Lecture 05

Taxes

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AEM 4510

Roadmap

1. What are the different kinds of price instruments in theory and the real world?
2. What happens under a tax?

Taxes

Emission taxes

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Solves the two big problems with externalities:

1. Poorly defined property rights (assigned to the regulator)
2. High transactions costs (pay a flat fee)

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We know abatement costs are decreasing in emissions and damages are increasing in emissions

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This means that the regulator's optimal tax is given by:

$$\tau^* = D'(E^*)$$

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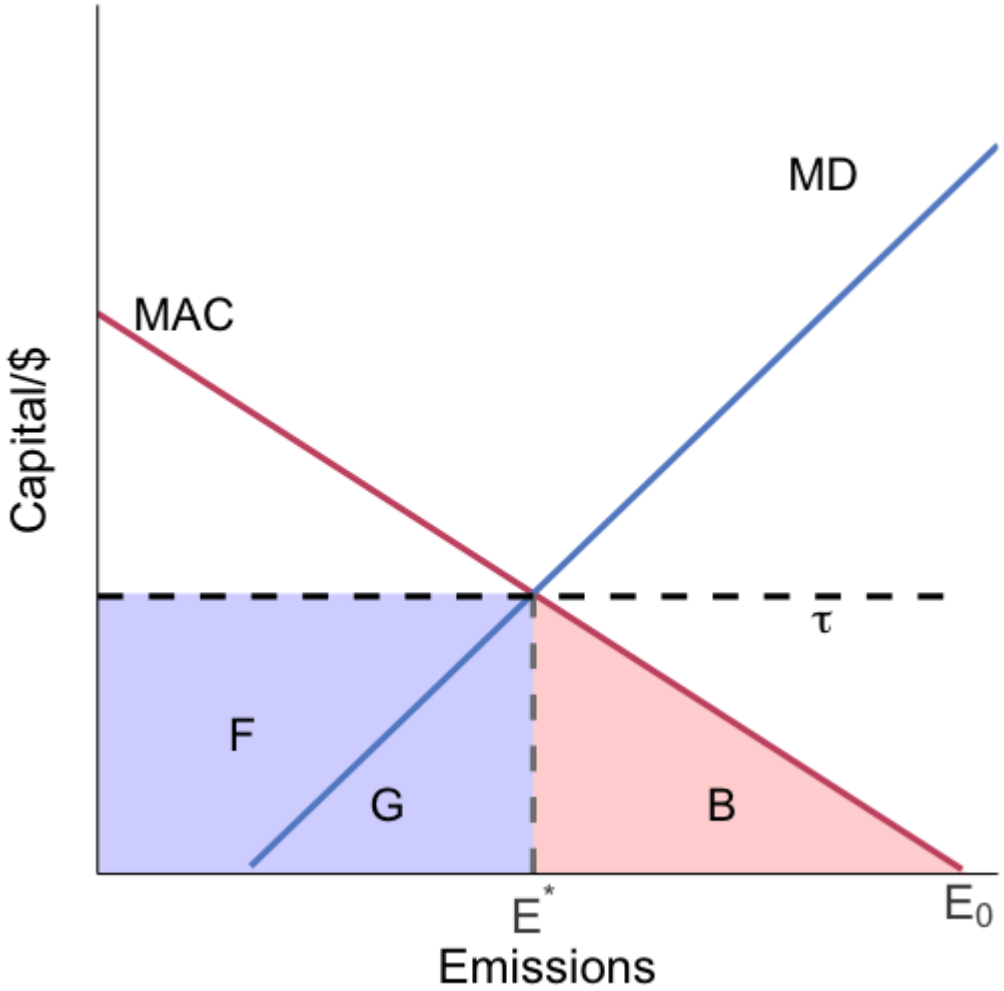
The tax actually makes them bear a cost exactly equal to marginal damage

Emission taxes: graphical



The optimal tax equals MD at E^*

You can think of this as the firm being forced to pay for damages equal to the cost of the last unit of emissions

