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Climate Change Economics

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FYE- Climate Changed Fall 2019

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And How Does Economics Contribute to Thinking about Climate Change? A Preview.

- Account for behavioral reactions to climate change
- Estimate / measure costs of climate change damages and costs of fighting climate change
- Design smart policy to minimize costs of fighting climate change

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Climate Change Science

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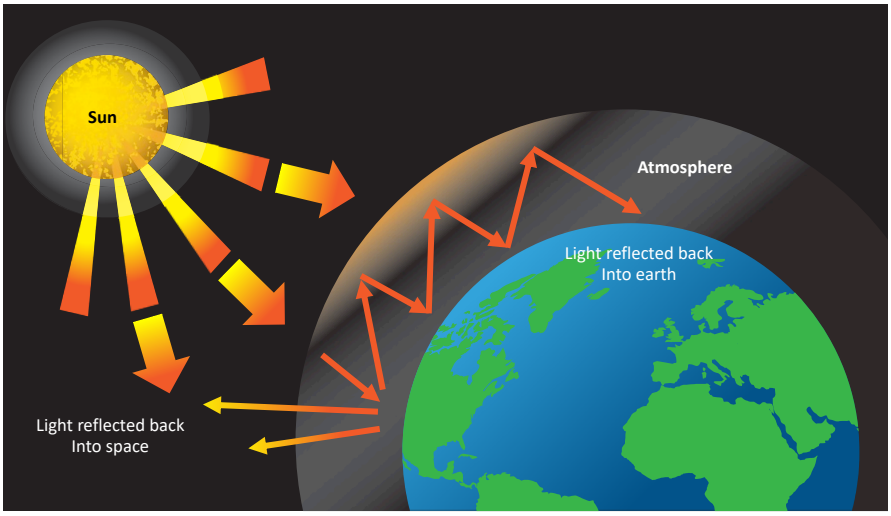
Intro on the science



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How Much Pollution Does Society Want?

Analogy: How Many Oranges Does Society Want?

- In a well function market, price will settle where:

# of oranges people want to sell = # of oranges people want to buy

- Prices reflect scarcity and social value of resource

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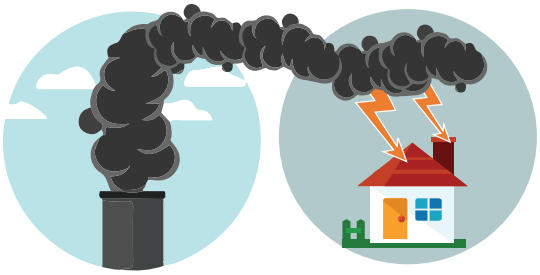
Pollution Is Different From Oranges

- **Pollution creates a market failure**
- **Externality: when not all effects felt by buyer and seller**
  - Electricity price does not reflect all costs → electricity too cheap → wrong balance! Too much pollution!
- **Goal is not 0 pollution but society's best balance between pollution and other things**



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Impacts of Climate Change

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How These Impacts Affect 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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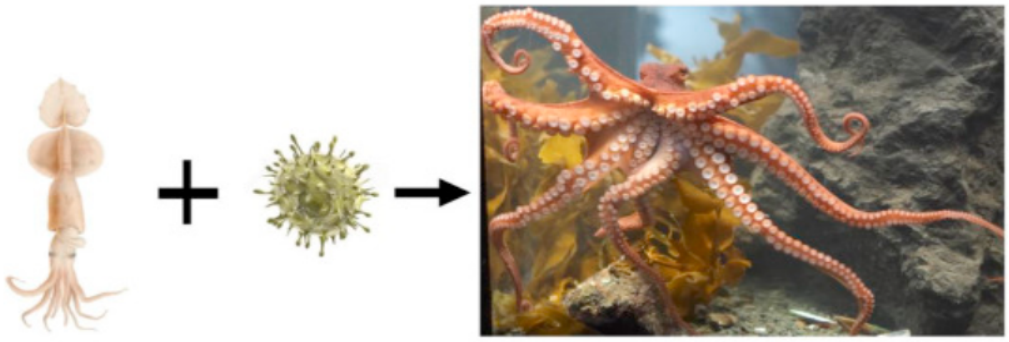

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Fig. 5. The evolution from squid to octopus is compatible with a suite of genes inserted by extraterrestrial viruses. An alternative extraterrestrial scenario discuused is that a population of cryopreserved octopus embryos soft-landed *en mass* from space 275 million years ago.

