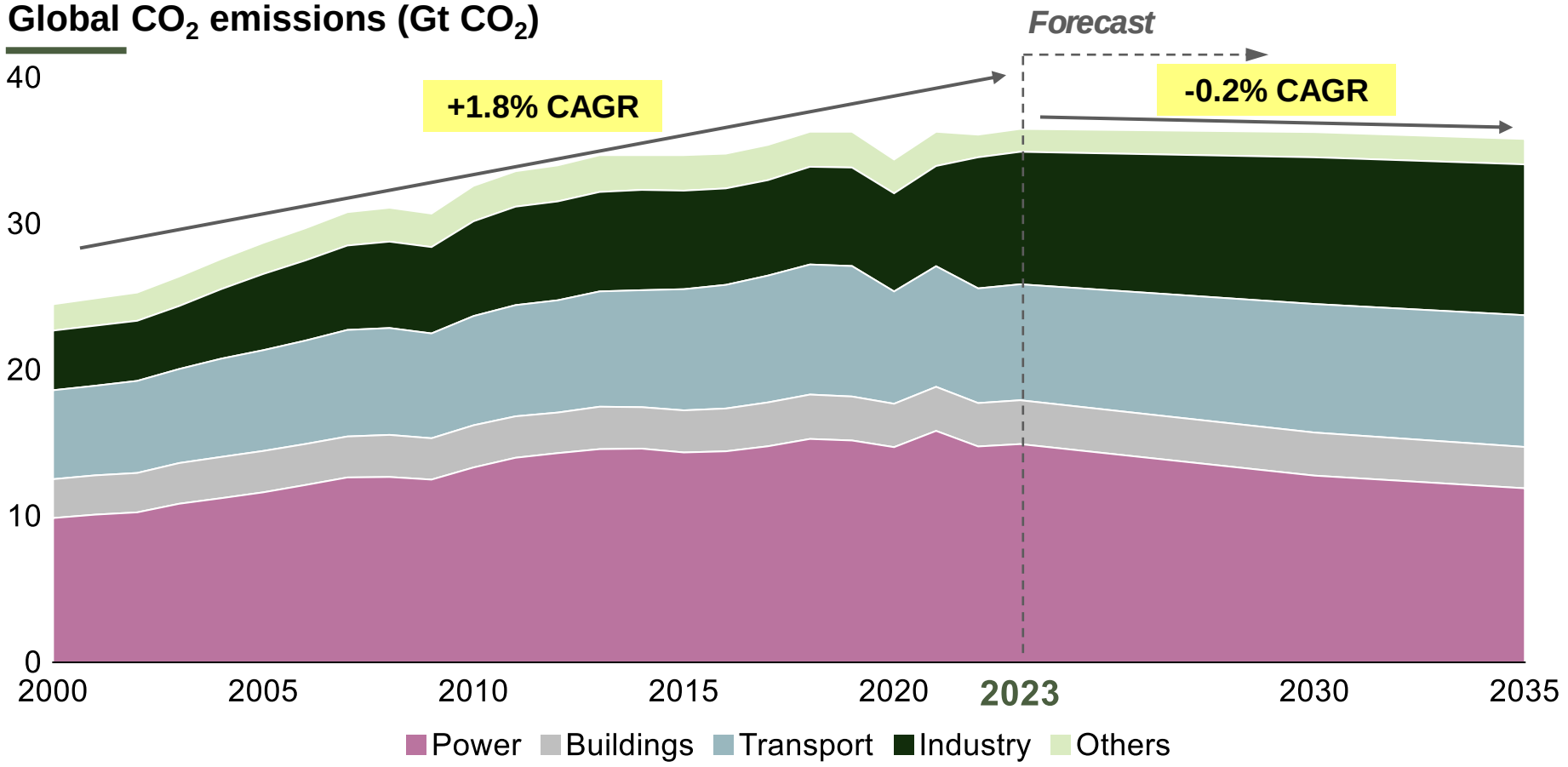
Outlook through 2035

+38% growth

- … as **electricity grows from 24% to 28% of total final consumption**
- … while **solar and wind surge to 43% of generation**
- ... amplified by **cheaper battery storage**

Global Carbon Emissions are Peaking

Global CO_2 emissions (Gt CO_2)

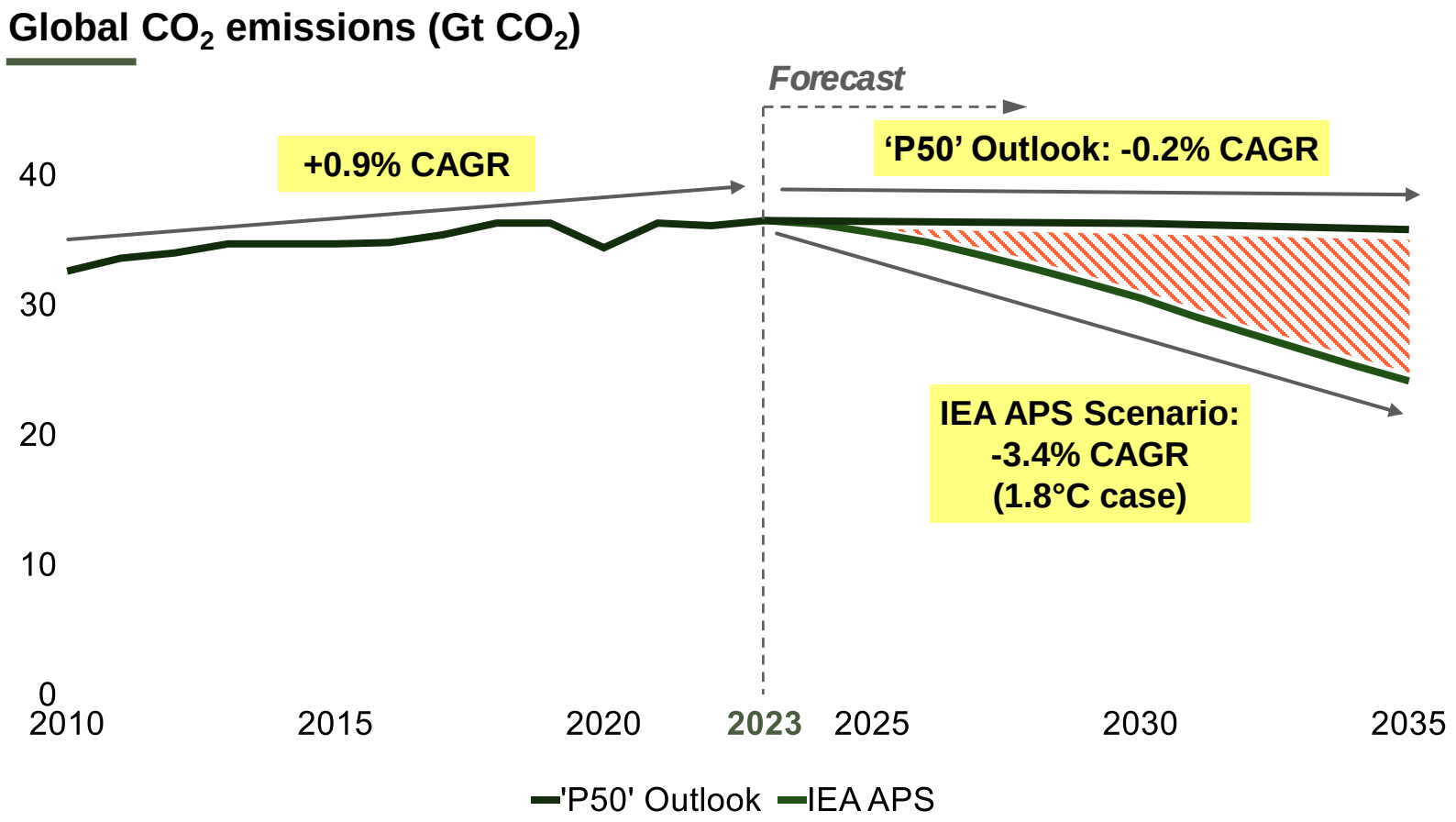


Outlook through 2035

Flattening

- ...as **China emissions peak by 2030**
- …and **transport and industry electrify** in developed economies
- …partially offset by **fuel-driven industrialization** in developing economies