In addition to paying abatement cost equal to the red area B, the firm also has a tax payment equal to the blue area $F + G$

Emission taxes: real world

Australia started carbon tax on July 1, 2012

$23 AUD per ton of carbon emitted for large emitters as a response to the Copenhagen Accord of 2009

Australia hopes to reduce carbon emissions by 80% below 2000 levels by 2050

Started by Julia Gillard government and revoked by Tony Abbott government in July 2014

Emission taxes: real world

In 2008, the province of British Columbia implemented North America’s first broad-based carbon tax

The carbon tax applies to the purchase and use of fossil fuels and covers approximately 70% of provincial greenhouse gas emissions

Beginning April 1, 2018, B.C.'s carbon tax rate is $35 per tonne of carbon dioxide equivalent emissions

To improve affordability, government increased the Climate Action Tax Credit

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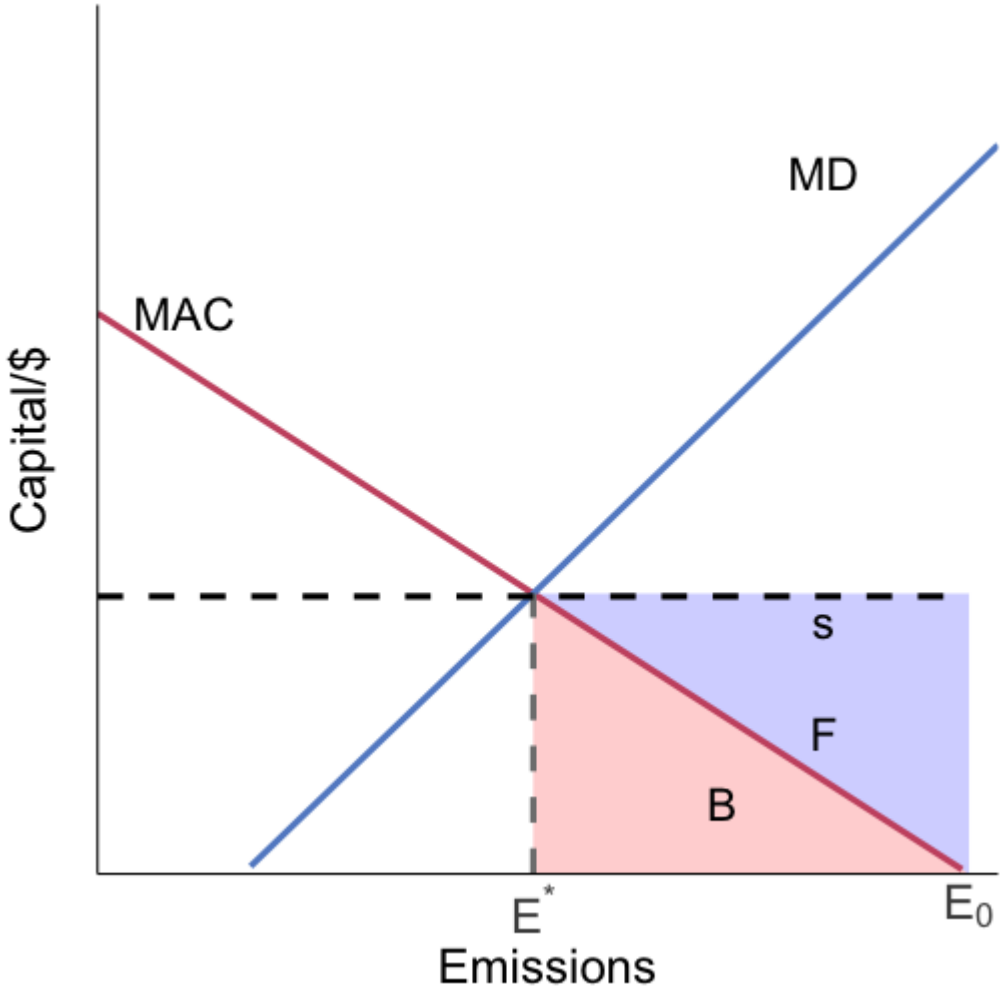

