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# Climate Change Economics


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**York, Maine, Rotary Club**  
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1

## National Economic Education Delegation

- **Vision**
  - One day, the public discussion of policy issues will be grounded in an accurate perception of the underlying economic principles and data.
- **Mission**
  - NEED unites the skills and knowledge of a vast network of professional economists to promote understanding of the economics of policy issues in the United States.
- **NEED Presentations**
  - Are nonpartisan and intended to reflect the consensus of the economics profession.

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2

2

## Who Are We?

- **Honorary Board: 54 members**

- 2 Fed Chairs: Janet Yellen, Ben Bernanke
- 6 Chairs Council of Economic Advisers
  - o Furman (D), Rosen (R), Bernanke (R), Yellen (D), Tyson (D), Goolsbee (D)
- 3 Nobel Prize Winners
  - o Akerlof, Smith, Maskin

- **Delegates: 652+ members**

- At all levels of academia and some in government service
- All have a Ph.D. in economics
- Crowdsource slide decks
- Give presentations

- **Global Partners: 48 Ph.D. Economists**

- Aid in slide deck development



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3

3

## Credits and Disclaimer

- **This slide deck was authored by:**

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- **Disclaimer**

- NEED presentations are designed to be nonpartisan.
- It is, however, inevitable that the presenter will be asked for and will provide their own views.
- Such views are those of the presenter and not necessarily those of the National Economic Education Delegation (NEED).



