The Basics of Climate Change: What to Know to Be “Action-Ready”

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Agenda

- Climate Science – What do we know?
- Action on Climate – Who and What? And, why is it so hard?
- How to Leverage Tools for Action?
Climate Science
The Challenge: Anthropogenic Climate Change

Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

**Changes in global surface temperature relative to 1850–1900**

(a) Change in global surface temperature (decadal average) as **reconstructed** (1–2000) and **observed** (1850–2020)

(b) Change in global surface temperature (annual average) as **observed** and simulated using **human & natural** and **only natural** factors (both 1850–2020)

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**Climate Change**: A change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere, which is distinct from natural climate variability over comparable time periods. (Framework Convention on Climate Change Article 1)

**Greenhouse gas (GHG) emissions**: Carbon dioxide, methane, and other gaseous constituents of the atmosphere, both natural and human-caused, that absorb and emit radiation at specific wavelengths that cause the heat-trapping greenhouse effect. (IPCC Glossary)
The Impact: Widespread, Rapid, Disproportionate Harms

1.5 degrees: In the Paris Agreement, countries committed to pursue efforts to limit the rise in the average global temperature to 1.5°C above pre-industrial levels. Climate commitments designed to meet this target are considered “Paris aligned.” (UNFCCC)
**Paris Agreement:** Adopted by 196 parties in December 2015 at the 21st session of the Conference of the Parties (COP) to the UNFCCC in Paris. One of the goals is to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change. (IPCC Glossary)
The Solution: Collective Global Action to Cut Emissions

Decarbonization: The process by which countries, companies, individuals or other entities aim to achieve zero fossil carbon existence, usually through a reduction of the carbon emissions associated with electricity, industry and transport. (IPCC Glossary)

Net zero: Net zero emissions are achieved when anthropogenic emissions of GHGs to the atmosphere are balanced by GHG removals over a specified period. (IPCC Glossary)
Adaptation: The process of adjustment to the actual or expected climate and its effects.

Mitigation: A human intervention to reduce emissions or enhance the sinks of greenhouse gases.

Resilience: The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance.

(IPCC Glossary)
US Climate Action: Who and What
US Government – Climate Policy Process
State and Local Governments
Tools – Carbon Pricing

Cap & Invest

Carbon Tax

Command and Control

Emission rate (lb CO₂/MWh) based on 90% capture
Tools - Incentives and Voluntary

Incentives

Voluntary Decarbonization
Third Parties

**Scope 1** emissions are direct GHG emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles).

**Scope 2** emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling.

**Scope 3** emissions are the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly affects in its value chain.

(EPA Center for Corporate Climate Leadership)
Third Parties
US Progress

**US greenhouse gas emissions under a joint action scenario**

Net million metric tons (mmt) of CO$_2$-e

- **Current policy with IRA**
  - High: -32%
  - Mid: -40%
  - Low: -42%
- **Joint action**
  - High: -41%
  - Mid: -49%
  - Low: -51%

Source: Rhodium Group. The high, mid, low ranges reflect uncertainty around future fossil fuel prices, economic growth, and clean energy technology costs.

US Progress

US greenhouse gas emissions under a federal action-only scenario

Net million metric tons (mmt) of CO₂-e

Source: Rhodium Group. The high, mid, low ranges reflect uncertainly around future fossil fuel prices, economic growth, and clean energy technology costs.

Why is climate policymaking so difficult?

Lazarus, The Making of Environmental Law (2022)
Leveraging Tools
Example – Oil and Gas Sector Methane

Sources: EPA, IEA, Carbon Mapper, EDF
Climate Policy – Key Tools

Scientific Data

Advocacy and Public Input

Technologies

State Policies

Cost Data

Corporate Investments

Federal Climate Policy