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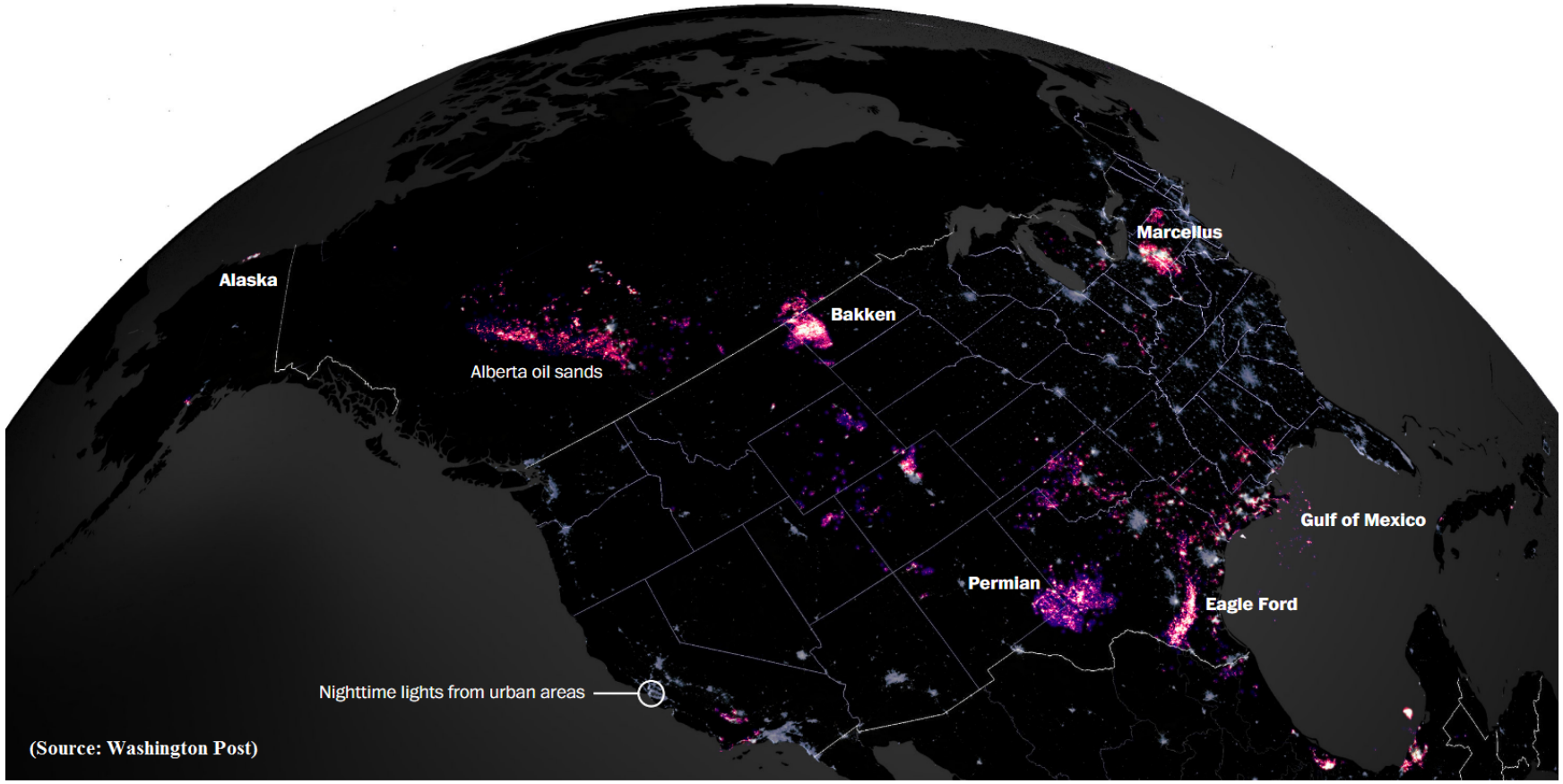
Abatement subsidies