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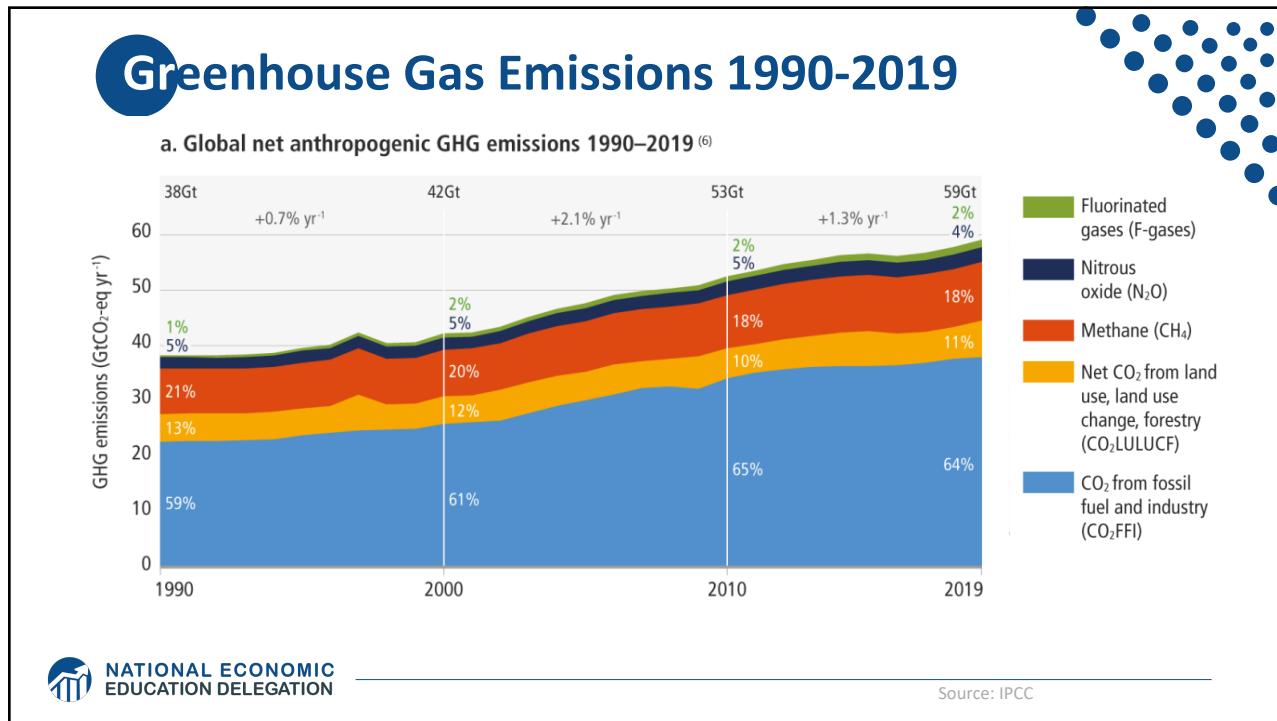
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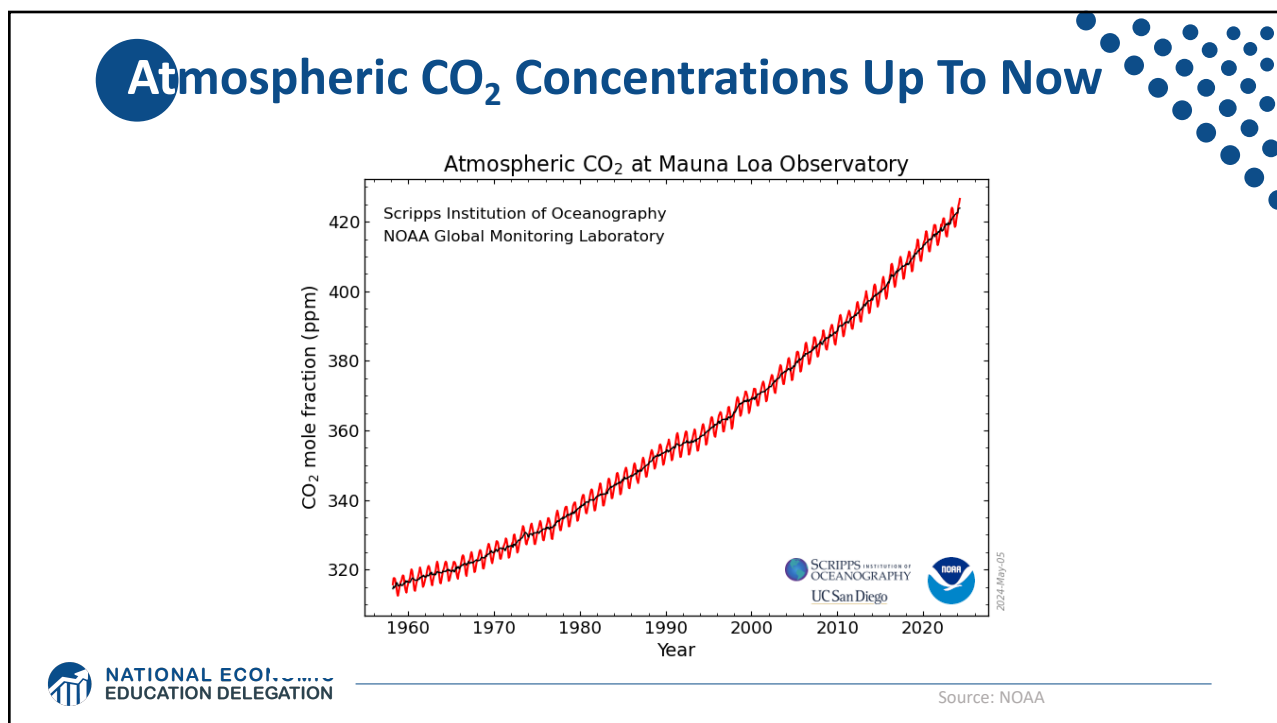
# Outline

- Economics of Climate Change
- Reducing Emissions
- Climate Change Policy
- Policy in Action

