

A hand holding a small globe of the Earth in a lush green forest setting. The background is a soft-focus forest with green foliage and a bright light source creating a bokeh effect.

Transition tipping points

Gradually, then suddenly

David Carlin
June 2024

“How did you go bankrupt?”
Two ways. Gradually, then suddenly.”
-Ernest Hemingway, The Sun Also Rises

We have a lot of work to do in order to hit our climate goals
That will require emissions reductions of nearly 50% by 2030 and net-zero by 2050
demand changes across all economic sectors and nations

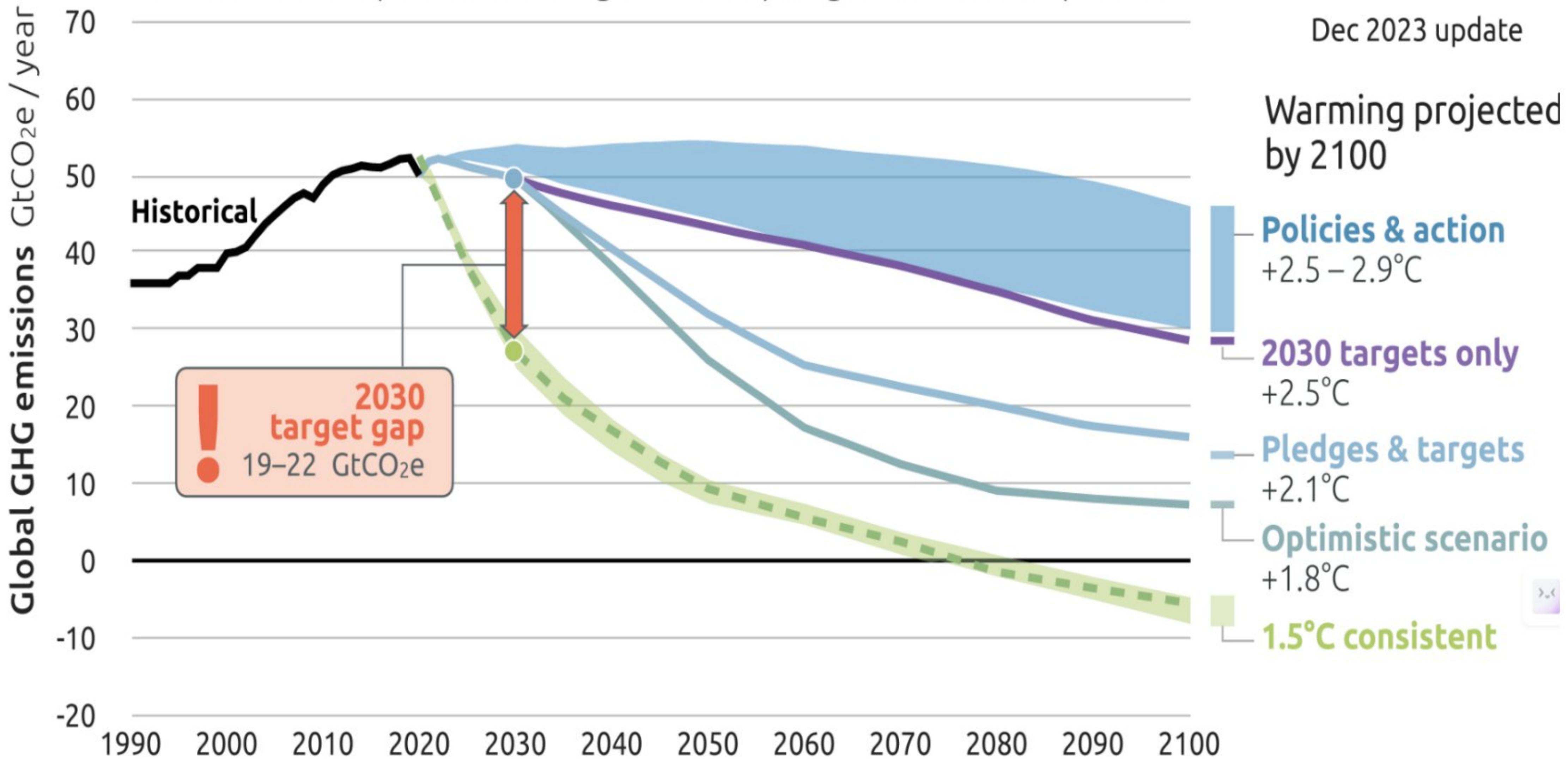
2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies