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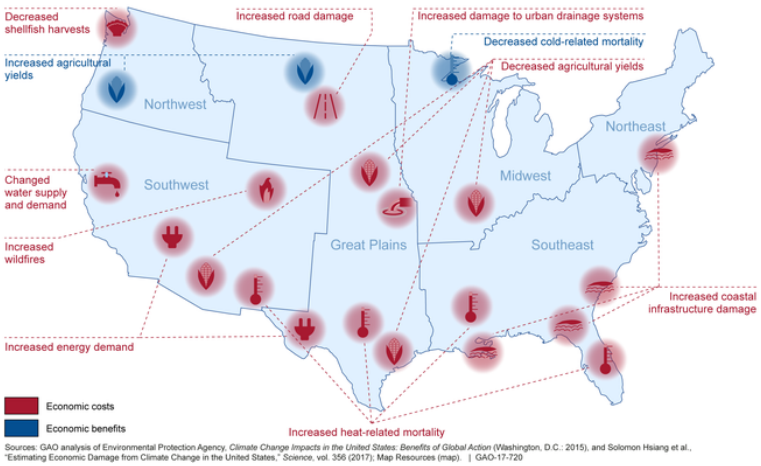
Projected Damages Vary Across the US But Are Estimated at 1.2% of GDP per 1C Increase



Sources: GAO analysis of Environmental Protection Agency, *Climate Change Impacts in the United States: Benefits of Global Action* (Washington, D.C.: 2015), and Solomon Hsiang et al., "Estimating Economic Damage from Climate Change in the United States," *Science*, vol. 356 (2017); Map Resources (map). | GAO-17-720

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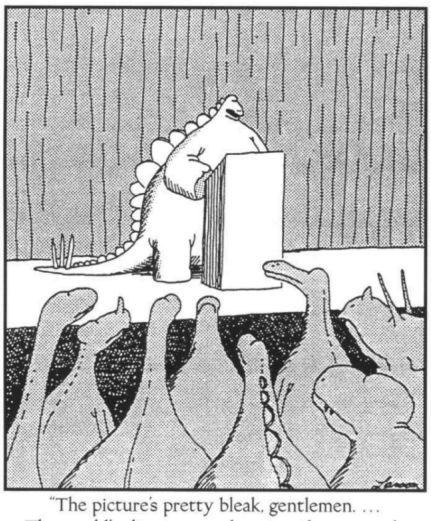

"The picture's pretty bleak, gentlemen. … The world's climates are changing, the mammals are taking over, and we all have a brain about the size of a walnut."

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Economics of Responding to Climate Change

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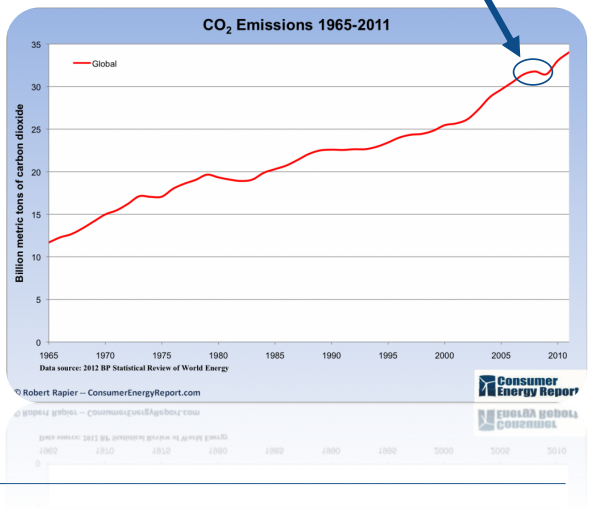
Recent Progress on Climate Goals

- **IPCC's Fifth Assessment Report (2014)**
  - Goals from previous report (2007) were met!
  - … but mainly because of the Great Recession…
  - … which was not a good thing.



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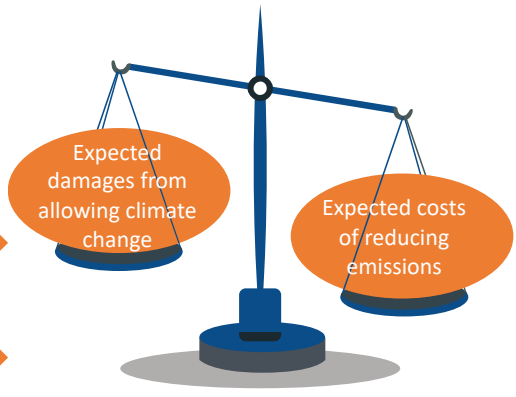
How Economists Decide How Much to Fight Climate Change

- **Cost Benefit Analysis**
- **Weigh:**

Expected costs of reducing emissions

VS

Expected damages from allowing climate change



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Climate Change Policy

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Policies to Fight Climate Change that Are Relatively Indirect

- Subsidizing R&D
- Grid / infrastructure
- Land use policies
- Energy efficiency mandates and subsidies
- Mandating renewable energy (e.g. renewable portfolio standards)

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Policies to Fight Climate Change that Directly Reduce Emissions

- Emissions standards or limits
- Putting a price on emissions
  - Subsidizing green energy (e.g. feed-in tariffs)
  - Tax or cap & trade!

