



**HARVARD Kennedy School**  
JOHN F. KENNEDY SCHOOL OF GOVERNMENT

# Design and Administration of a Carbon Tax

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# Design and Administration of a Carbon Tax

Point of Compliance

Scope / Tax Base

Crediting



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# Point of Compliance

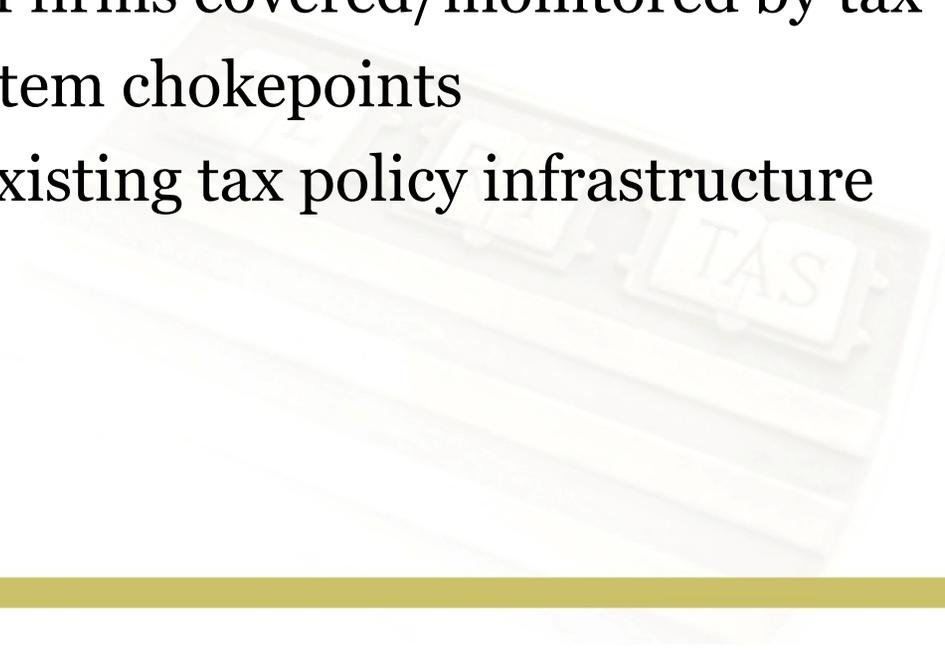
Administrative feasibility is a key principle of tax policy

- Design administratively simple implementation

Minimize number of firms covered/monitored by tax

Focus on energy system chokepoints

Take advantage of existing tax policy infrastructure



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# Energy System Chokepoints: Upstream vs. Downstream

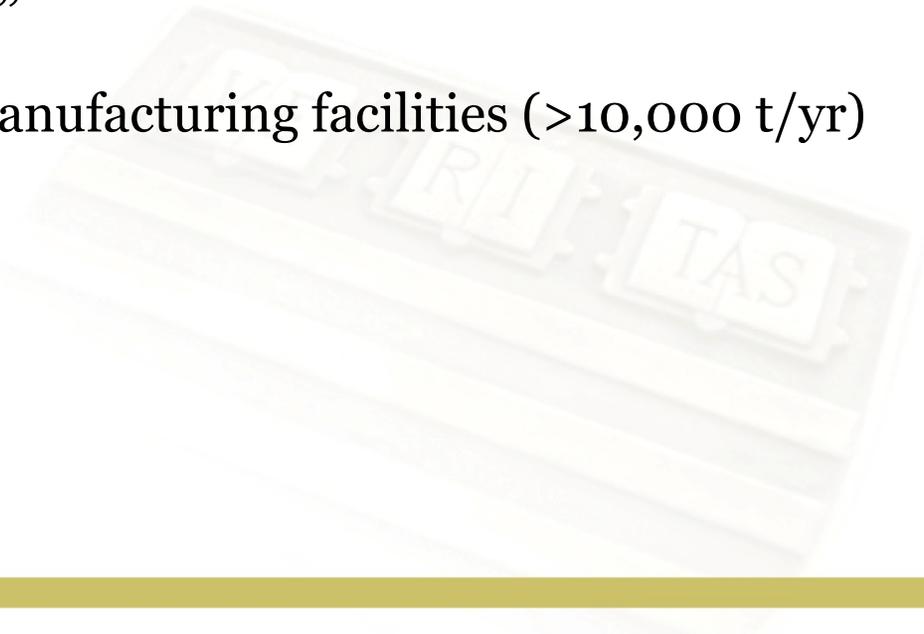
## “Upstream”