It is as if the government claimed the property rights to the air on behalf of the firm, and then pays the firm for the right to clean air on behalf of the citizens

Taxes vs Standards



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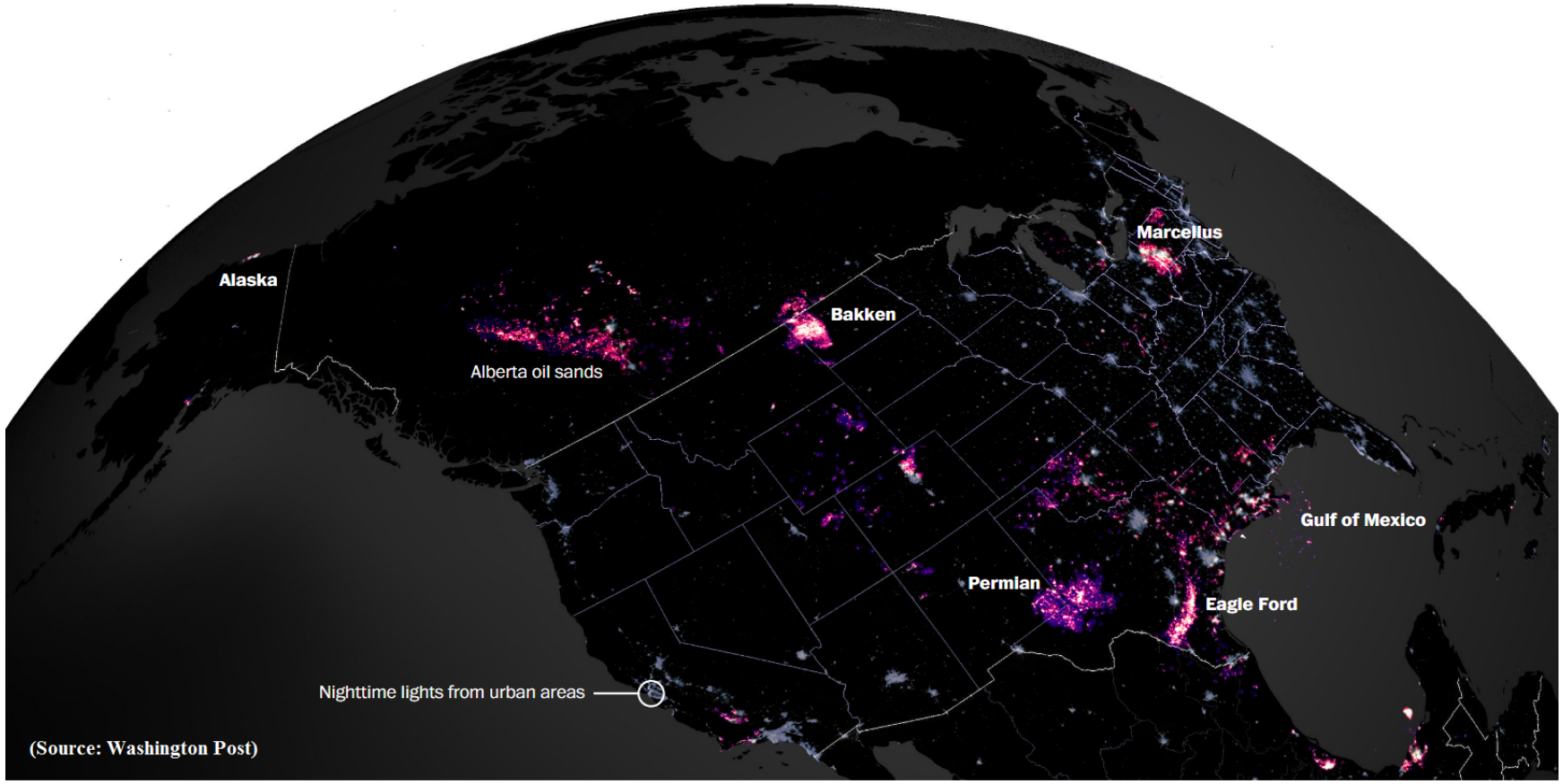

