RESOURCES *for the* FUTURE

Federal Climate Policy 108: The Oil and Gas Industry

Explainer by **Brian Prest** — April 2021

Introduction

US oil and natural gas consumption was responsible for more than **4 billion metric tons of CO_2 in 2019,** together amounting to about 80 percent of energy-related CO_2 emissions in the United States. As the coal industry continues to decline, these two fuels will represent nearly all future energy-related emissions in the country. Oil and natural gas are consumed in many sectors in the economy, including by cars and trucks, in homes, and at power plants. While other explainers in this series generally lay out federal climate policy options specific to end-use sectors—that is, where and how fuel ultimately is *used*—this explainer focuses on policies relevant to US oil and gas *production*. These policies include eliminating tax rules that specifically benefit oil, gas, or coal producers, imposing a carbon tax on fossil fuel production, reducing oil and gas production on federal lands, and reducing methane emissions throughout the oil and gas supply chain.

Sector Overview

Oil and gas production involves drilling wells deep into the earth, facilitating the flow of fuels to the surface, transporting the fuels, and refining the fuels into final products (such as gasoline, diesel, propane, and jet fuel). Emissions occur both when those fuels are burned and when the fuels are produced and transported, during which methane—the primary component of natural gas and a highly potent greenhouse gas (GHG)—leaks into the atmosphere. Hence, policies can reduce emissions either by reducing the production and consumption of oil and gas or by addressing methane leaks in the supply chain. Policy options include changes to financial incentives that encourage or discourage oil and gas production, as well as regulations and standards to reduce emissions.

Eliminating Existing Tax Preferences for Oil, Gas, and Coal

The Basics

The tax code offers tax provisions and credits that benefit the fossil fuel industry specifically and encourage the production of fossil fuels. Policymakers can reduce emissions by eliminating some of these provisions, thereby reducing incentives for oil and gas production.

Many provisions and credits favor oil and gas producers; the major ones are listed here:

- accelerated tax deduction for intangible drilling expenses
- accelerated tax deduction for resource depletion ("percentage depletion")
- tax credits for enhanced oil recovery
- tax credits for marginal oil and gas wells (wells producing fewer than 25 barrels of oil equivalent per day)

Together, these credits and preferences cost the government between $3 billion and $7 billion each year. Eliminating some or all of these tax breaks can lead to increased government revenue and decreased emissions.

The Refined Coal Tax Credit

In addition to oil and gas tax credits, the federal government **offers a tax credit** of nearly $1 billion annually for "refined coal," which is coal that is chemically treated with the intention of reducing the amount of local air pollution it generates when burned. To claim the tax credit, coal refiners must demonstrate that sufficiently large pollution reductions are achieved (20 to 40 percent). However, **RFF research** has found that, in practice, the resulting emissions reductions fall significantly short of the targets established by the tax law. That research has led to an **investigation** by the US Government Accountability Office.

Eliminating the refined coal tax credit would save about $1 billion annually and reduce the use of refined coal, which in turn would mean that some coal plants may retire sooner or find more effective ways to reduce emissions to comply with air quality regulations. The refined coal tax credit is scheduled to expire at the end of 2021, though **several bills** have been **introduced** to **extend** the credit.

Benefits and Challenges

Repealing oil and gas tax preferences would increase government revenue by several billion dollars annually. In addition, it would make oil and gas development slightly less profitable and could make some wells unprofitable to develop, slightly reducing oil and gas production and the associated emissions. A potential drawback is that this reduced supply would also slightly increase energy prices. However, research finds that the effect on global oil production—and, accordingly, emissions and prices—**would be modest.**

Key Considerations

The primary decision that policymakers must make for this policy tool is which tax credits and preferences to eliminate and which to keep. One consideration is the accounting mechanisms that policymakers deem to be appropriate for the types of capital expenses incurred by oil and gas developers. This is in part a technical accounting question and in part a subjective determination about what type of tax treatment is deemed fair.

Past, Current, and Proposed Policies to Eliminate Tax Credits

Proposed bills from the 116th Congress that would eliminate these preferences include **S. 4887, H.R. 7781,** and **H.R. 8411**. All three bills would eliminate all the oil and gas tax preferences discussed above; the first two would also eliminate the refined coal credit.