We’re Bending the Emissions Curve, Yet Face a Big Gap



The gap through 2035

~66Gt

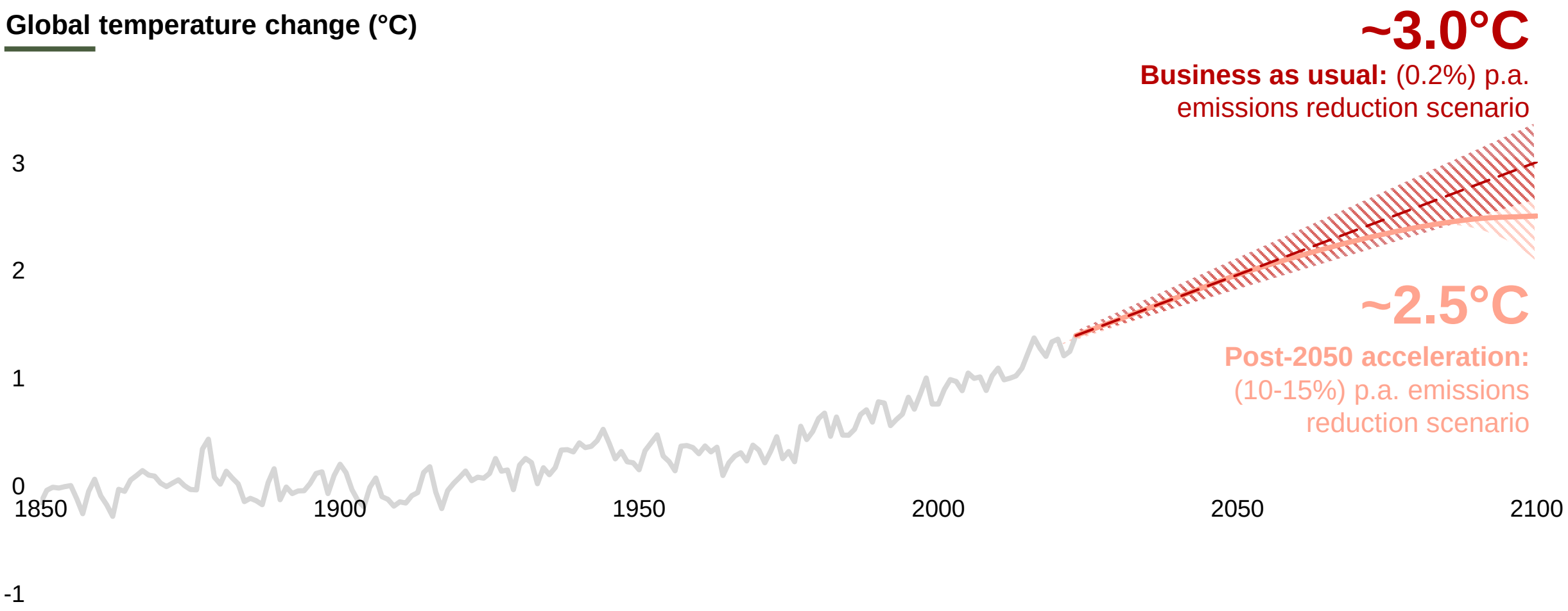
Total global CO_2 emissions gap between the ‘P50’ Outlook and 1.8°C scenario

-14%

Total global CO_2 emissions reduction needed to stay on track from ’23-’35

Temperatures Will Increase Without Further Progress

Global temperature change (°C)



To Recap: OpenMinds' 2035 Energy & Climate Outlook

Energy Demand...

Up 15%

Oil Demand...

2030 Peak

Natural Gas Demand...

Up 15%

Renewable Energy...

25% of mix

Carbon Emissions...

Peak

Global Temperature...