- Coal mine mouth, gas wellhead, refineries, port of entry
- ~3,000 sources

## “Large point sources”

- Power plants, large manufacturing facilities (>10,000 t/yr)
- ~13,000 sources

## “Downstream”

- Millions of sources
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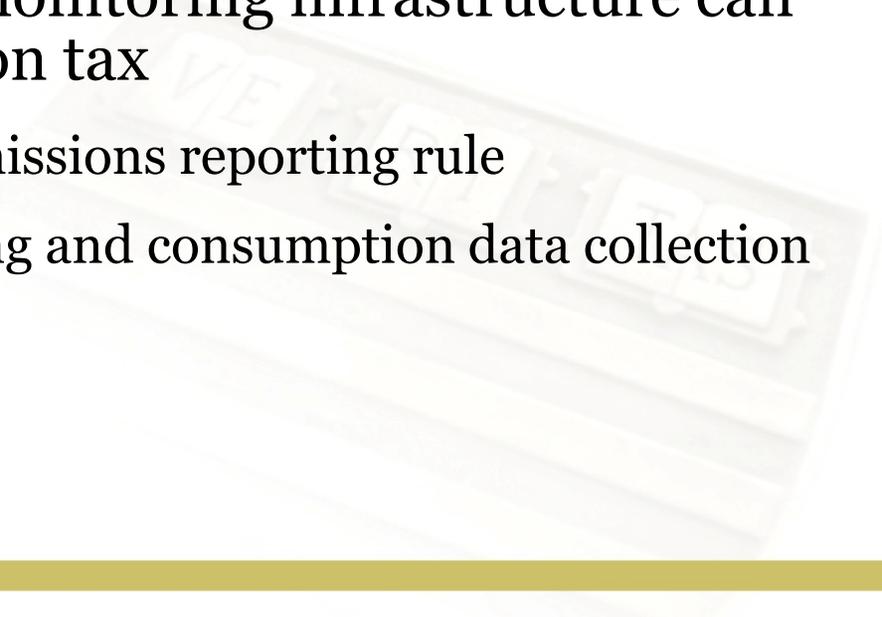
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# Existing Tax Policy Infrastructure

Refineries pay a per barrel tax to finance the Oil Spill Liability Trust Fund

Coal mines pay a per ton tax to finance the Black Lung Disability Trust Fund

In addition, existing monitoring infrastructure can inform design of carbon tax

- EPA greenhouse gas emissions reporting rule
  - DOE/EIA fuel marketing and consumption data collection
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# Tax on Carbon Content of Fuels

Focus on chokepoints and existing tax policy infrastructure → tax on carbon content of fossil fuels

A carbon tax program would require taxpayers to report on physical quantities of fossil fuel sales that are converted into their tax obligation

Taxpayer	Report on
Refineries	barrels of crude oil
Coal Mine Operators	tons of coal shipped
Gas Producers	thousand cubic feet of gas

Note: Points of entry for imports for refined petroleum product, coal, and natural gas would also need to be covered.

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# Scope / Tax Base of a Carbon Tax

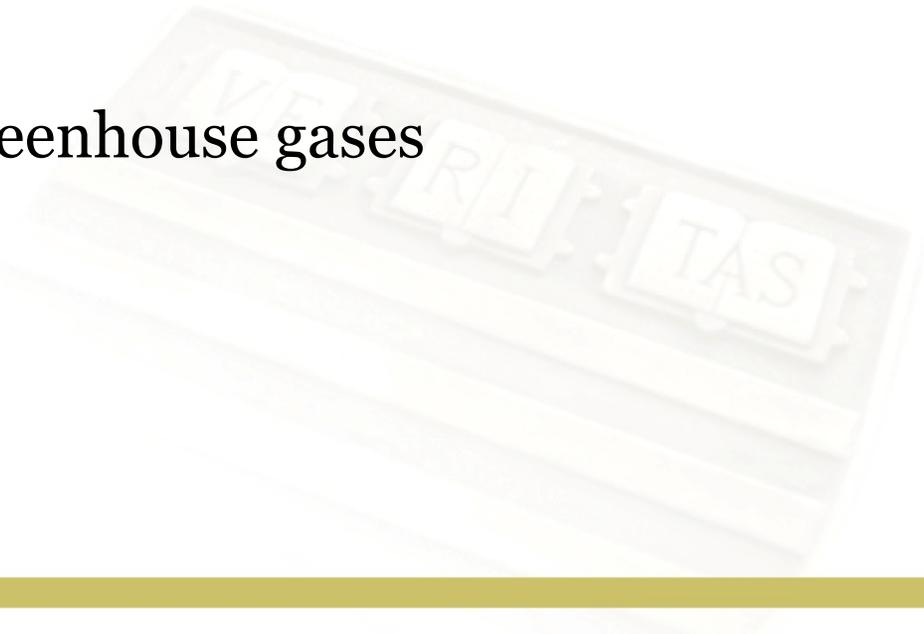
“Scope” in climate policy  $\approx$  tax base in tax policy