# Economics of Climate Change



7

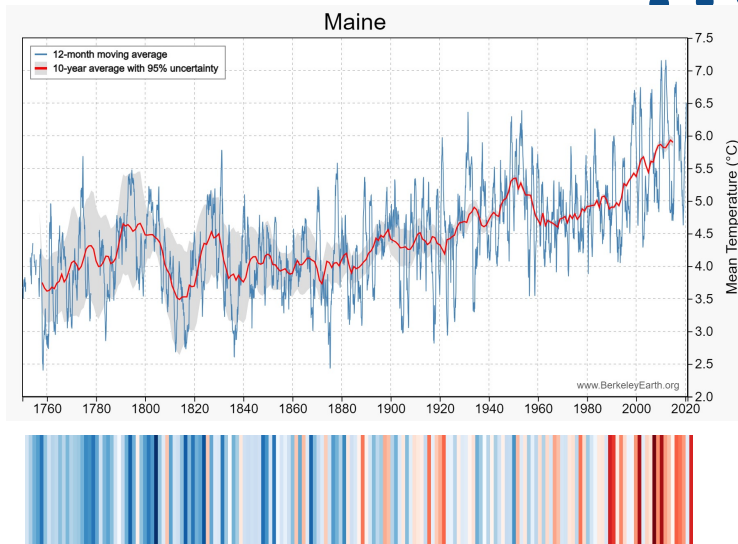


8

## This Causes Warming & Other Consequences

Use <https://berkeleyearth.org/temperature-city-list/> to see the temperature history of an area!

Here's Maine!



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9

## How Climate Change Affects Humans

- Agriculture
- Fisheries
- Coastal damages
- Direct health effects, including sickness and death (temperature & drought; also pollution)
- Indirect health effects (vector-borne disease)
- Reduced fresh water availability
- Wildfires
- Shifting zones for important ecosystems, and desertification
- Reduced worker productivity
- Increased violence
- Some of these may cause human migration and/or conflict



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10

## How Can Economists Help Fight Climate Change? By...

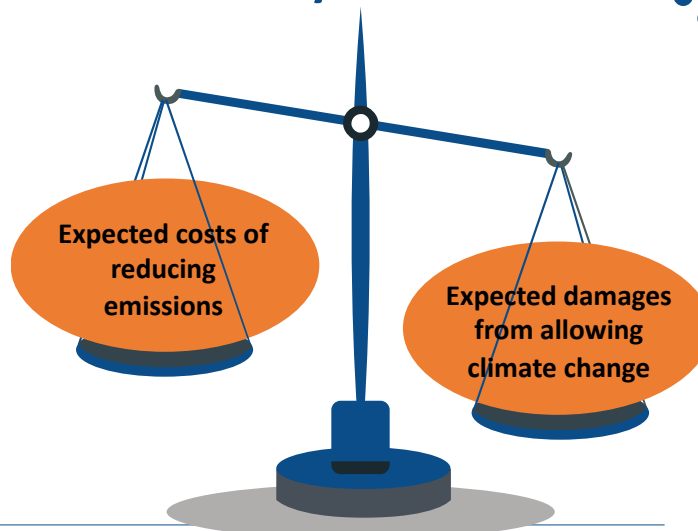
- Measuring climate change damages and estimating the costs of fighting climate change (abatement).
- Identifying how, since climate change is an *externality*, without climate policy we will suffer inefficiently large costs.
- Designing smart policies that minimize costs to society.
- Assessing behavioral reactions to climate change.

11

## How Economists Decide How Much to Fight Climate Change: Cost Benefit Analysis

Abating greenhouse gas emissions is costly...  
... but without action, climate change damages are even more costly.

Goal is not zero emissions, but efficient level that achieves a balance.



12

## Social Cost of Carbon

- The expected cost of damages from each unit of greenhouse gas emissions.
- Current EPA estimate: ~\$51 per metric ton of CO<sub>2</sub>
- New estimate is \$190!
- Social cost of carbon will increase over time.