Up 2.5-3.0°C

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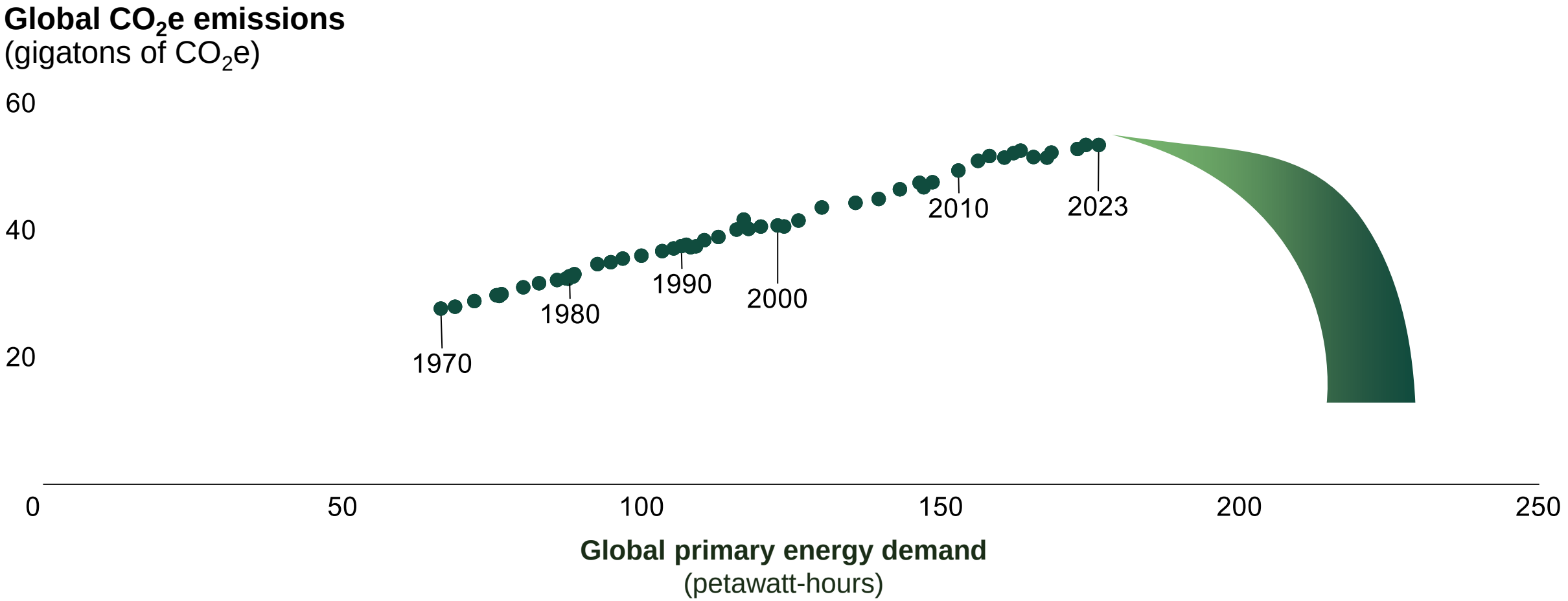
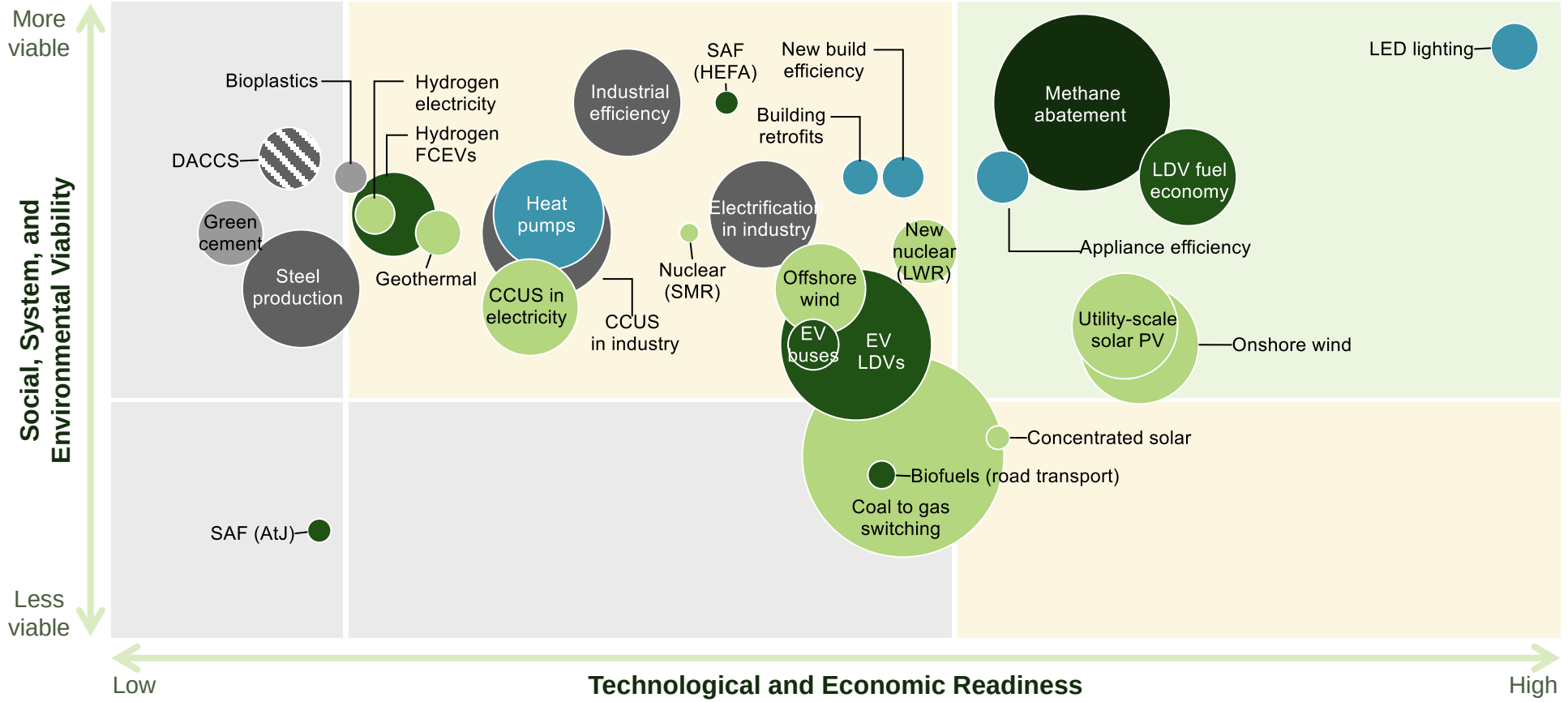
Our Task: Change the Trajectory of Emissions



Prioritization of Potential Solutions



Electricity generation from fossil fuels
Energy usage in buildings
Industrial processes
Oil and oil products for transportation
Fugitive emissions
Other

1.5 $GtCO_2e$ — Medium-term annual CO_2e abatement potential

Prioritized by:

- Low cost
- Deployment speed
- Abatement potential

OpenMinds' Top 10 Solutions

Cost effective, ready now

Big 4 opportunities

- Abating methane emissions from energy
- Renewables (i.e., solar and wind)
- Coal-to-X switching
- CCUS in electricity and industry
- Transportation energy efficiency
- Industrial efficiency and electrification
- Electric LDVs
- Heat pumps
- LED lighting
- Buildings efficiency