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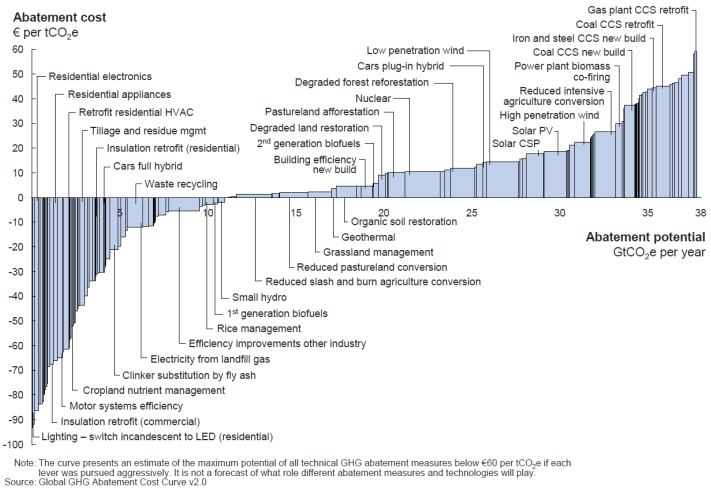
Global GHG Abatement Cost Curve Beyond Business-as-usual - 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0

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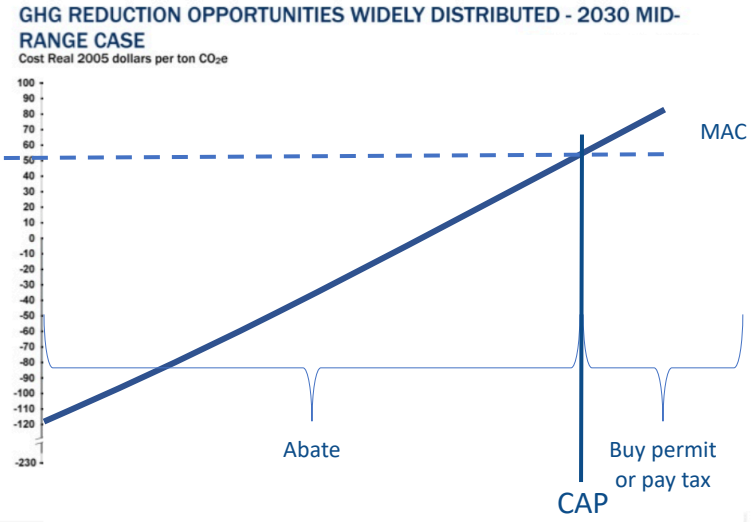
Putting a Price on Carbon

TAX =
Permit Price
=
Carbon Price



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Climate Change Policy in Action

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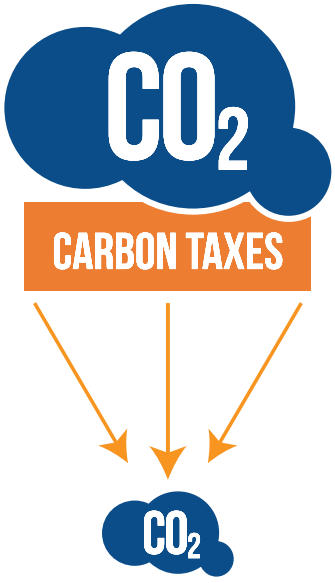
Carbon Tax



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Carbon Tax Programs

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National Jurisdictions Covered

5.3%

of global greenhouse gas emissions

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British Columbia's Carbon Tax Policy

0.1%

of global greenhouse gas emissions

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> “Tax the pollution we do not want, and return the money for what we do want — money in people’s pockets, jobs and investment. ”
>
> - B.C. Government - Carbon Tax Brochure