Upstream or Midstream Carbon Tax

The Basics

Carbon taxes require companies to pay for each ton of GHG emissions they are responsible for, creating a financial incentive for companies and individuals to reduce their emissions. When implementing a carbon tax, policymakers must choose where in the economy to impose it—essentially determining who directly pays the tax. Policymakers can levy carbon taxes at any of the following points:

- **downstream**, where the emissions occur, such as at a power plant or a gasoline pump when filling your fuel tank
- **upstream**, at the point of production of fossil fuels, such as at a coal mine or oil well
- **midstream**, somewhere in between, such as at an oil refinery

A midstream or upstream tax would apply to the **embodied emissions** in the oil or gas—that is, the emissions that eventually are produced when the fuel is burned. The cost of the tax would be paid directly by the taxed entity, but may be passed on to other entities, as well. For instance, some of the increased cost of an upstream tax would be borne by oil and

gas producers, reducing production; however, to the extent that producers can raise their prices to cover additional expenses, some of the tax would be passed on to refineries (midstream) and utilities and consumers (downstream), reducing consumption. Reduced production and consumption alike lead to reduced emissions.

Benefits and Challenges

The benefits of an upstream or midstream carbon tax are similar to the benefits of **a carbon tax in general**: it encourages cost-effective emissions reductions in the covered sector, as explained in RFF's **explainer on economy-wide policies**.

A key concern with an upstream or midstream carbon tax could be emissions **leakage**. Leakage occurs when production shifts from an area with a tax to an area without the tax, or when consumers import fuels from foreign suppliers that are not subject to the tax. Under an upstream tax, which by nature can only be applied to domestic oil and gas production, US consumers can import oil or gas from foreign suppliers not subject to the tax. This makes the tax less efficient and less effective at reducing emissions.

Key Considerations

Leakage can be combated by imposing a **border adjustment** (**import tax** or **export rebate**) on the carbon content of imported (or exported) products, including oil and gas, so that domestic and foreign sources are treated equally. Imposing a border adjustment raises concerns, however, about ensuring that the adjustment comprehensively covers all related goods. For example, if the import tax applies only to crude oil but not to gasoline (which is made from crude oil), consumers may import the untaxed gasoline.

Administrative ease is an important factor for policymakers to consider when choosing whether to apply a carbon tax upstream, midstream, or downstream. The structure of the supply chain may make it easiest to measure and apply a tax at a particular point. For example, the United States contains **nearly one million** operating oil and gas wells owned by **thousands** of companies (upstream), more than **100,000** gas stations (downstream), but only about **100** refineries (midstream). It may be easier to apply the tax at the level with the fewest entities, which in the case of oil is the midstream refineries.

The preferred point of regulation may vary by fuel type; for example, **scholars have argued** that natural gas is best taxed downstream, because a large share of gas does not go through midstream processing, so would be missed by a midstream tax.

Past, Current, and Proposed Upstream or Midstream Carbon Taxes

Where carbon pricing has been implemented, it typically has been applied downstream for fossil fuels used at large stationary sources (like power plants) and midstream for oil refineries. While upstream carbon taxes generally have not been imposed, many states already charge severance taxes on oil and gas at the point of extraction. Severance taxes usually are based on a percentage of the monetary value of the oil and gas extracted—unlike a carbon tax, which is based on emissions generated and set in terms of dollars per ton of emissions.

Reforming Federal Oil, Gas, and Coal Leasing Policy

The Basics

The federal government owns about **28 percent** of US land and leases the right to extract fossil fuel from those lands to private developers. The emissions associated with the extraction and use of fossil fuels from federal lands are equivalent to about **one quarter** of US emissions annually.

Three policy reforms on this issue have received the most attention from policymakers: a **ban** on all new fossil fuel leasing, imposing "**carbon adders**" (akin to a **carbon tax**) on federal lands, and adjusting **royalty rates** (the share of fossil fuel revenues that the federal government receives).