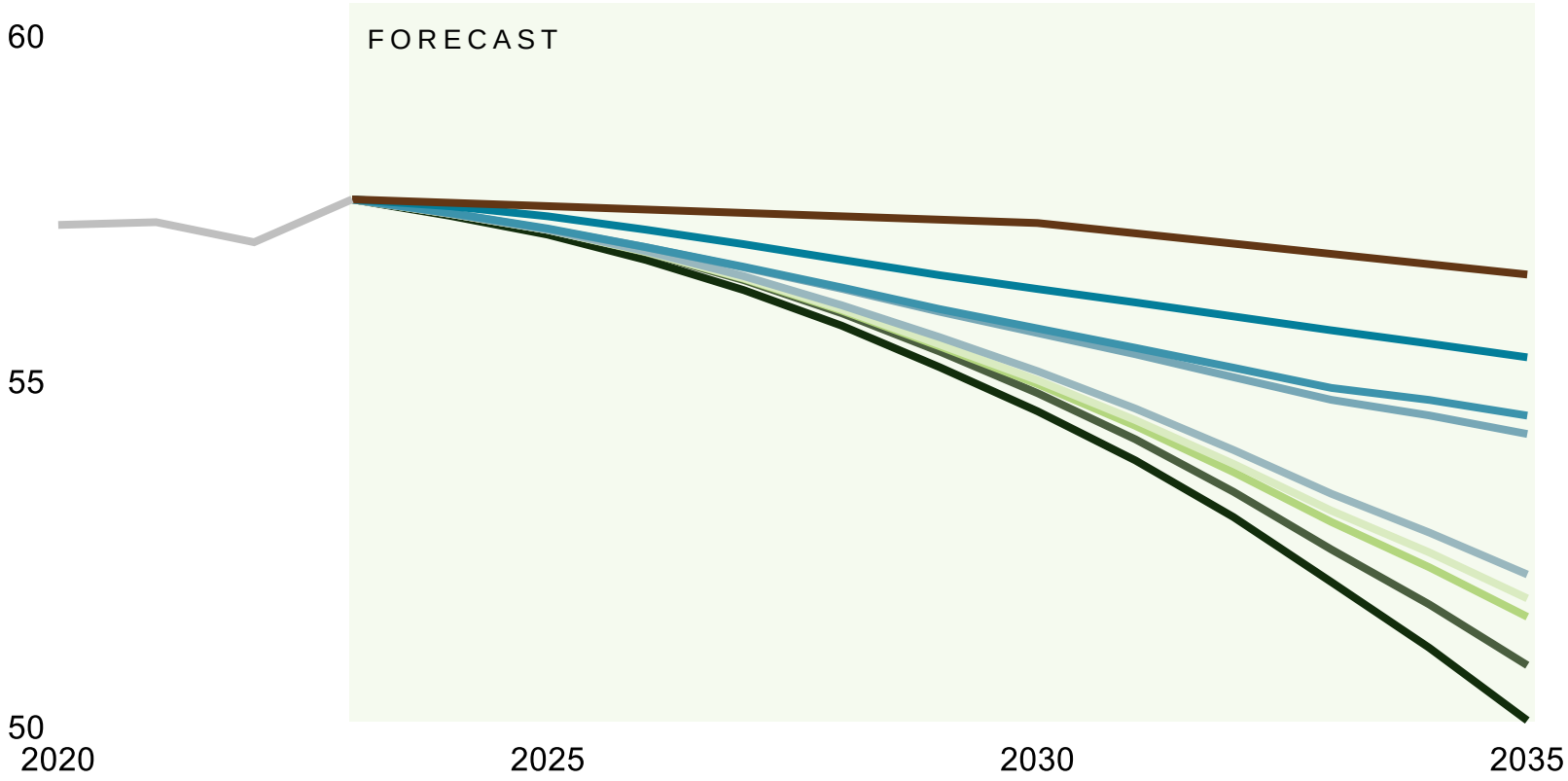
Longer timeline to full potential

- Behavioral change
- Adaptation
- Distributed generation
- Green steel and cement
- Nature-based solutions
- Hydrogen
- New and existing nuclear
- Direct air capture
- Geothermal
- Circular economy

Impact of Implementing Key Solutions

Projected emissions impact

GIGATONS OF CO_2E PER YEAR

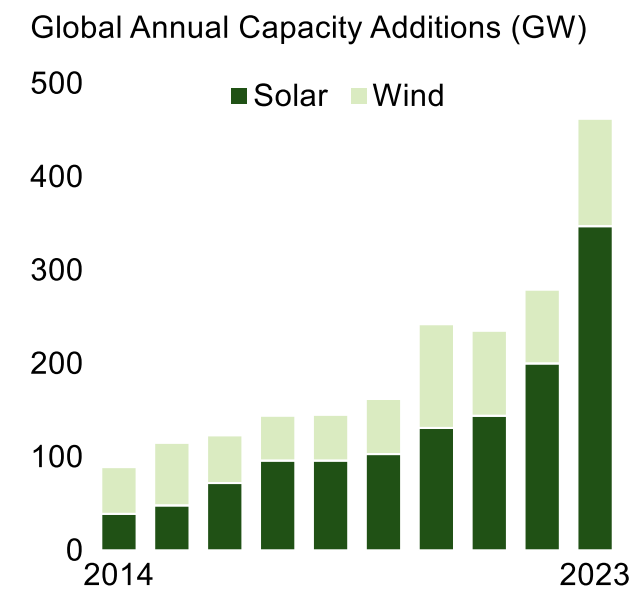


Baseline
+
Methane abatement
+
Coal-to-X switching
+
CCUS in electricity & industry
+
Renewables
+
Nuclear
+
Transportation efficiency
+
Transport electrification
+
Buildings and industry efficiency and electrification