Dec 2023 update

Warming projected
by 2100

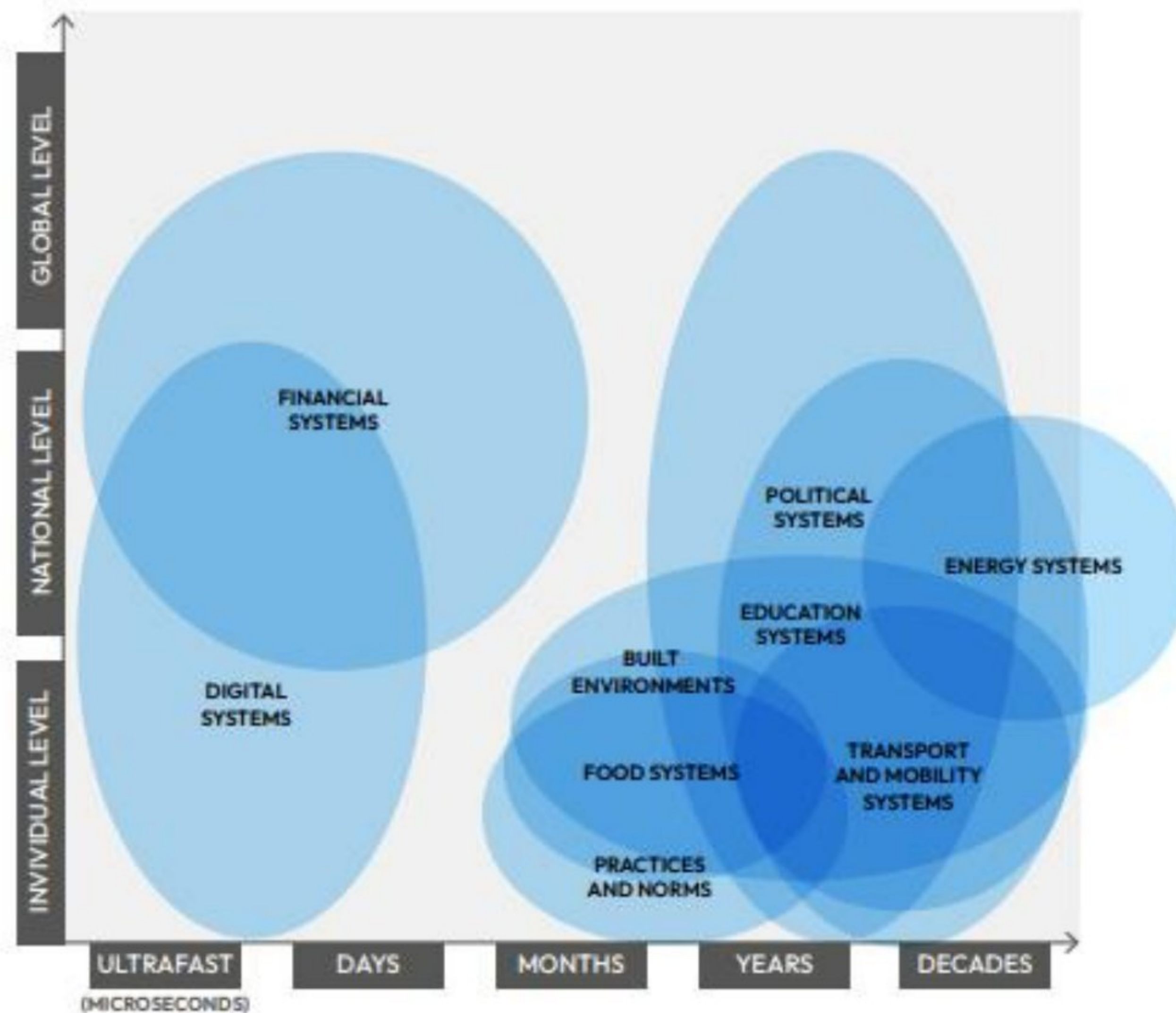


Source: [Climate Action Tracker](#)

Transition tipping points are essential to our climate goals

They will introduce new dynamics that will create massive opportunities and risks

