

From: Pete Ogden, Trevor Houser, and Ben Kobren

Date: March 11, 2015

Re: Key Climate/Energy Issues and Potential Initiatives

Here are some of the key ideas and research that we have been developing over the past few months in the areas that we discussed: a) driving additional GHG reductions beyond President Obama's Clean Power Plan; b) issues surrounding fossil fuel production and consumption in the context of the oil and gas boom; c) innovation. We are continuing to develop these ideas further and to solicit expert outside advice in the context of the policy process that Jake and Dan are running.

Please let us know if there are particular items in these areas that you think are promising and would like us to concentrate more on, or if there are new areas we should be looking exploring.

Driving Additional GHG Reductions Beyond the Clean Power Plan

The significant steps that the Obama administration is taking to accelerate clean energy deployment and reduce domestic greenhouse gas emissions is putting us on track to achieve our 2020 climate target of a 17% reduction below 2005 levels. But, as you well know, additional action will be required to reach our 2025 target of 26-28%, and in particular the deeper reductions required by 2030 to remain on track to meet our long-term climate objectives.

Below are three pathways to achieve these reductions:

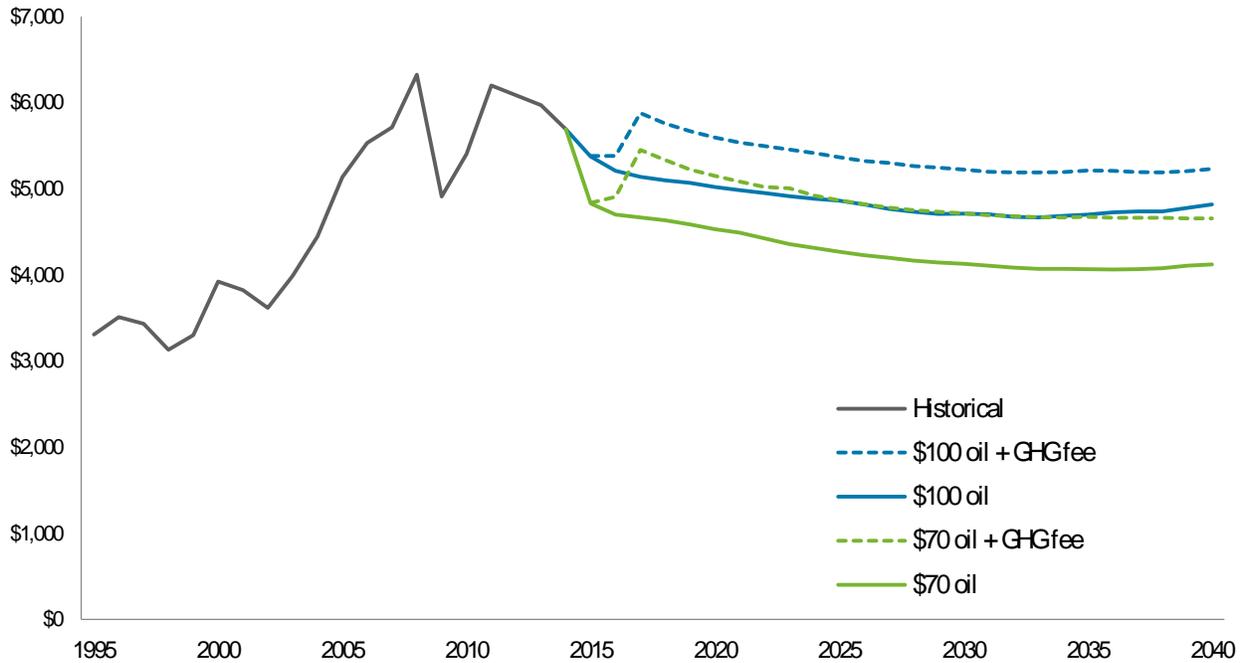
- 1.) GHG Pollution Fee: propose economy-wide legislation that puts a price on GHGs.
- 2.) Clean Energy Competition: Leverage tax expenditures, infrastructure spending and regulatory authority to encourage and reward Clean Power Plan over-compliance and local clean energy leadership.
- 3.) Section 115: GHG regulations through Section 115 of the Clean Air Act.