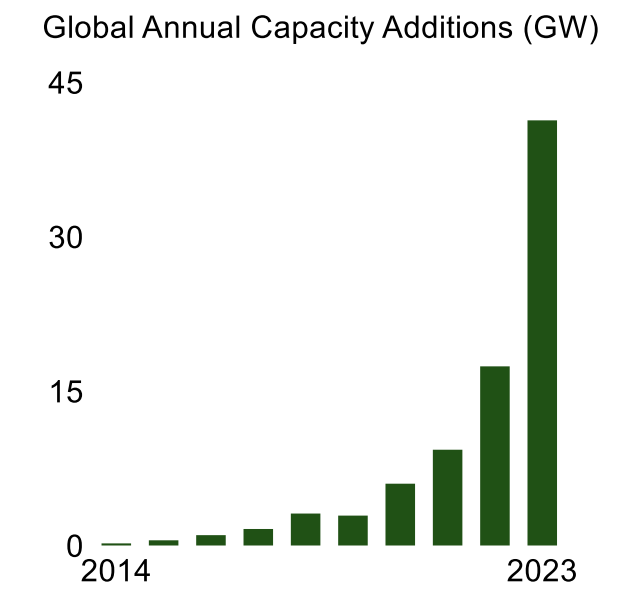
Early Wins – Technology

LED Lighting

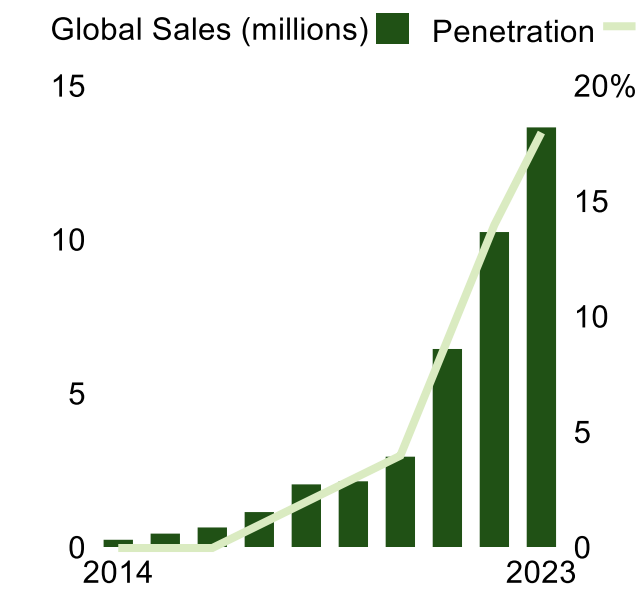
Solar & Wind



Battery Storage



Electric Vehicles

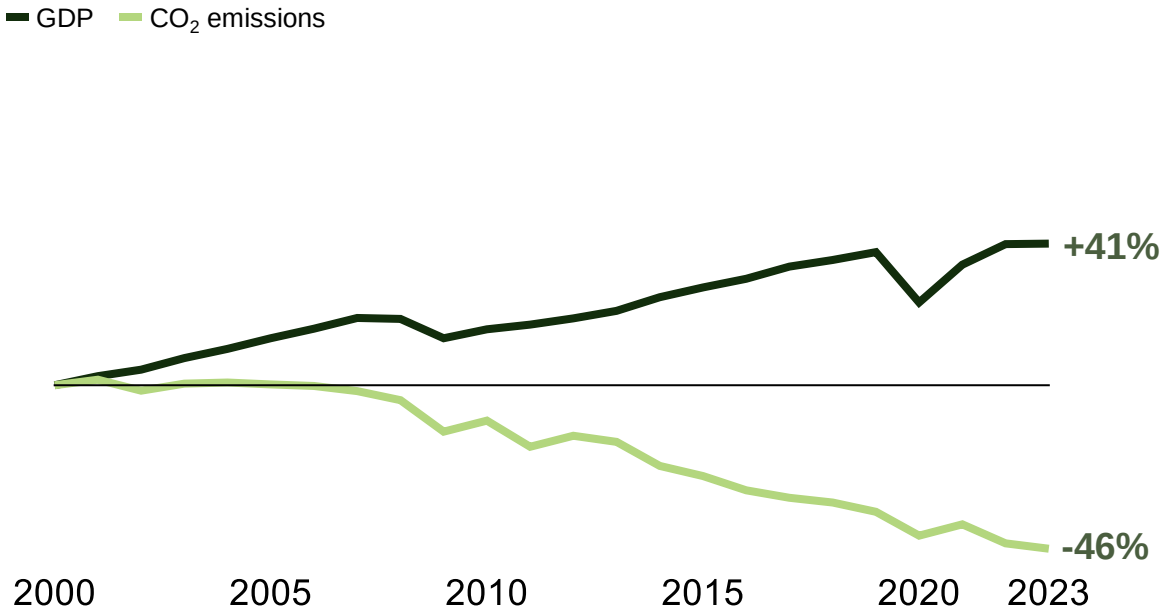


These technologies have already reduced annual emissions by ~2-3 Gt (7-8%)

Sustained Wins – Decoupling Growth and Emissions

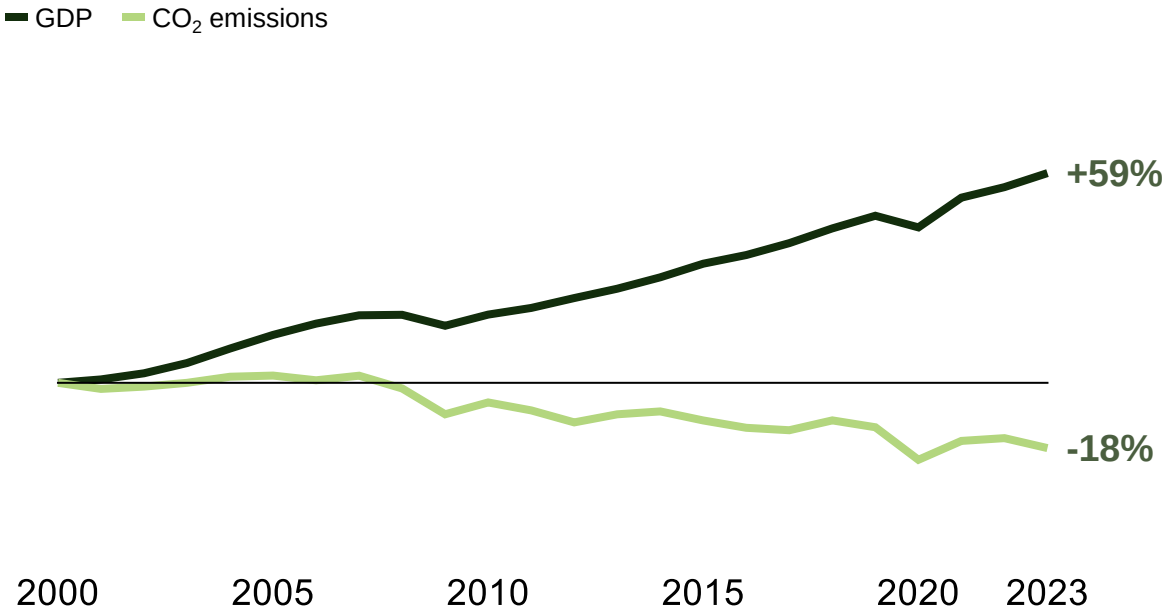
Change in GDP and CO_2 emissions

United Kingdom



- Coal phase out
- Offshore wind growth
- Energy efficiency gains

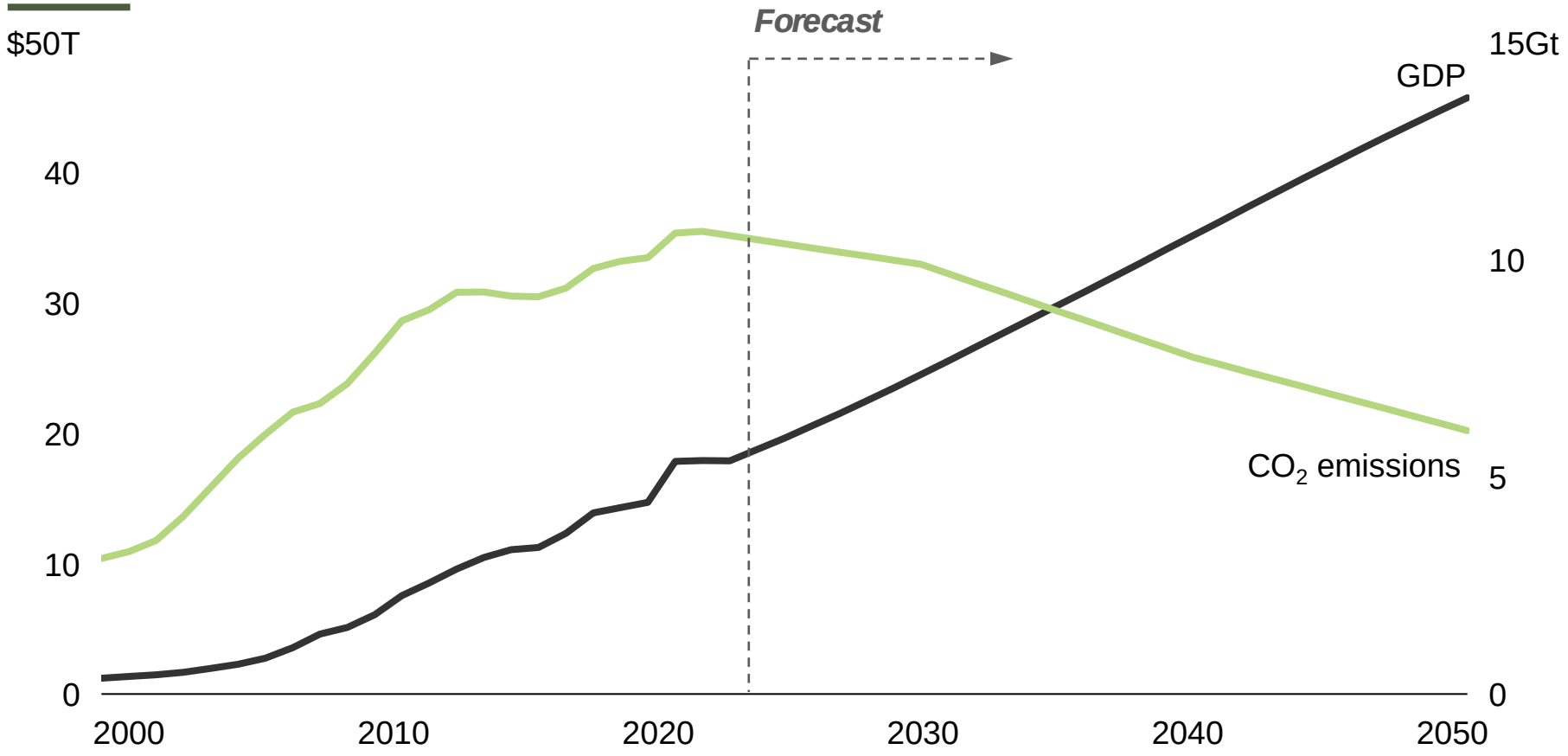
United States



- Coal to gas switching
- Wind and solar expansion
- Enhanced energy efficiency

Emerging Wins – China's Transformation

Chinese GDP ($T) and CO_2 emissions (Gt)