Transition tipping points by scale and time



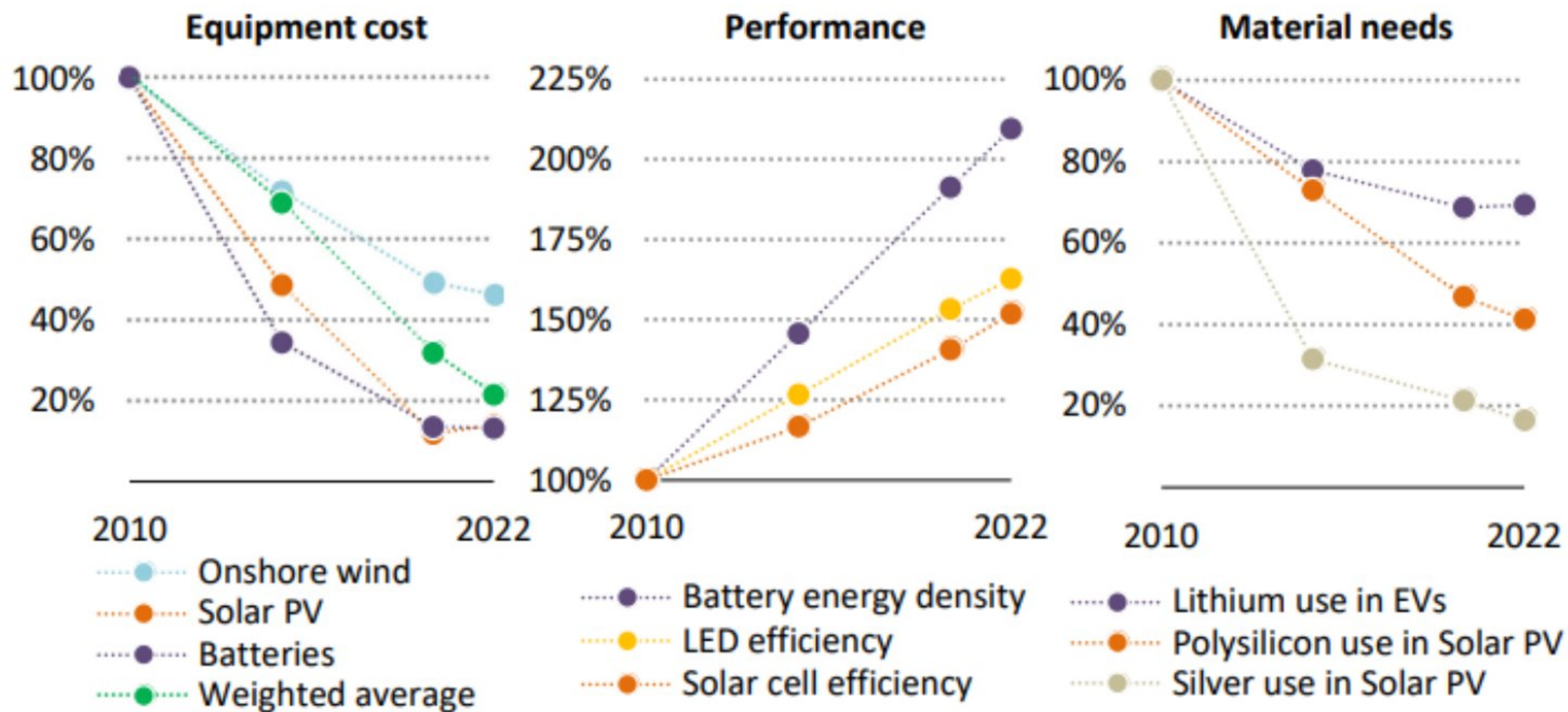
Understanding tipping points

- Tipping points are where a system changes from one state to another
- They can be driven by a variety of factors or by multiple factors
- The changes can be rapid and dramatic
- Often, underlying shifts can be spotted before the tipping point occurs

Tipping points and technology

We are witnessing remarkable shifts on a nearly annual basis

Equipment cost, performance and material needs per unit for selected clean energy technologies, 2010-2022



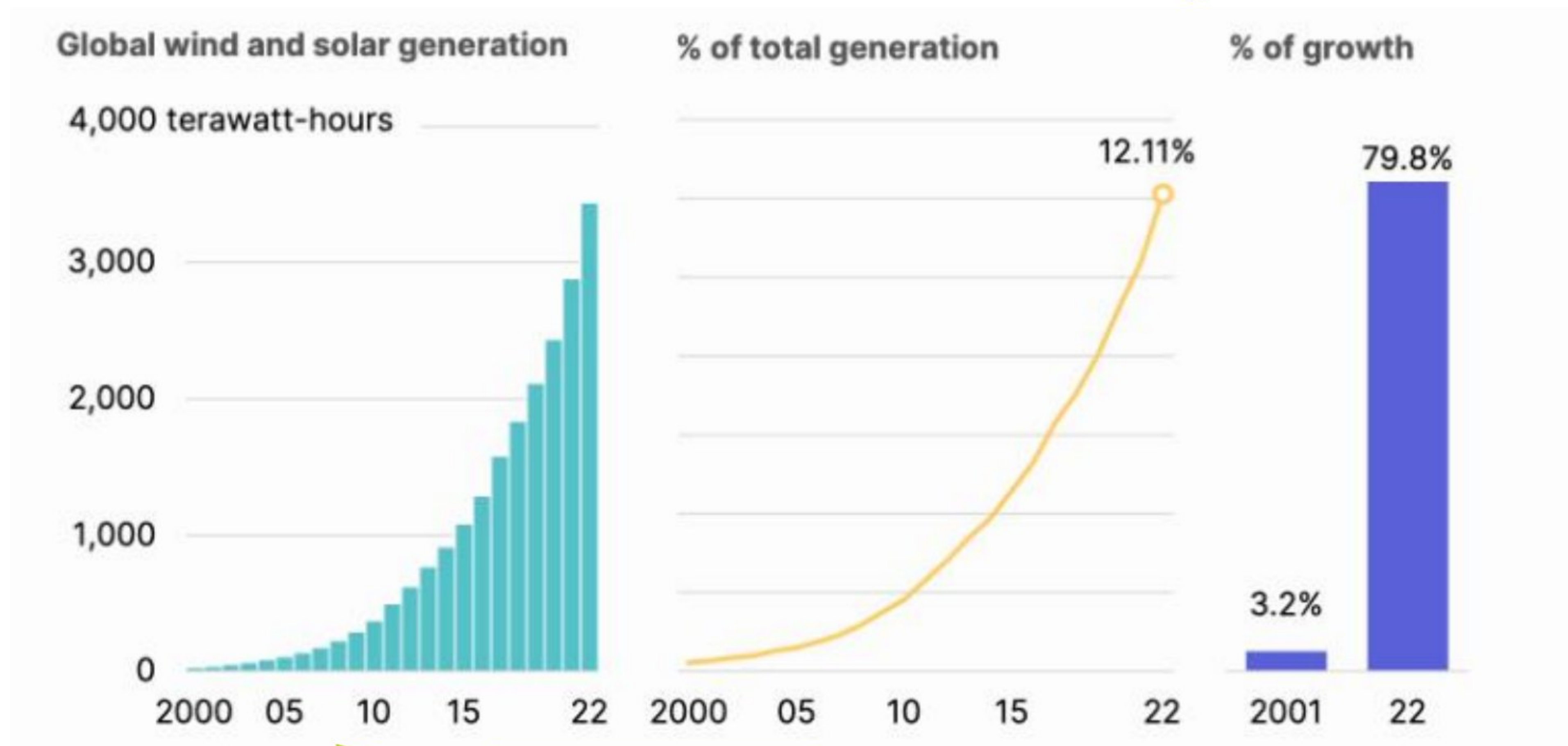
Improved performance and decreased material needs are sharply reducing the footprint of clean energy

Tipping points and energy system deployment

Nearly 80% of new power capacity installations in recent years have been from wind and solar