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13

## Adaptation Reduces Damages

- *Adaptation*: costly action that reduce damages from climate change.
- The **net damage cost to society** is the **cost of adaptation** plus the **cost of remaining damages**.
- People and firms will take some actions on their own, up to the point where they find it worthwhile.
- Some adaptation requires government involvement.



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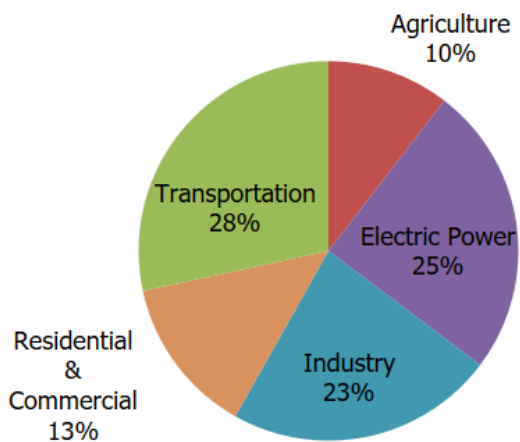
14

# Reducing Emissions



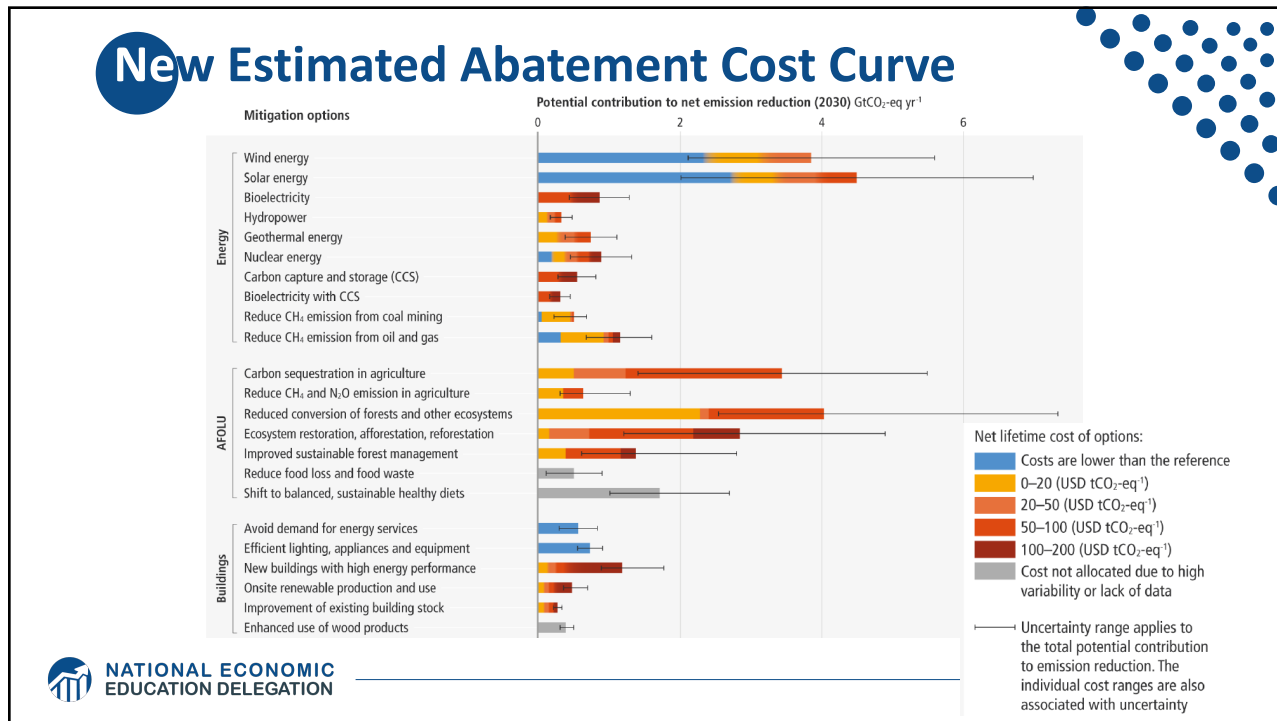
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## Total US Greenhouse Gas Emissions by Economic Sector in 2022