Outlook through 2035

Emissions peak

- … by **2030**, driven by huge **investments in wind, solar, batteries, and nuclear**
- … while **reducing reliance on coal**
- … and **maintaining economic growth**

Accelerating Progress Will Require More Investment

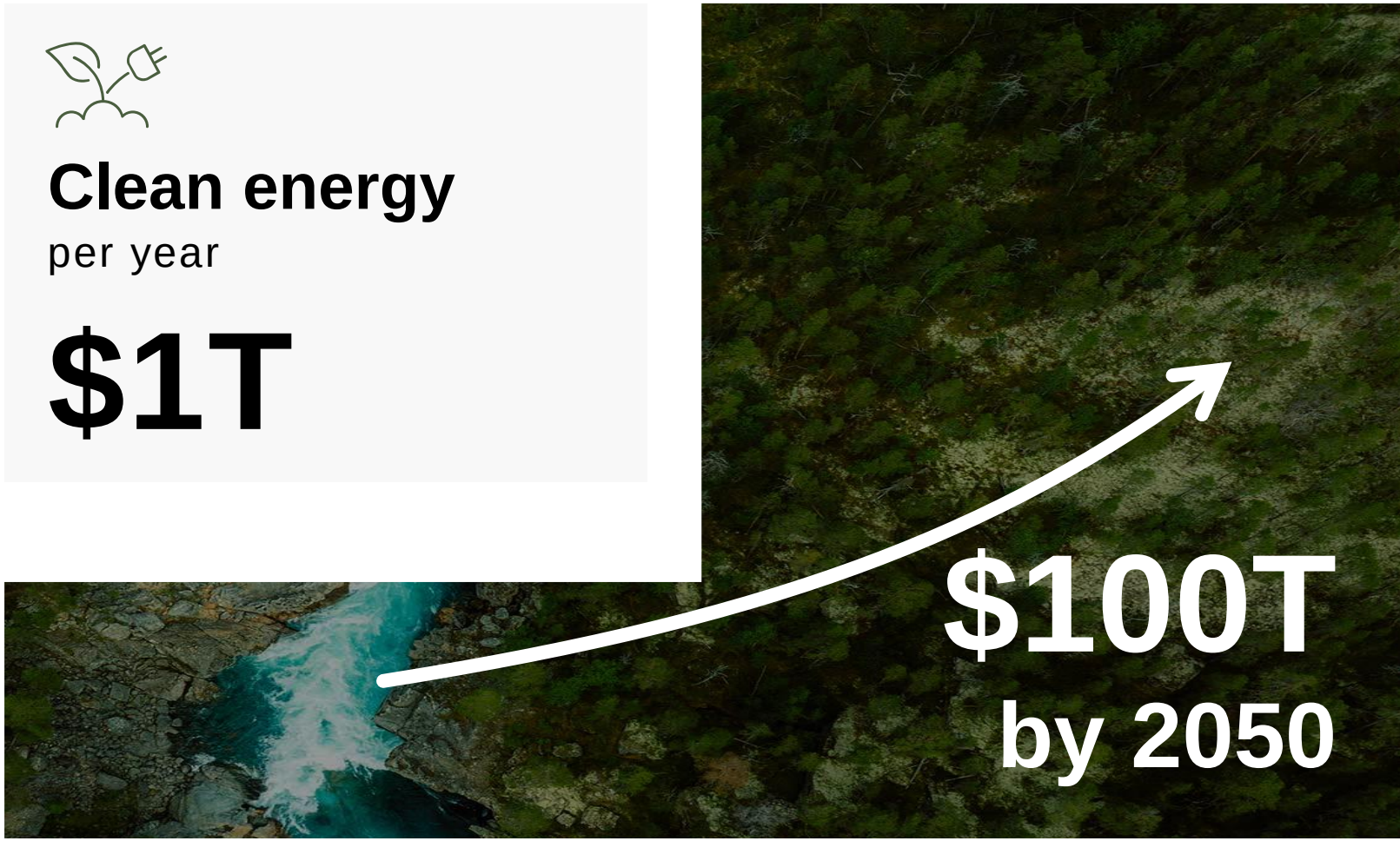
$5T

Fossil fuel
per year

$1T

Clean energy
per year

$1T



Near Term Investment = Long Term Benefits

	Shorter Term (2025-2035)	Longer Term (2035+)
Energy Investment	↗ Increasing	↘ Decreasing
Energy Costs	↗ Increasing	↘ Decreasing
Economic Growth	→ Slowing	↗ Accelerating
CO_2 Emissions	→ Peaking	↘ Decreasing
Climate Impact	↗ Warming	→ Stable
		Benefits accrue to all future generations

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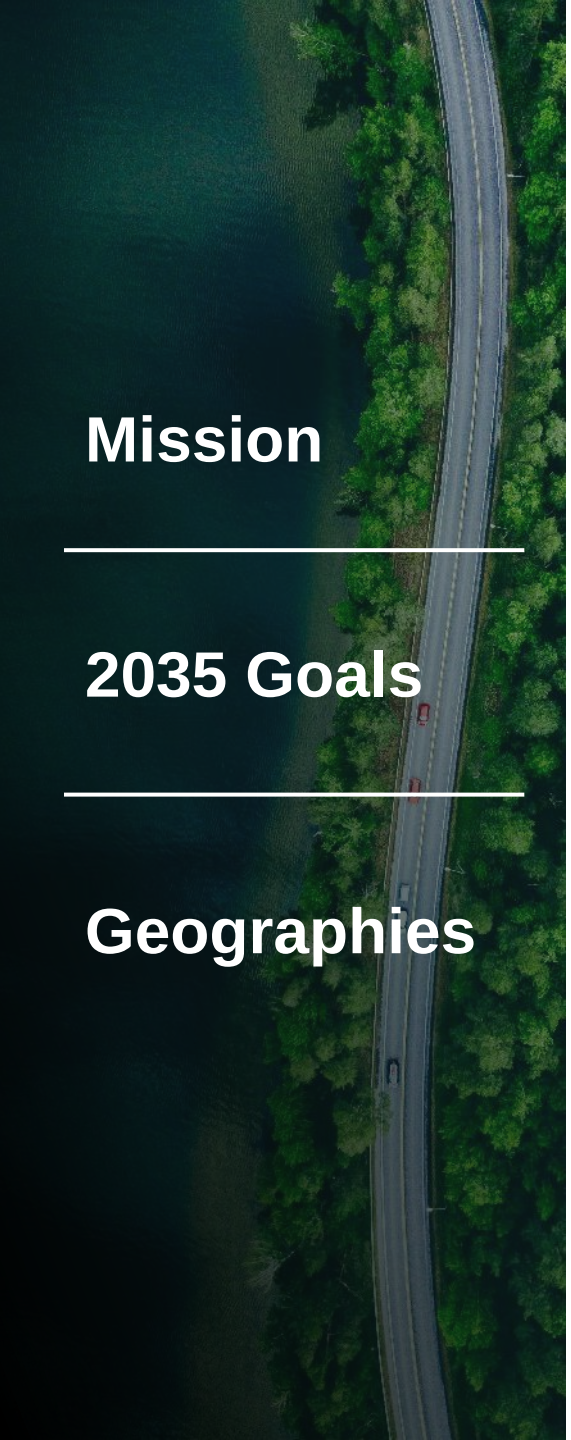


OpenMinds' Impact Strategy

Mission

More energy. Less emissions. By 203X.