Installations, generation, and growth for wind and solar

Renewables are increasingly cutting into fossil fuel generation demand

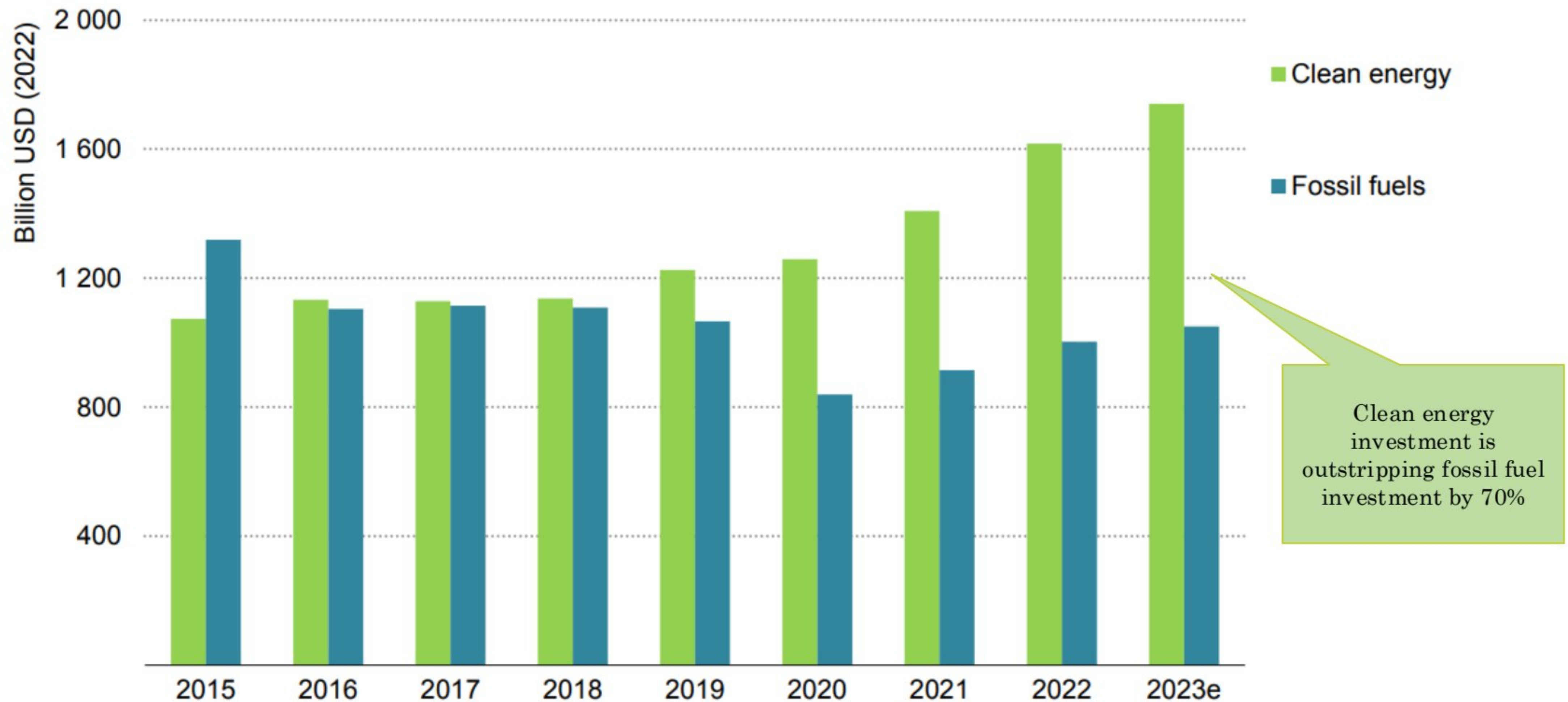


Weekly installations in 2024 match annual installation rates 2 decades ago

Tipping points and energy system financing

Clean energy financing is now definitively exceeding fossil fuel investment

Global energy investment in clean energy and in fossil fuels 2015-2023



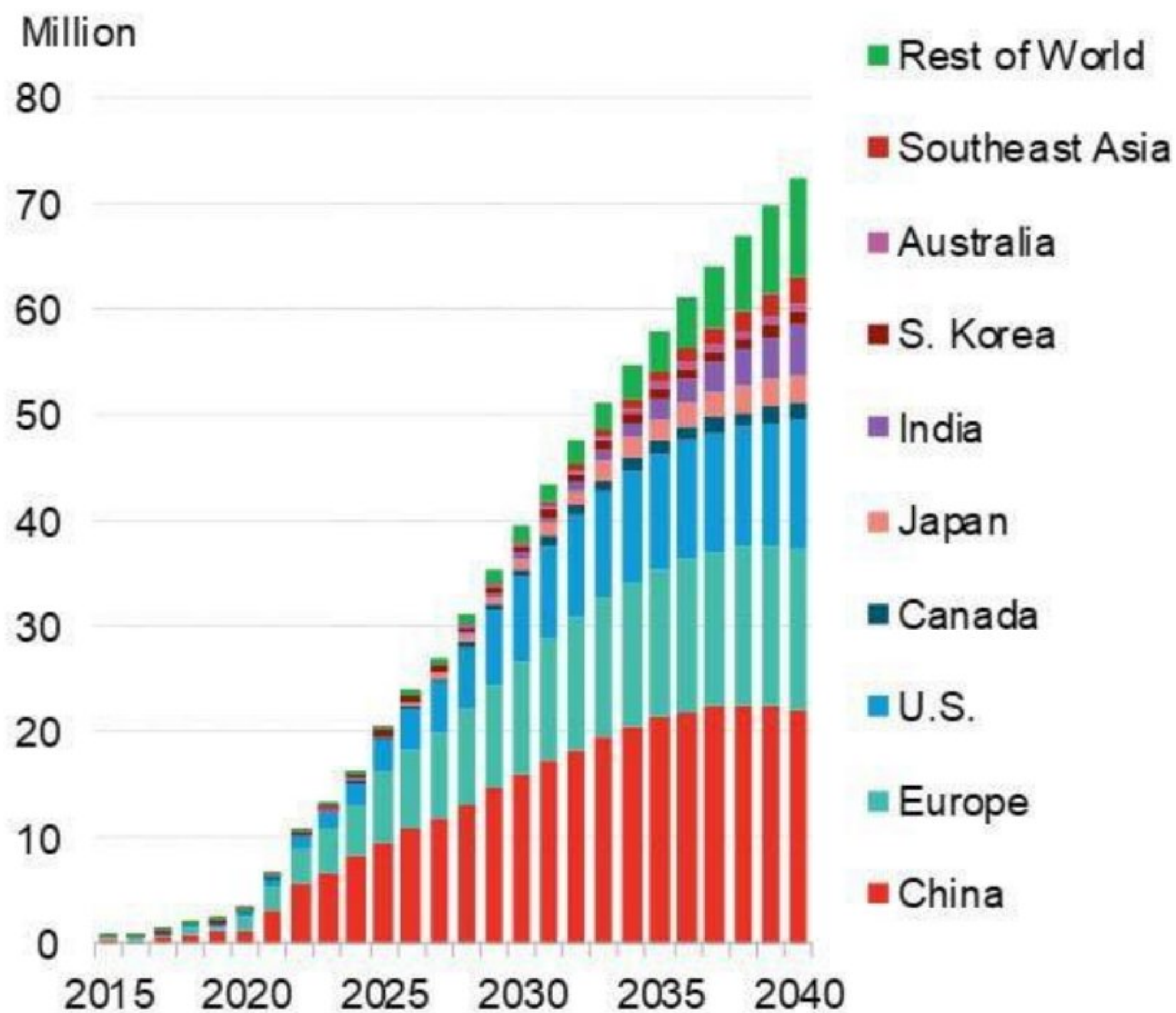
Tipping points and low carbon technology adoption