Emission taxes

Unconventional oil

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Flaring regulations in North Dakota

North Dakota Industrial Commission established firm-level flaring limits beginning in October 2014

North Dakota Industrial Commission Order 24665 Policy/Guidance
Version 041718

Policy Goals:

1) reduce the flared volume of gas
2) reduce the number of wells flaring
3) reduce the duration of flaring from wells

The Commission establishes the following gas capture goals:

74% October 1, 2014 through December 31, 2014
77% January 1, 2015 through March 31, 2016
80% April 1, 2016 through October 31, 2016
85% November 1, 2016 through October 31, 2018
88% November 1, 2018 through October 31, 2020
91% beginning November 1, 2020

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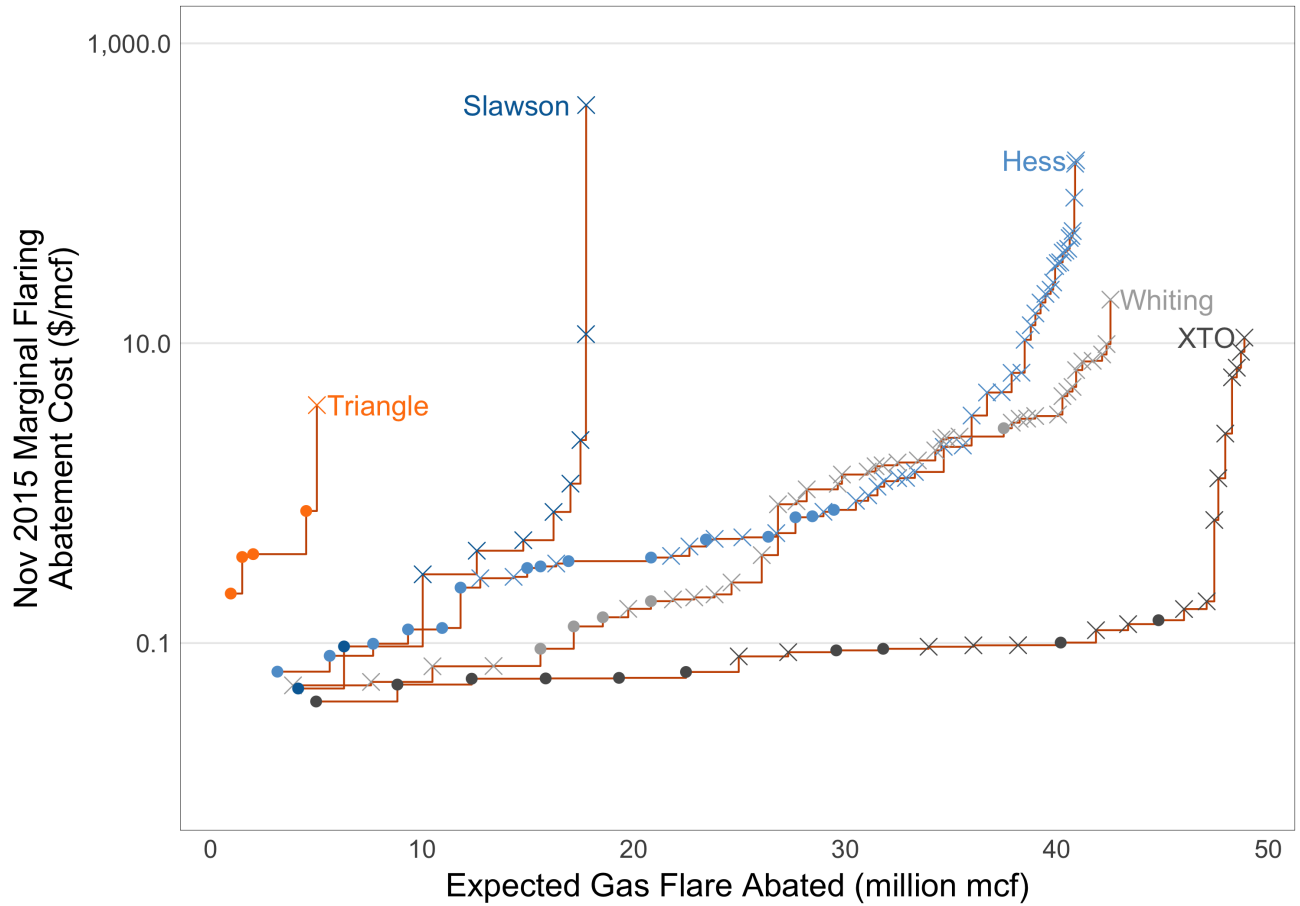
We know that means it'll be inefficient