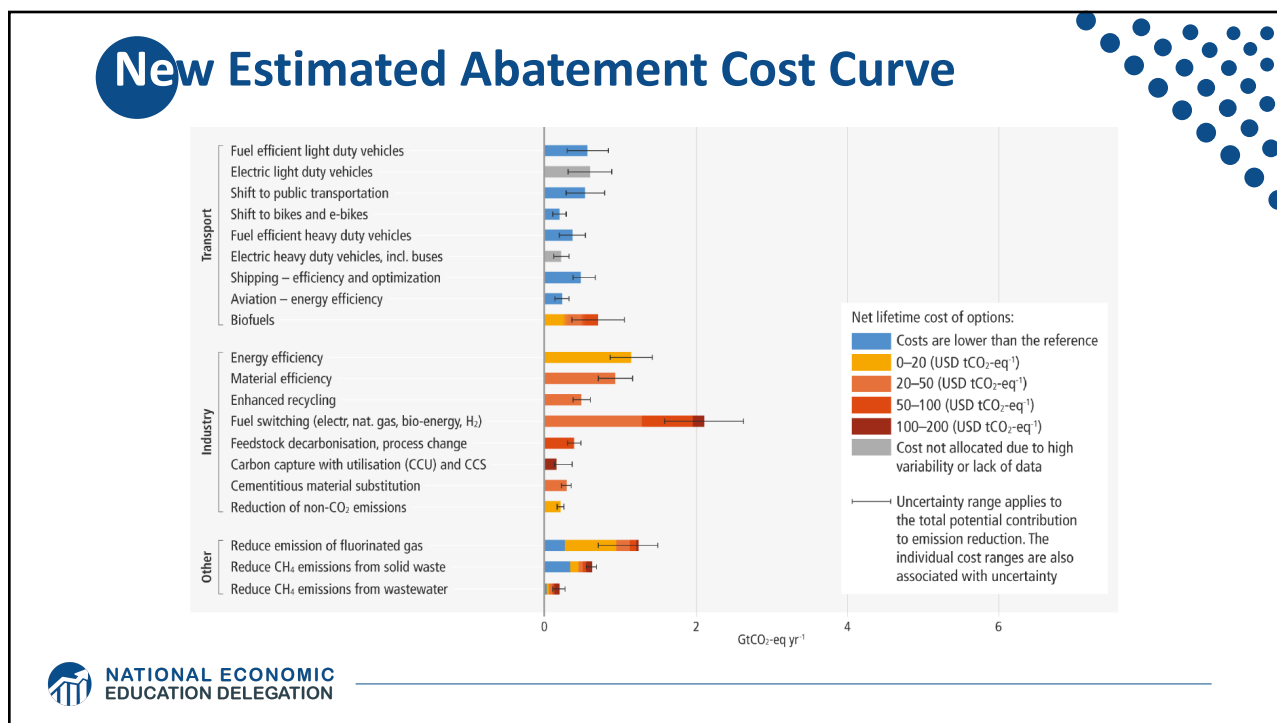


16





17



18

# Climate Change Policy



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19

## Policies That Reduce Emissions Directly

- **Command and control regulation**

- Emissions standards or limits (e.g., Clean Water Act discharge limits)
- Tech standards (e.g., require scrubbers on power plants)

- **Incentive-based policies**

- Putting a price on emissions – leveling the playing field!
  - Tax or cap & trade
  - Subsidizing green energy (e.g., feed-in tariffs)



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20

20

## Command and Control vs. Incentive-Based Regulation

- **Efficiency**

- Both can achieve the same amount of emissions reduction.
- Incentive-based policies can achieve emissions reduction at much lower cost.