2035 Goals

Break the emissions growth trend and accelerate decline.

Geographies

Phase 1 (2024-2026)	Phase 2 (2026-2030)	Long-term (2030+)

Accelerate US →

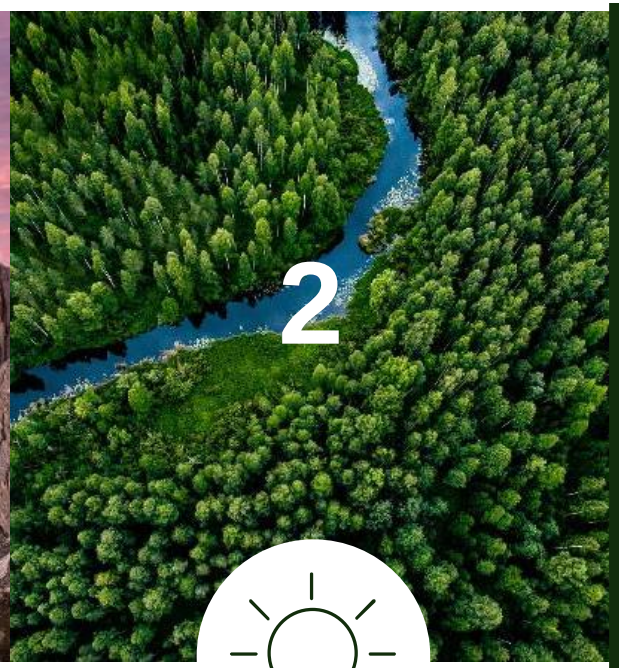
EU / UK →

Asia →

OpenMinds: Transitioning to Impact in 2024+

2022 - Define

More energy.
Less emissions.
By 203X.

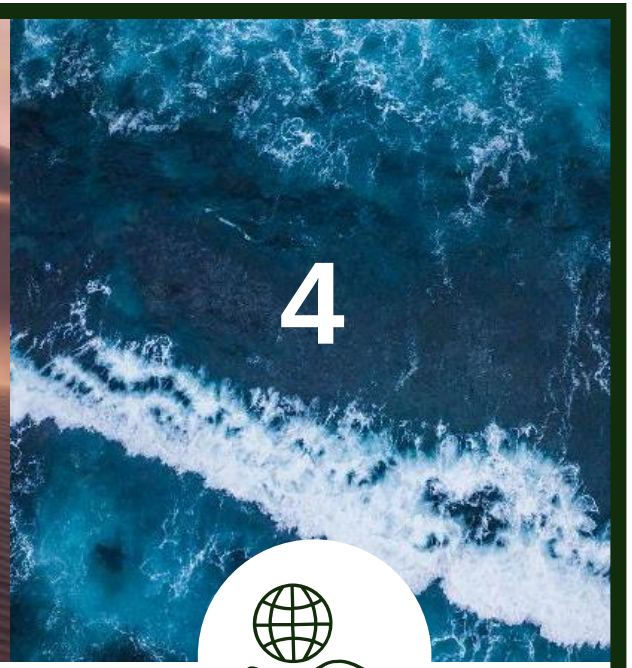


2023 - Solve

Data-driven.
Solutions pathway.
Cost, speed, scale.

2024 - Impact

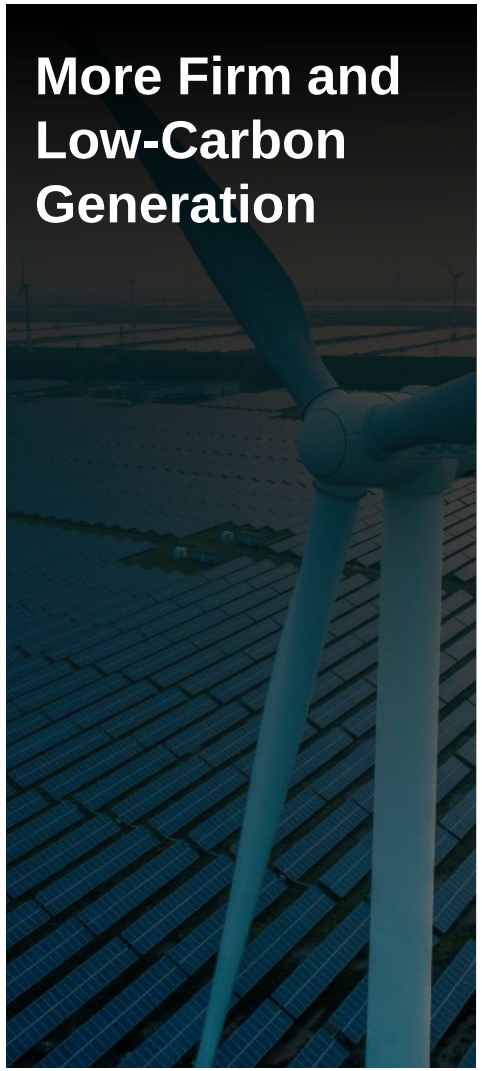
8 projects.
Removing bottlenecks.