Benefits and Challenges

All three of the aforementioned policies would reduce emissions, with the amount of reductions **depending on the stringency of the policy**. However, because the policies would affect only the production from federal lands—not all US production—emissions leakage may occur; in other words reduced federal production and emissions may be partially offset by increased production and emissions on nonfederal land within the United States and in other countries.

Another benefit is that imposing higher royalties would generate new revenues for the government. These revenues historically have been shared with the producing states and could help support communities that **depend on fossil fuels for their livelihoods**, as the economy transitions away from fossil fuels.

Key Considerations

When designing leasing reforms, policymakers must weigh key trade-offs, including emissions and revenues, given that fossil fuel leasing on public lands generates billions of dollars annually in royalty revenues for the federal government and the producing states. A large fraction of oil and gas revenues is directed to the **Land and Water Conservation Fund** and the Bureau of Reclamation. Without new leasing, those programs would lose funding over time. The three policies described here are likely to have different effects on emissions and revenues, as shown by **this RFF study and infographic**.

Past, Current, and Proposed Leasing Reforms

The Obama administration issued a temporary **moratorium on offshore oil and gas leasing**, following the Deepwater Horizon oil spill, and later imposed a moratorium on **federal coal leasing** while it considered imposing **carbon adders** on new coal leases, potentially based on the **social cost of carbon**. In January 2021, the Biden administration took an **analogous approach** with respect to oil and gas leasing.

Methane Policy: Leakage, Venting, and Flaring Regulations

The Basics

The primary component of natural gas is methane, a GHG about 30–90 times as potent as CO. Methane can leak into the atmosphere at multiple points in the oil and gas supply chain, such as through leaky pipes and valves. Additionally, methane sometimes is intentionally released (**vented**) or burned (**flared**) as part of the production process, both of which contribute to atmospheric GHG concentrations and waste natural gas. Though methane theoretically could be captured and used, it is often more practical for producers to dispose of the gas, because transporting gas to market can be difficult.

Regulations have been proposed to limit or penalize methane leaks, include **several issued by the Obama administration** (but later rolled back) that would have required leak detection and repair and limited venting and flaring by establishing minimum gas capture rates.

Benefits and Challenges

The benefit of regulating methane emissions is that it can reduce GHG emissions while ensuring that less natural gas is wasted. Capturing more gas for delivery to market means more royalty revenues for the owners of the resource, which includes both private landowners and the federal government. However, although gas has value, the **private value lost from flaring falls far below the social cost** of emitting methane—in other words, companies have insufficient private incentive to capture the gas.

Methane regulations come with costs and challenges, as well. First, capturing excess gas is not always economical: many oil-heavy regions are in remote areas with limited gas pipeline capacity, so capturing the gas and delivering to market would require building new pipelines. The costly, unpopular alternative would be to shut the wells down completely and cease drilling, which would mean less energy production. Second, monitoring leaks at scale is costly and difficult. Methane

leaks largely come from so-called "super-emitters"—infrequent but massive leaks; thus, the costs to install improved infrastructure may yield negligible benefits in emissions reductions at many wells that are not leaking to begin with, while the emissions reductions from other wells may be very large. Targeting heavily leaking wells in a timely way is difficult with existing technology.

Key Considerations

Enforcing policies that penalize methane leaks requires those leaks to be tracked accurately. This means that regionally widespread yet accurate monitoring technology is necessary, but the most common monitoring technology is a handheld infrared camera, which is difficult to deploy at the necessary scale. Satellites increasingly are **being deployed** to improve monitoring; other approaches involve sensors on aircrafts or drones. Flaring is easier to detect, because the light produced by flaring is **visible by existing satellites**, but those data have not yet been explicitly incorporated into regulatory action.

Past, Current, and Proposed Methane Regulations

Many states have **rules** that limit the venting and flaring of methane, and the stringency of these rules varies from state to state and over time. At the federal level, the Obama administration issued **regulations** that restricted methane and other emissions from all new oil and gas wells, along with a **Methane Waste Prevention Rule** that limited venting and flaring from wells on federal lands and charged royalties on any such lost gas. These rules were rolled back by the Trump administration. Recent congressional proposals would reinstate Obama-era restrictions on new wells. In addition, the **Methane Waste Prevention Act of 2021**, proposed by Rep. Diana DeGette (D-CO), would codify the Obama-era rule of the same name.