- **Equity**

- Both have may regressive impacts (low-income families bear costs that are a larger percent of their incomes vs hi-income families)
  - However, new evidence increasingly questions this.
- Cap and trade and carbon tax can generate revenues that can be used to offset the regressivity.
  - E.g.: “carbon dividend”
- Command and control regulations do not.



## How Does a Carbon Tax Work?

- **Choose activities to be covered (e.g., electricity sector, all emitters, etc.).**

- **Set tax level.**

- Optimally, it represents the social cost of polluting.

- **Polluters must pay a tax for every unit emitted.**

- Polluters with **low** abatement costs will **abate** to avoid the tax
- Polluters with **high** abatement costs will pollute and **pay the tax**



## How Does Cap and Trade Work?

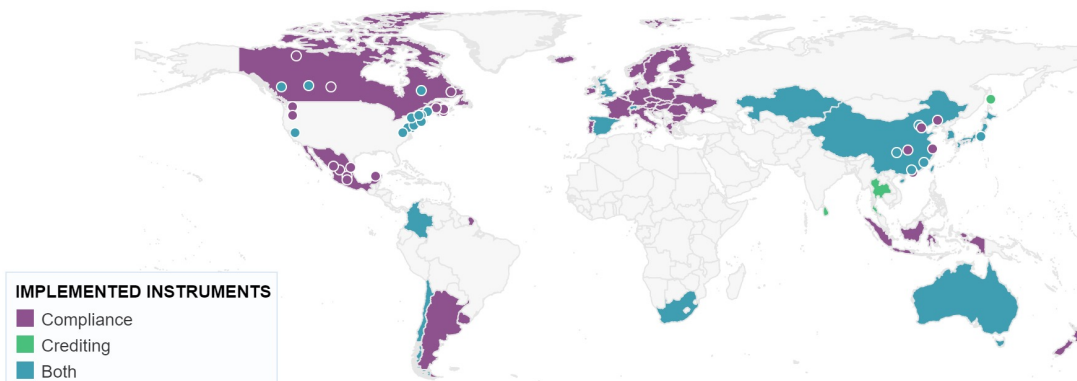
- Choose activities to be covered (e.g., electricity sector, all emitters, etc.).
- Set maximum emissions level (“cap”).
- That many pollution permits are issued.
  - Can be auctioned off or given to polluters
- Every polluter in a covered sector must have a permit for every unit of pollution.
- Polluters buy and sell (“trade”) permits on a market as they wish.
  - Polluters with **low** abatement costs will make / save money by **abating** and selling / not buying permits
  - Polluters with **high** abatement costs will buy permits and **pollute**

23

## Incentive-Based Climate Policies Right Now

### Carbon pricing instruments around the world, 2023

Map shows jurisdictions that have implemented Direct Carbon Pricing Instruments - Compliance instruments (Emissions Trading Systems (ETS) and Carbon taxes) and/or domestic carbon crediting mechanisms, subject to any filters applied. The year can be adjusted using the slider below the map.



24

## Examples of Other Policies that Reduce Emissions

- Research and development subsidies
- Renewable energy mandates (e.g., renewable portfolio standards)
- Energy efficiency mandates and subsidies (e.g. CAFE fuel economy standards)
- Grid / infrastructure improvements
- Public transportation
- Land use / zoning policies