Over 10 million EVs were sold globally last year, with records being set in nearly all major markets

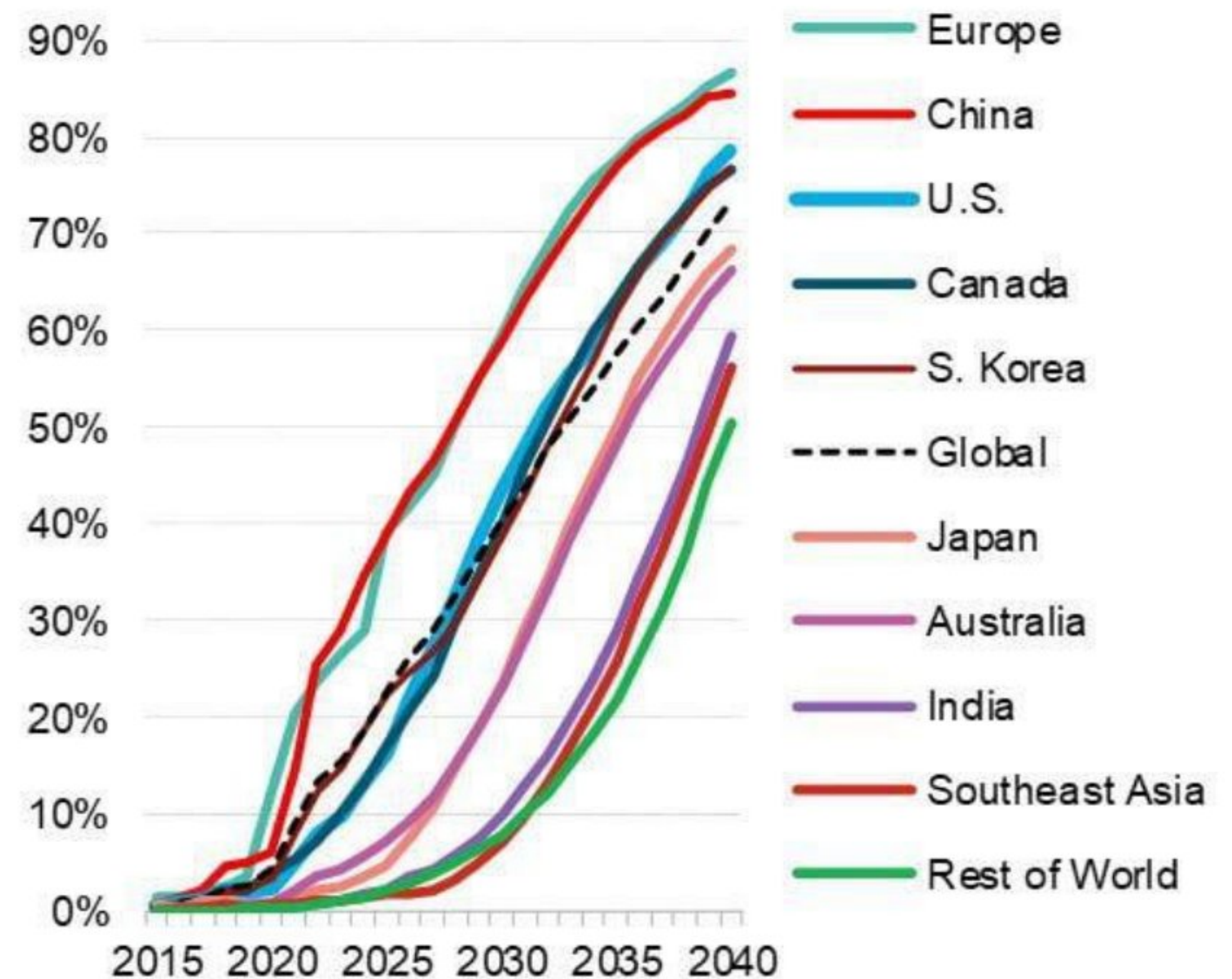
Current and projected EV adoption 2015-2040