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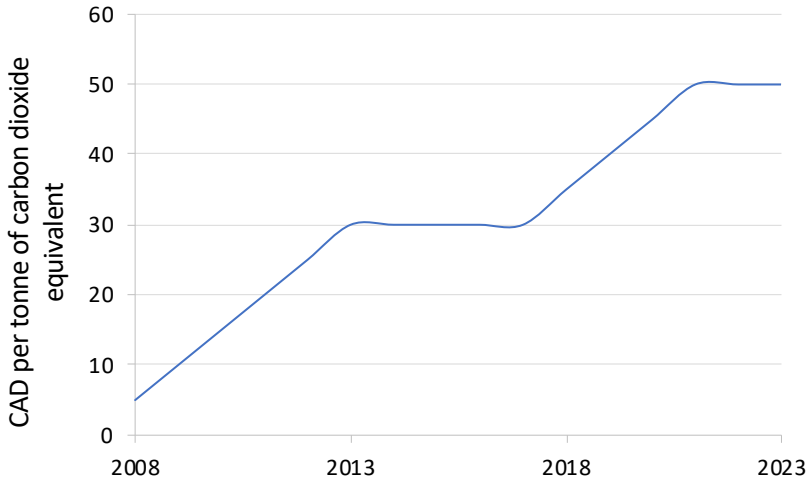
British Columbia's Tax on Carbon



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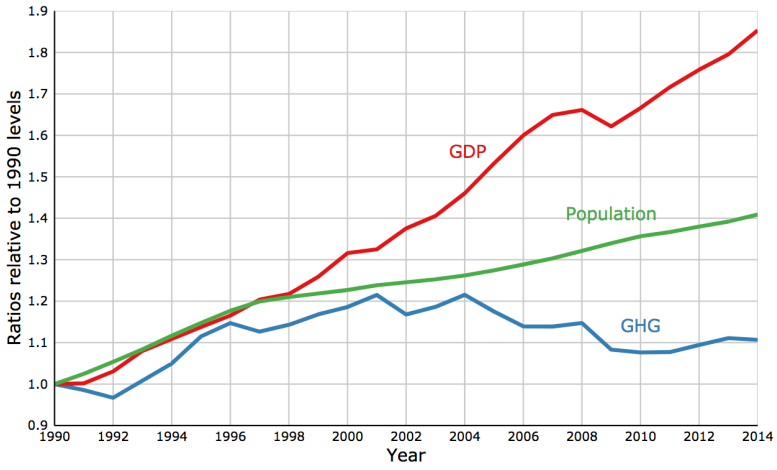
Relative Greenhouse Gas Emissions, Gross Domestic Product & Population Size



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Oldest Carbon Tax

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Sweden's Carbon Tax Policy

Started in 1991

Currently at $140/ton

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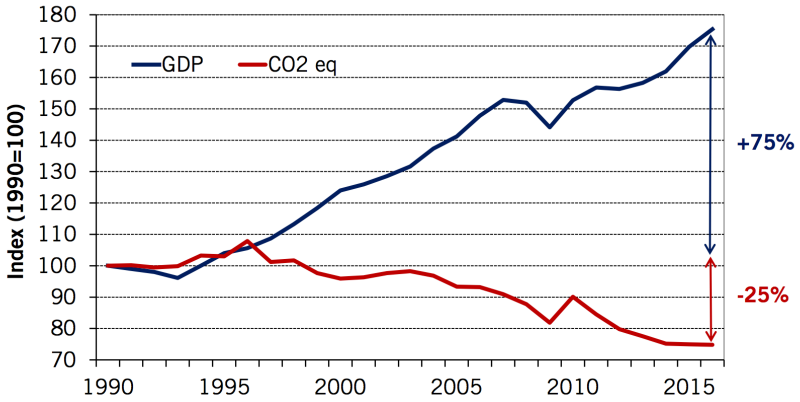
Real GDP and Domestic Co_2eq Emissions[1] In Sweden, 1990-2016



[1] In accordance with Sweden's National Inventory Report, submitted under the UNFCC and the Kyoto Protocol. CO_2 = approx. 80 % of total CO_2eq emissions. Preliminary data for 2016.

Sources: Swedish Environmental Protection Agency, Statistics Sweden

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U.S. Carbon Tax Plans

- Climate Leadership Council
- Citizens Climate Lobby
- States and municipalities: Washington state, Oregon, Washington DC

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Summary

- Climate change is real, is caused by human actions, and has impacts we're already feeling
- Scientists and the IPCC recommend that we work to keep warming below 2 degrees C
- There are many ways to reduce emissions
- Economics-inspired policies can help us do this at the lowest cost
- Taxes and cap-and-trade are proven effective tools to fight climate change!

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“ Economic policies will be central to accomplishing the goals we choose „

~ Harris and Roach (2007)

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