Common categories of scope

- Economy-wide
- Large point sources
- Utility sector only

Energy CO<sub>2</sub> vs. all greenhouse gases

Exemptions



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# Effect on Government Revenues

Economy-wide carbon tax would likely raise \$100+ billion

- 2015: \$20/ton CO<sub>2</sub> tax → \$110 billion

Comparable to other revenue streams

- Corporate income tax raised \$190 billion in 2010
- The 2% payroll tax reduction in 2010 cost ~\$110 billion
- 2010 AMT relief cost ~\$135 billion

Utility-sector carbon tax of \$20/ton would raise ~\$40 billion in 2015

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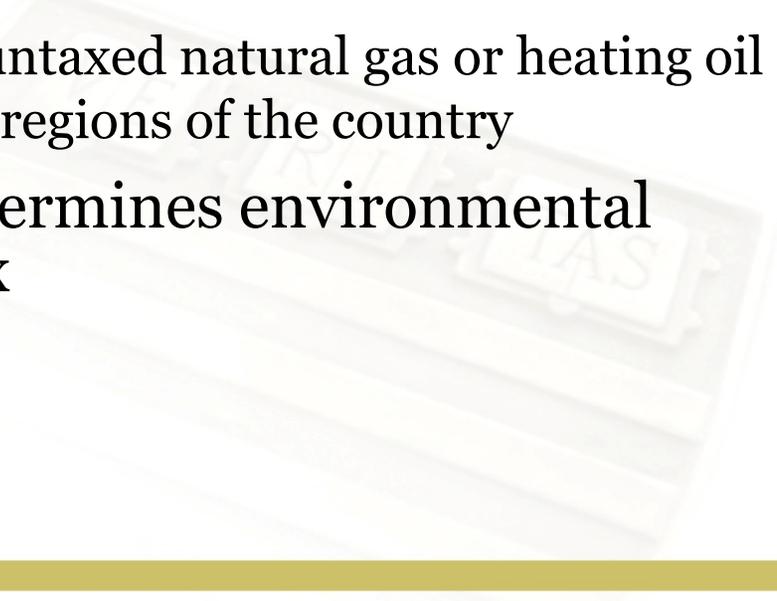
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# Risks of Domestic Leakage with Limited Scope

Utility-sector only carbon tax could result in emission leakage to industrial and building sectors

- Manufacturing facilities could generate own power in lieu of buying electricity that is taxed based on its carbon content
- Households may heat with untaxed natural gas or heating oil in lieu of electricity in some regions of the country

Reduces tax base and undermines environmental effectiveness of carbon tax



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# Energy CO<sub>2</sub> vs. All Greenhouse Gases

Benefits of expanding tax base vs. complexity of implementation

Some greenhouse gases easy to cover

- HFCs, CO<sub>2</sub> from cement production

Some greenhouse gases are difficult to cover

- Nitrous oxide emissions from agriculture

Energy CO<sub>2</sub> covers about 80% of U.S. emissions, could feasibly increase coverage to 87-90%

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# Exemptions

Exempt specific categories of sources

- Scope question

“Non-marginal” exemptions

- Example: first XX% of a source’s emissions are exempt from taxation
- Potential administrative challenges
- Potential gaming by emission sources
- Reduces tax base

Should other energy policies be exempted?

- Supplemental policies reduce tax base, undermine cost-effectiveness
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# Crediting

Fossil fuels that do not result in emissions to atmosphere

- Non-combusted inputs to production (e.g., petrochemicals)
- Carbon capture and storage