Adoption of EVs is reaching the “biting point” in multiple markets

Global long-term passenger EV sales by market - Economic Transition Scenario



Global long-term EV share of new passenger vehicle sales by market - Economic Transition Scenario



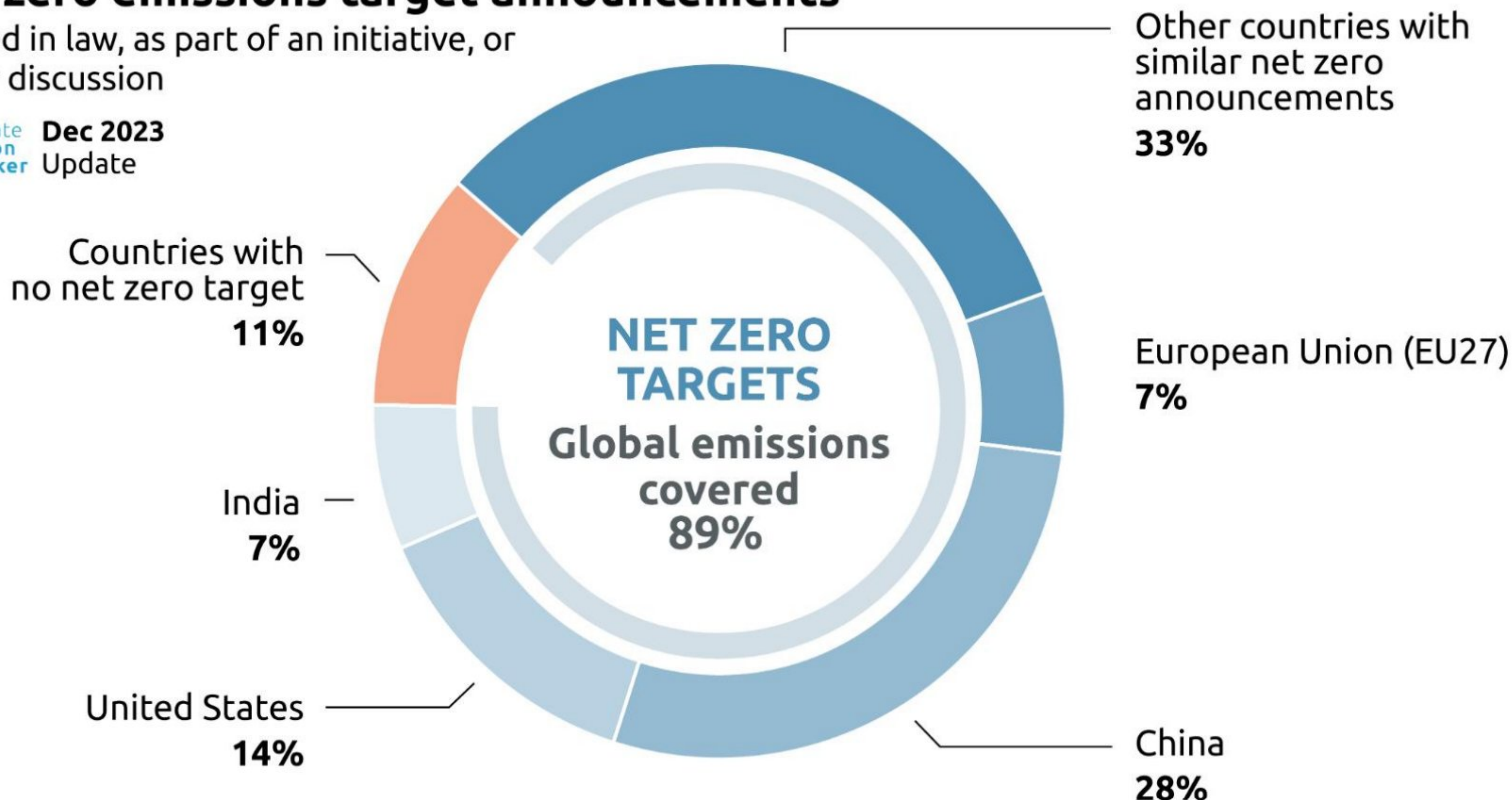
Tipping points and global climate commitments