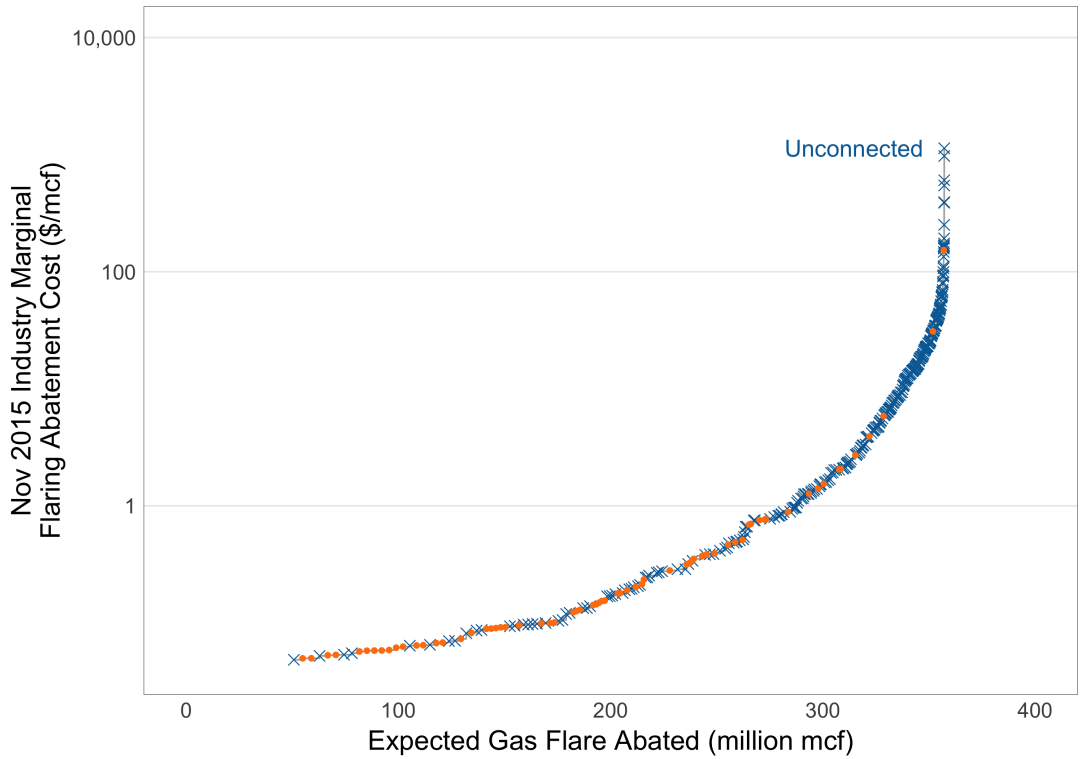
Real world MACs

Firms appear to be cost-minimizing to comply



Real world MACs

But this doesn't mean total costs are minimized given the quantity of gas captured



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What if we set a tax instead of a standard?

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We could capture 99% of the gas as the regulation, but 50% of the cost

Almost everyone is better off

The majority of firms are better off with a tax