Biological sequestration

International offsets

Credits for R&D and other climate-friendly investments



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# (Tradable) Tax Credits

Carbon capture and storage projects should qualify for tax credits

- Credit should be set equal in value to tax per ton of CO<sub>2</sub>
  - Monitoring of annual CO<sub>2</sub> storage relatively straightforward given existing EPA and DOE programs
  - Power plants and manufacturing facilities that capture CO<sub>2</sub> *could* trade tax credits to covered upstream firms
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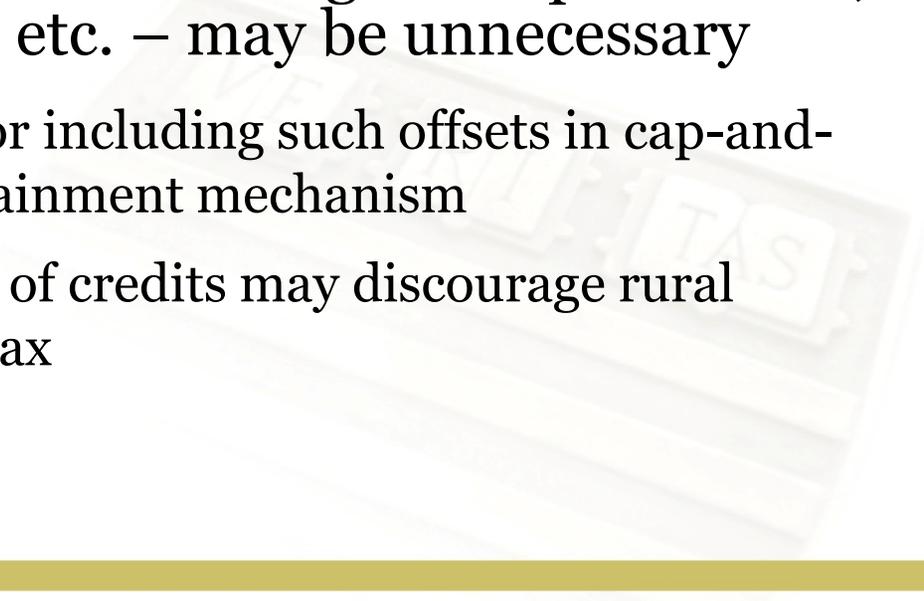
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# Are Credits Necessary?

Clear need for credits in an upstream tax program to create incentive for downstream emissions capture

Credits can also ensure that activities that use fossil fuels for non-combustion do not bear the tax

Broader set of credits – for biological sequestration, international offsets, etc. – may be unnecessary

- Primary motivation for including such offsets in cap-and-trade is as a cost containment mechanism
  - Excluding these types of credits may discourage rural support for a carbon tax
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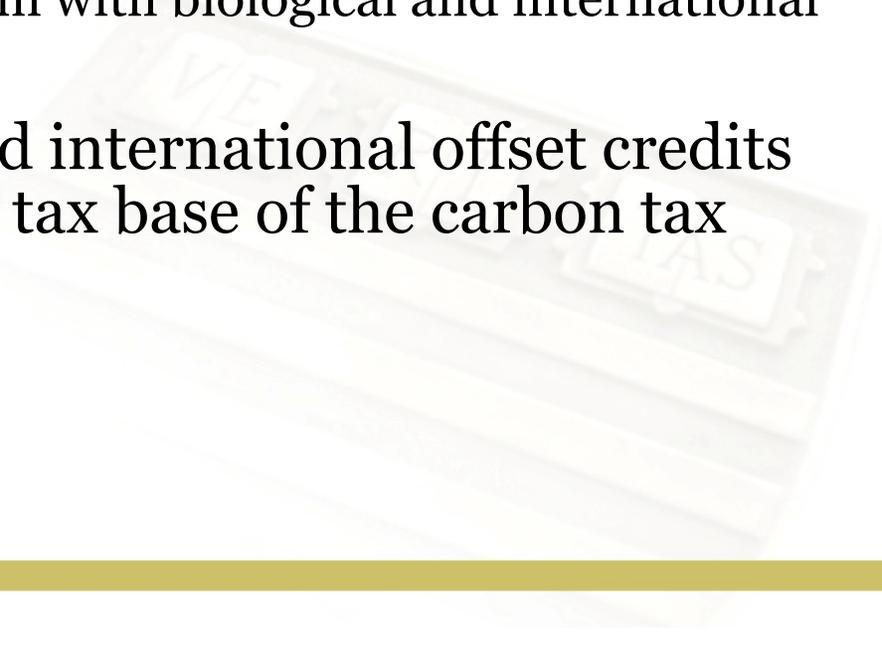
# Challenges in Implementing Credits

Administrative complexity increases risk of fraud

Unknown counterfactual problem with emission offsets raises questions of environmental integrity

- More significant problem with biological and international offsets than from CCS

Allowing biological and international offset credits effectively reduces the tax base of the carbon tax program



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# Conclusions

## Point of compliance

- Upstream tax on carbon content of fuels consistent with tax policy principles

## Scope

- Broader scope yields larger tax base
- Narrow scope risks domestic leakage

## Crediting

- Tax credits for downstream CCS, non-combusted fossil fuels
  - Credits for offsets beyond domestic energy raises questions about need, administrative feasibility, and risk of fraud
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