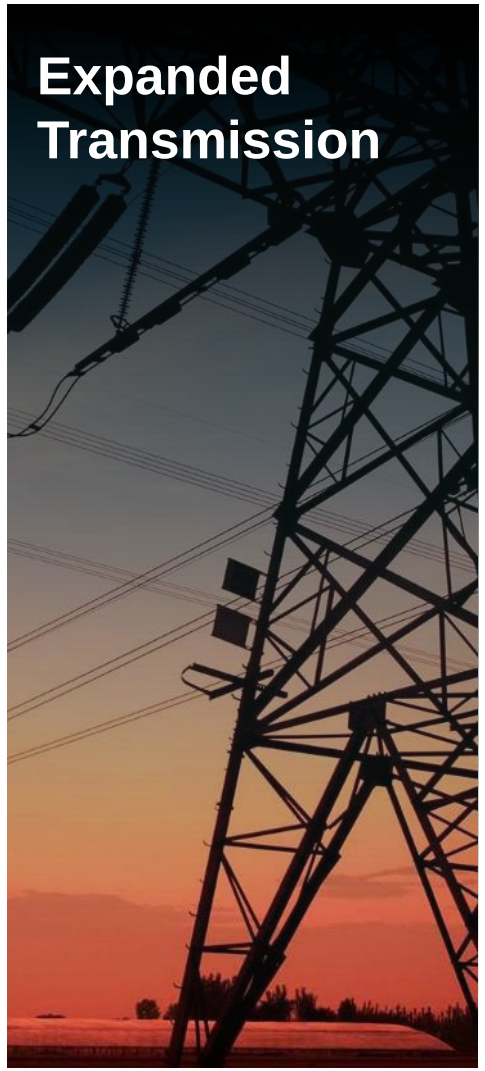


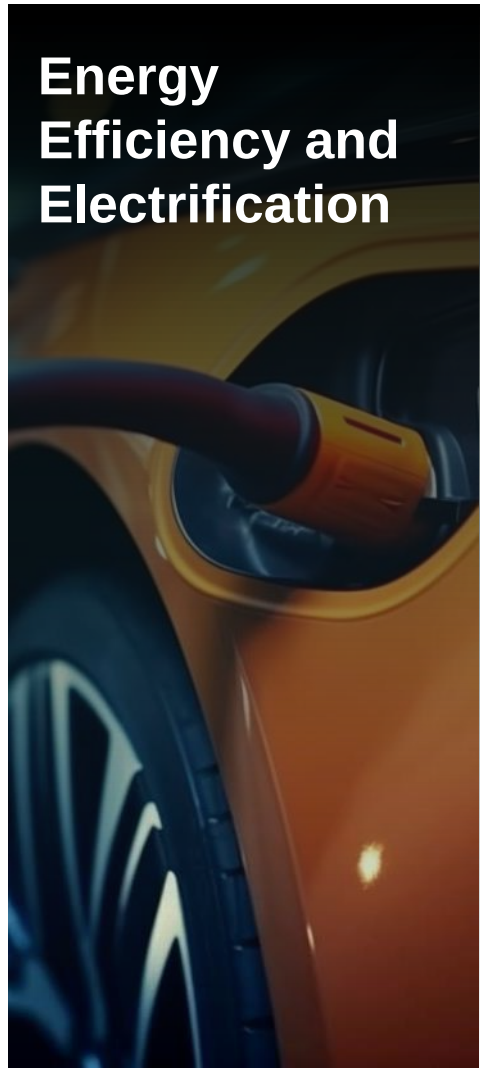
2025 plus - Scale

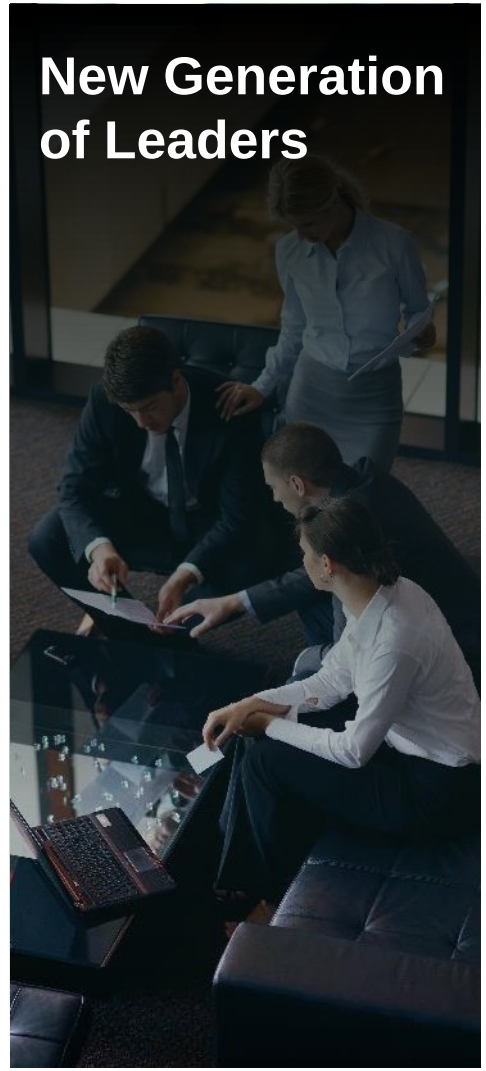
Additional projects.
Global reach.

What’s Needed to Close the Gap in the US









OpenMinds' Impact Projects – Removing Key Bottlenecks

More Firm and Low-Carbon Generation

- Meet AI Demand with Renewables
- Create the Market for Multi-Day Storage
- Segment Direct Air Capture Customers

Cleaner Fossil Fuel Power

- Quantify CCUS Economics
- Prove and Catalyze CCS
- Incentivize Methane Abatement
- Evaluate Coal-to-X Switching Full Potential

Expanded Transmission

- Accelerate Transmission Permitting Reform
- Catalyze Transmission Investment
- Improve Community Benefits of Transmission

Energy Efficiency and Electrification

To be determined

New Generation of Leaders

- Launch NextGen Program
- Scale the NextGen Community

Trusted Source of Information and Progress

The World...

will need more energy to grow and thrive, while climate impacts and urgency to act intensify

In the Long Term...

energy prices can be reduced and climate impacts minimized as more success stories emerge

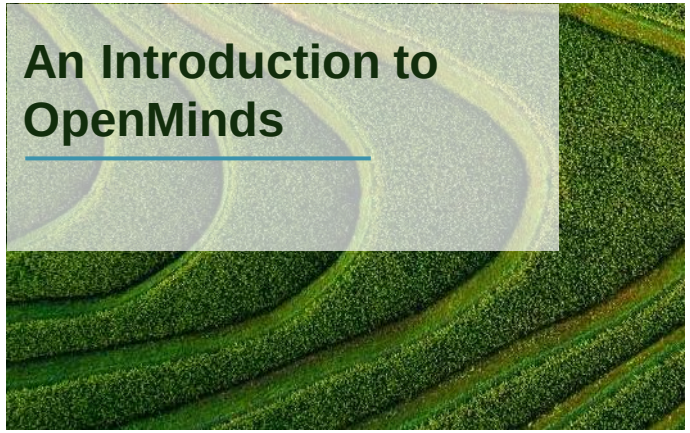
Bending the Curve...

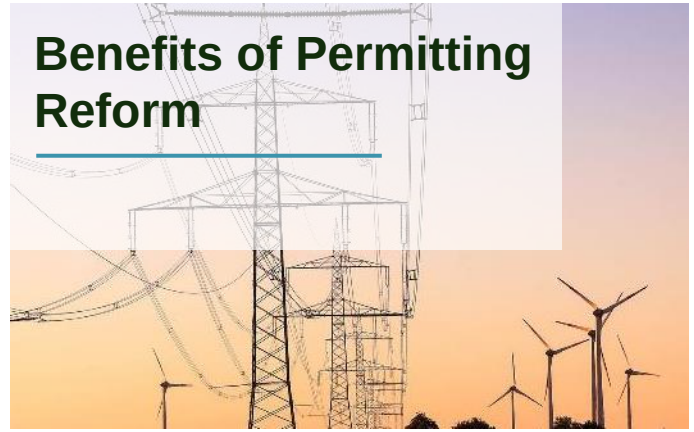
requires near-term action and large investment in prioritized solutions

OpenMinds...

is bringing energy AND climate experts together to remove key bottlenecks and accelerate progress

Sharing Our Work – OpenMinds203x.org





OpenMinds

Solving for the

Dual Challenge

openminds203x.org