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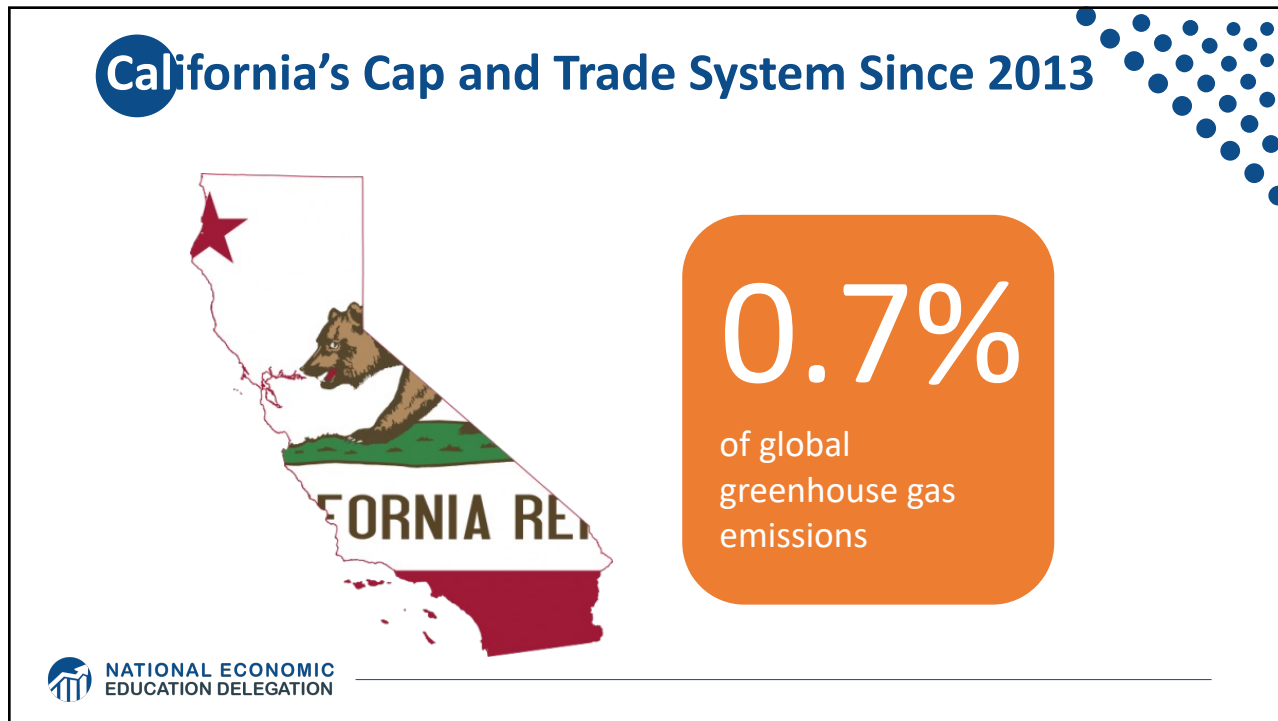
25