Nearly 90% of the world is covered by a net-zero commitment

Net zero emissions target announcements

Agreed in law, as part of an initiative, or under discussion

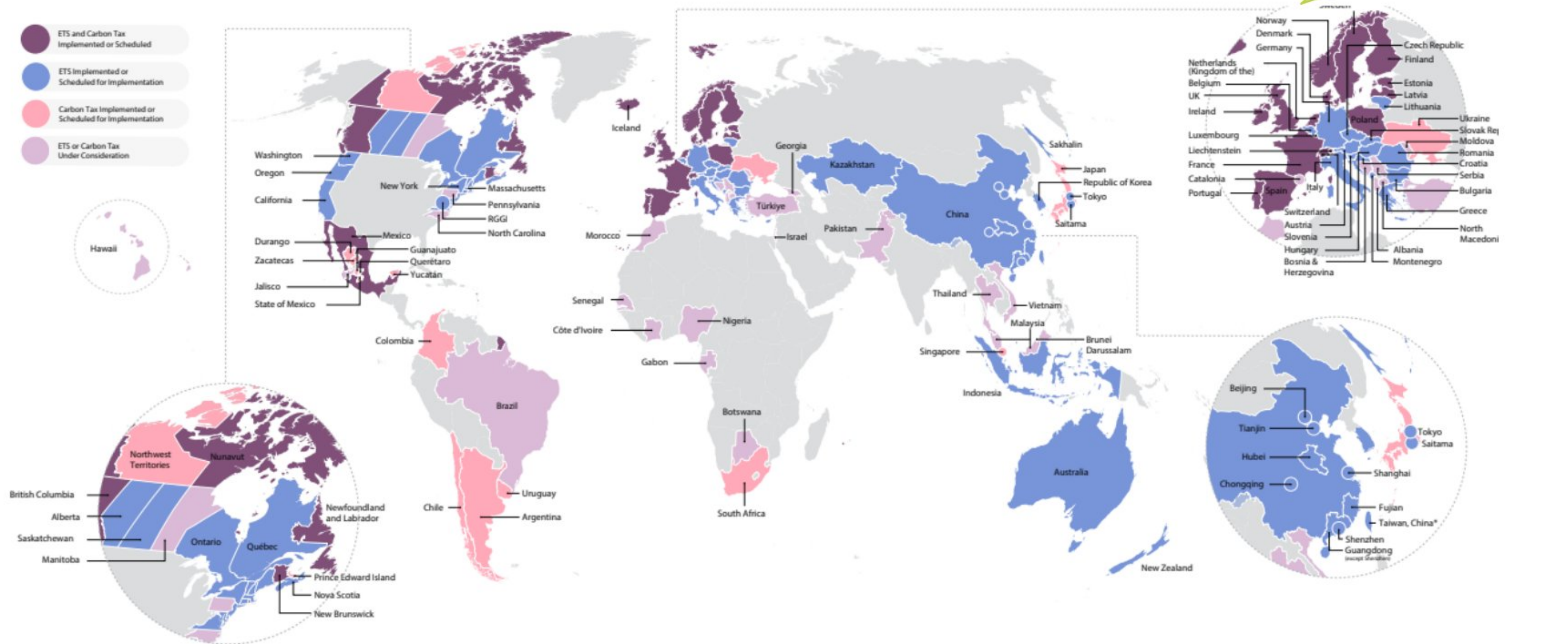
 **Dec 2023**
Update



Tipping points and carbon pricing

Dozens of jurisdictions now have carbon taxes or emissions trading systems (ETS)

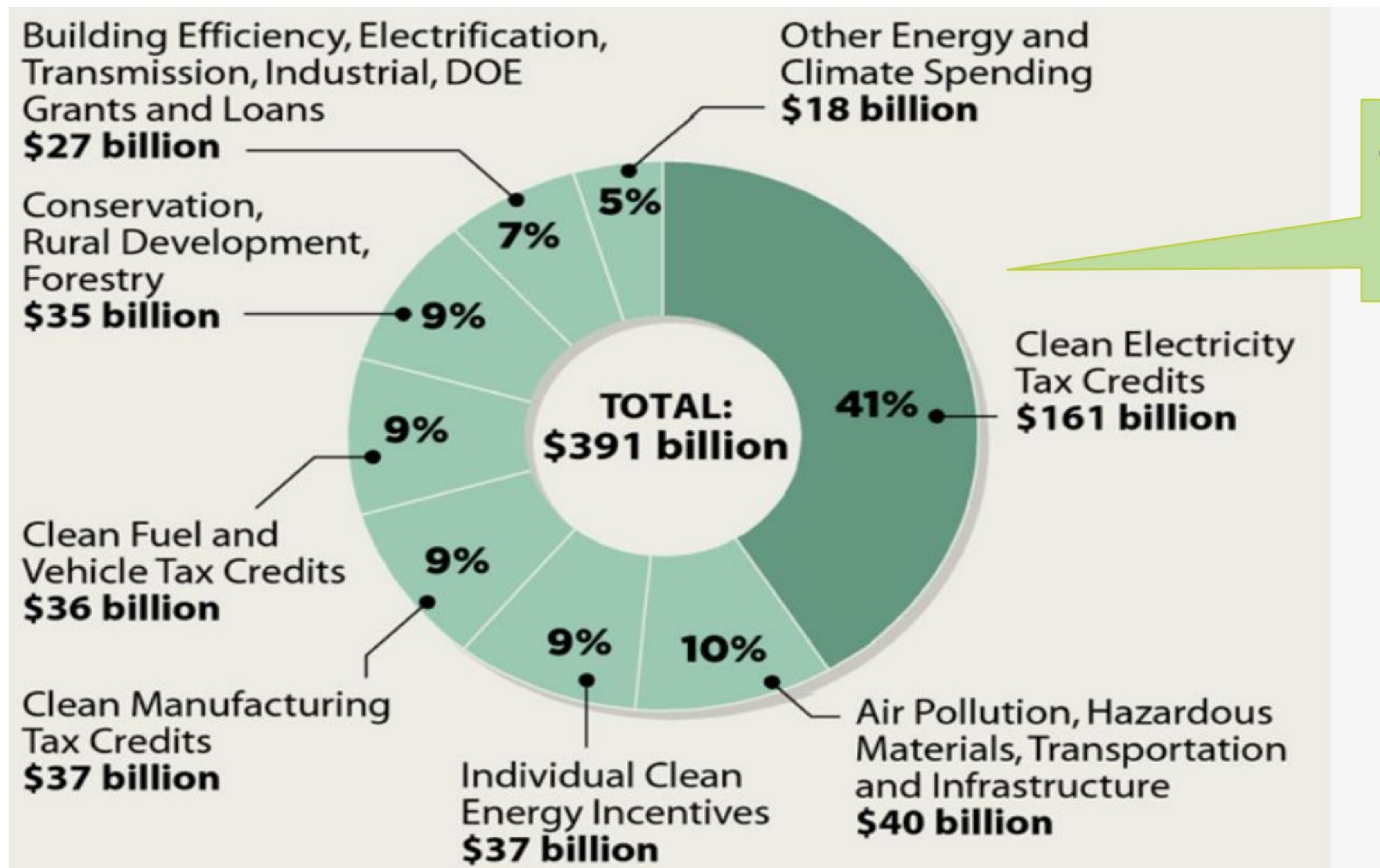
Areas where carbon taxes or ETS are implemented or planned