"Green" Gas Certification, Standards, and Markets

The Basics

By reducing methane leaks and taking other actions, gas producers can reduce emissions associated with the gas they sell. Creating certification programs to validate this low-methane-emissions gas, standards to mandate low-methane gas, and markets for "greener" gas can lead to emissions reductions without reducing the amount of gas that is produced and used.

"Green" gas standards would work by certifying gas that has relatively low emissions associated with it. Producers would get a certificate or credit that can be used to comply with the standards or sold to other companies that have more methane-intensive gas supply chains. This system could mirror a clean energy standard or renewable portfolio standard, as seen in the **power sector**.

"Green" Gas Markets

Even without a policy in place, certifying lower-emissions gas could lead to environmental benefits. As explained by **Krupnick and Munnings (2020)**, such certification could encourage upstream gas producers to reduce methane emissions in their supply chain and demonstrate that they are producing "green" gas. One incentive to do so could be consumers who are willing to pay a higher price for this lower-emissions gas. Even if this willingness to pay were small, some producers might enter a green gas market to bolster their reputation for social responsibility and attract climate-conscious investors. For example, in 2020 the French company Engie **backed out of a multibillion dollar deal** to purchase US-produced gas over concerns that the gas might be more methane-intensive than alternative suppliers. This shows that being perceived as more polluting can mean lost market share.

Benefits and Challenges

The benefit of green gas certification is that it would create incentives for operators to reduce their emissions and provide a standardized way to measure the methane intensity of different gas sources. A concern would be whether sufficient market demand exists; if consumers are not willing to pay extra for green gas, operators will have little incentive to pursue certification. Another potential drawback is that if the certification is voluntary, only operators that are already low methane likely will opt in to claim credit, resulting in little to no reduction in emissions.

Key Considerations

Designing a program to certify green gas requires widespread yet accurate measurement of emissions associated with gas production. However, methane monitoring is not straightforward, and is thus an important consideration for policymakers. Improved satellite- or aircraft-based monitoring technology could facilitate this measurement. Policymakers must also decide how frequently producers need to recertify. Because a single large leak can have a major effect on the overall "greenness" of a gas supplier, somewhat frequent certification may be necessary. Another key question is who would design and implement the green gas certification program. While standards would be set by the government (state, federal, or international), certification could be led by an industry coalition, nonprofits, or other stakeholders, and each option has different **merits**.

Past, Current, and Proposed "Green" Gas Policies

No federal standards for green gas exist yet, although some in the industry have begun voluntary efforts, such as **ONE Future**. Many other products have analogous certifications (e.g., fair trade coffee, Energy Star appliances). The US Environmental Protection Agency has used voluntary programs to reduce methane emissions, such as the Obama-era Methane Challenge Program and the Natural Gas Star Program (akin to Energy Star).

Some existing natural gas policies could be built upon to create a green gas standard or program. The Sustainability Accounting Standards Board (SASB) requires member companies to disclose methane leaks in their US Securities and Exchange Commission filings. Finally, the **Clean Energy Innovation and Deployment Act** would encourage gas-fired power plants to demonstrate that their gas supply chain is clean, by providing credits for reducing emissions (i.e., provide greater financial incentives to produce clean energy) under a clean energy standard in the power sector.

Brian Prest is a an economist and Fellow at Resources for the Future specializing in climate change, oil and gas, and energy economics. Prest uses economic theory and econometric models to improve energy and environmental policies by assessing their impacts on markets and pollution outcomes. Prior to joining RFF, Prest earned his PhD at Duke University and previously worked in both the public and private sectors. At the Congressional Budget Office, he developed economic models of various energy sectors to analyze the effects of proposed legislation, including the 2009 Waxman-Markey cap-and-trade bill and related Clean Electricity Standards. At NERA Economic Consulting, he conducted electricity market modeling, project valuation, and discounted cash flow analysis of various infrastructure investments in the United States, Latin America, Europe, Africa, and Southeast Asia, with a focus on the power sector.