## Climate Change Policy in Action

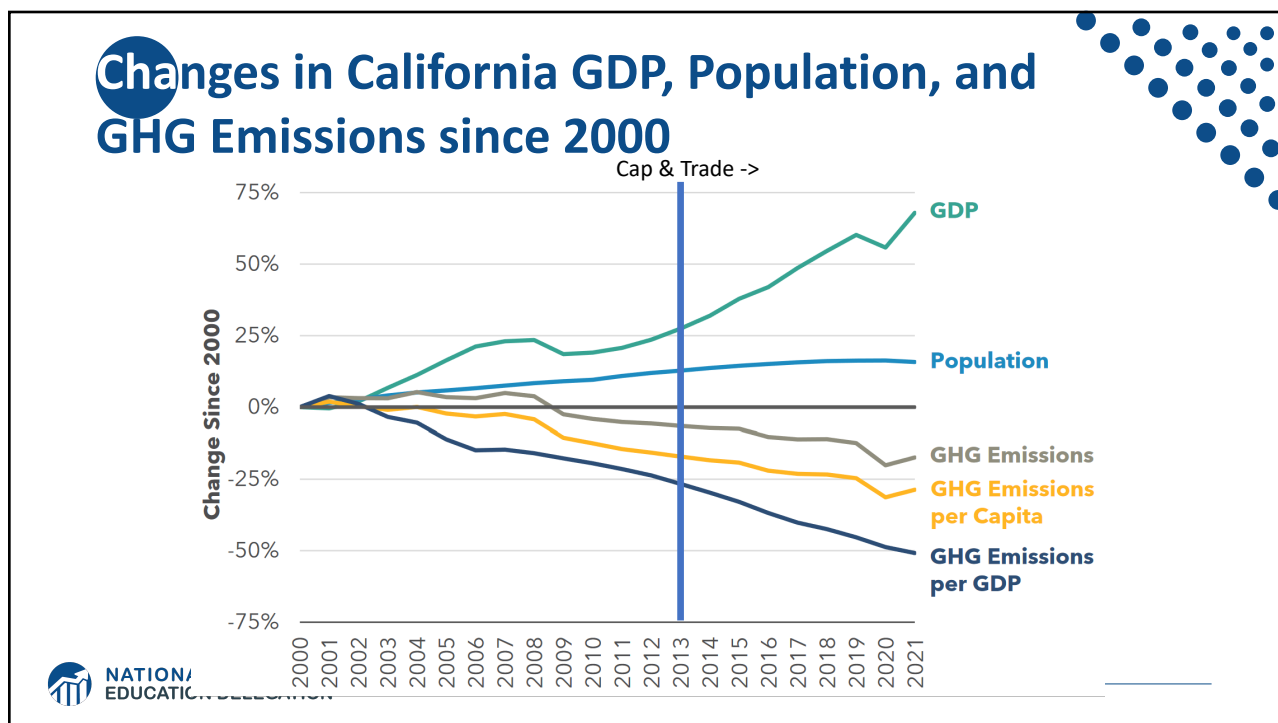


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26

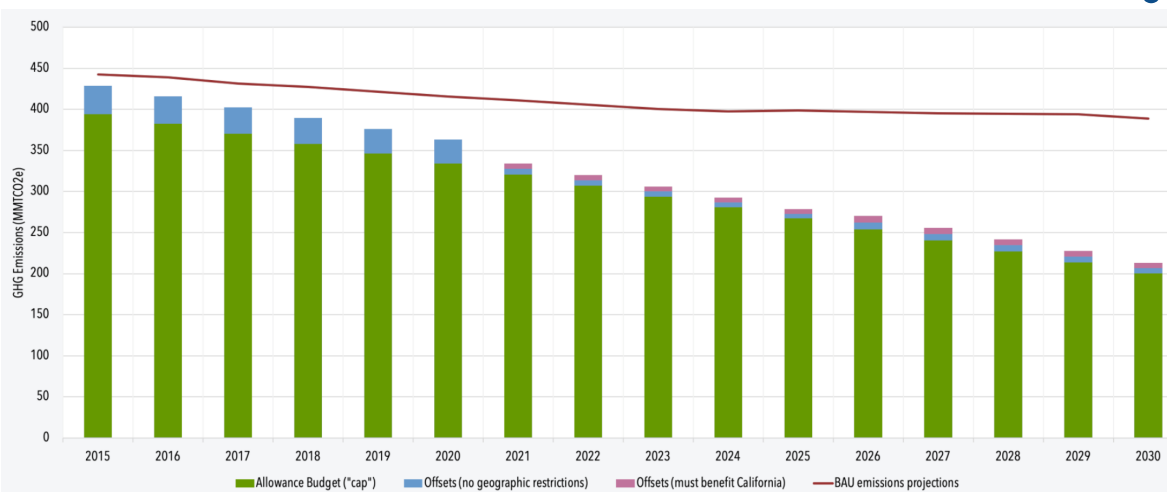


27



28

## Projected trends in California's emissions



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29

29

## Summary

- **Climate change is real, is caused by human actions, and has impacts we're already feeling.**
- **This problem won't solve itself; we need policy intervention, and fast.**
- **Smart policy can reduce greenhouse gas emissions by the right amount and at the lowest possible cost.**
  - For example, cap and trade and emissions taxes!
- **We also need policies to help with adaptation and support those bearing the greatest damages.**



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30

**Thank you!**

## Any Questions?

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31