Tipping points and climate policy

The US, Europe, and China all have committed to billions in climate financing from consumer tax incentives to infrastructure investments

Elements of the US Inflation Reduction Act



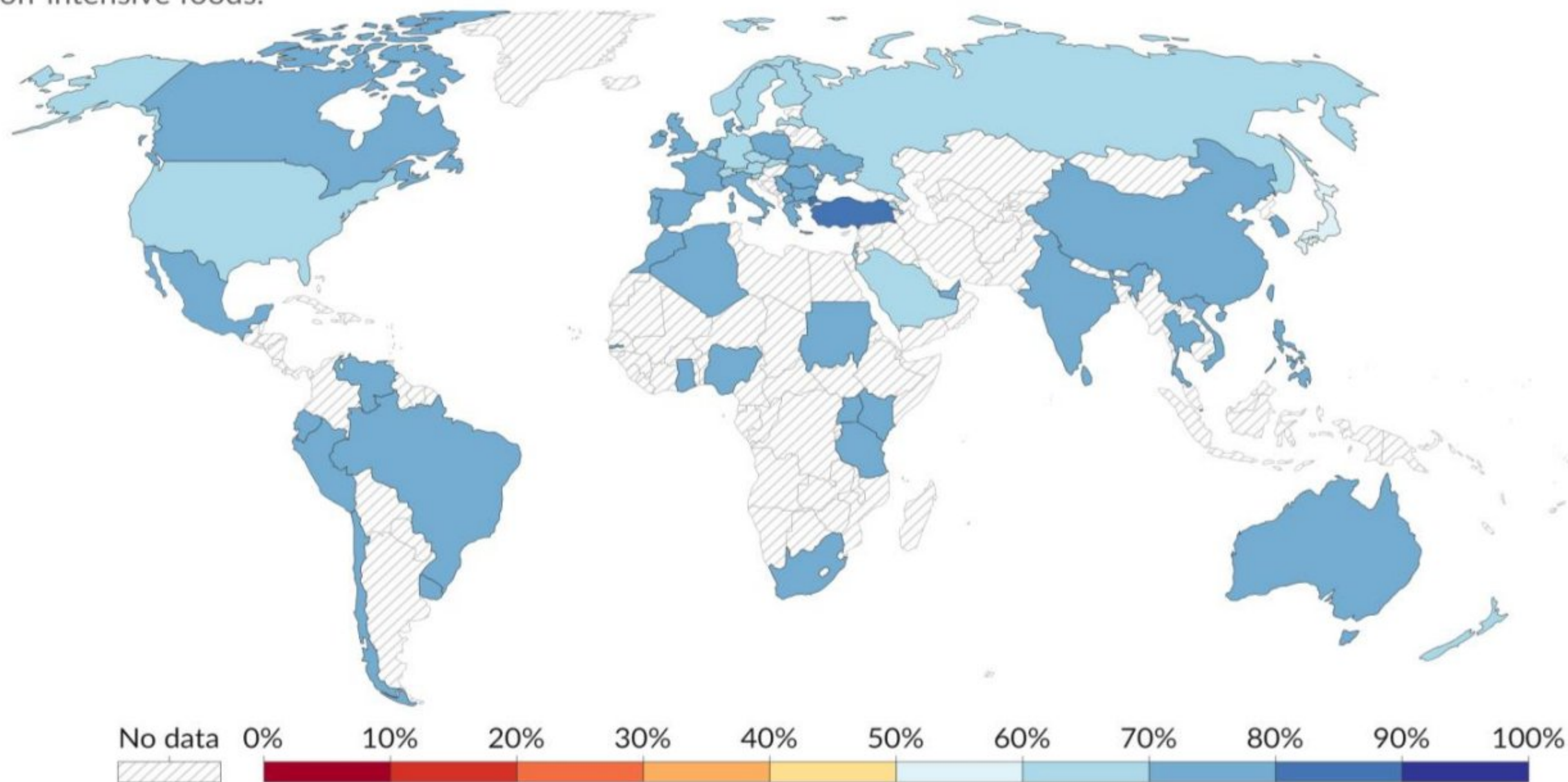
Climate policy will act as an accelerant to the transition

Tipping points and social priorities

Across the world, nearly 90% of people want to see more climate action from their governments

Share of people who support policies to tackle climate change

Support was measured on a scale from 0 to 100 across nine interventions, including carbon taxes on fossil fuels, expanding public transport, more renewable energy, more electric car chargers, taxes on airlines, investments in green jobs and businesses, laws to keep waterways clean, protecting forests, and increasing taxes on carbon-intensive foods.



Transition risks and opportunities

The changes discussed will create winners and losers across economic sectors and geographies

Losers

- Legacy fossil fuel infrastructure
- Fossil fuel reserves
- Fossil fuel power plants
- High emitting shipping and shipping for fossil fuels
- Low-efficiency buildings
- High carbon construction materials
- Internal combustion engines

Winners

- Solar PV
- Wind power
- Electric vehicles
- Batteries
- Lithium and rare earth mining
- New low-carbon technologies
- New low-carbon materials

Transitions happen faster than we think!

Easter morning 1900: 5th Ave, New York City. Spot the automobile.



Easter morning 1913: 5th Ave, New York City. Spot the horse.



Source: George Grantham Bain Collection.

Thank you for your attention!

If you have any questions about this content, please do not
hesitate to reach out!



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