1.) GHG Pollution Fee

We were asked to develop a proposal for a GHG pollution fee. In brief, our proposal called for a tax (pollution fee) on CO₂ emissions from coal, oil, and natural gas combustion, as well as some major sources of other GHG emissions. The revenue would be directly returned to households, with the exception of a relatively small share dedicated to transition assistance for coal miners and communities. (See Appendix A for the memo that we provided Sec Clinton answering specific questions she had about the proposal)

We analyzed the impact of a GHG pollution fee set at the social cost of carbon, where revenue is rebated to households on a lump-sum basis. Under this scenario, household energy costs would rise, but remain below recent levels in absolute terms, even if oil prices return to \$100 per barrel (Figure 1). The increase in energy costs would be more than offset by the pollution rebate for all households.

Figure 1: Household energy costs with and without a GHG pollution fee
 real 2012 USD, tax rate set at the Social Cost of Carbon

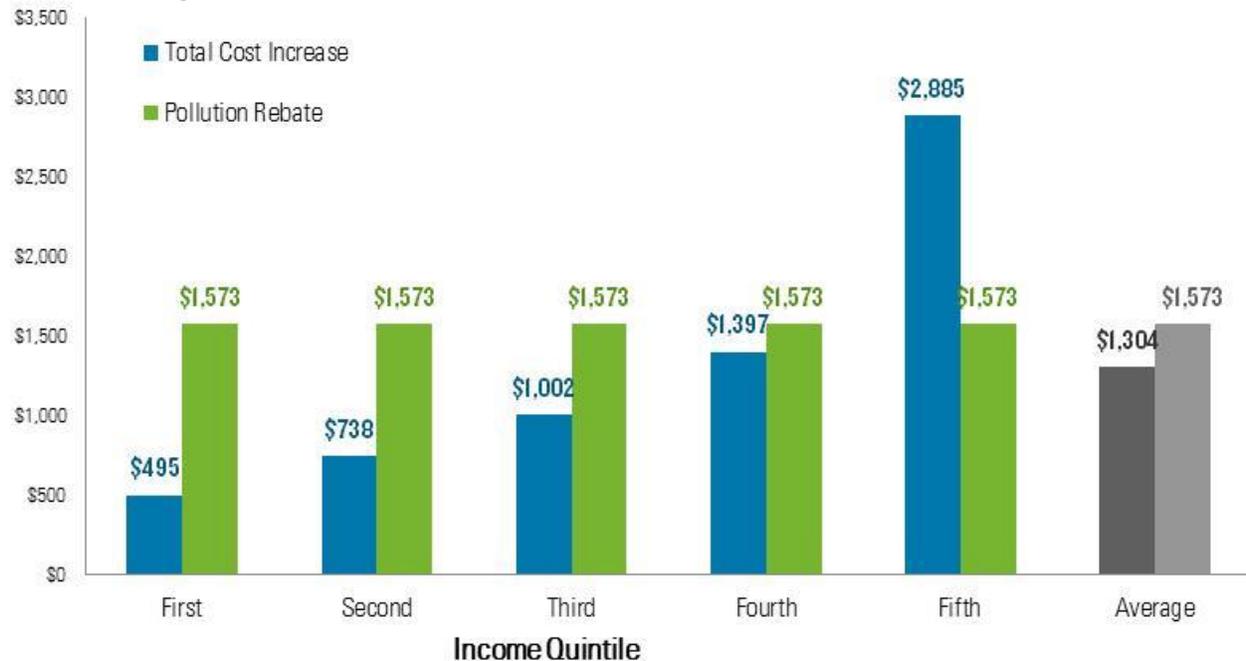


The price of non-energy goods would increase slightly as well, due to higher input costs. The pollution rebate would offset the combined increase in energy and non-energy household costs for most Americans.

Exactly what share of households would see a net cost reduction (disregarding the benefit they would receive from cleaner air and avoided climate impacts) depends on the design of the tax and the economic model used to assess its effects. Our preliminary analysis of a tax set at the social cost of carbon suggests that the bottom four income quintiles would come out ahead (Figure 2). The poorest Americans would see significant real income growth, while the richest 20% of Americans would face a meaningful net cost. We are still analyzing how costs would likely be distributed within the top 20% (which the Tax Policy Center defines as households making over \$157,000 per year in 2017 measure in today’s dollars).

Figure 2: Increase in average annual household costs vs. pollution rebate

2020-2030 average, real 2012 USD, tax rate set at the Social Cost of Carbon



While a GHG fee would clearly face stiff opposition from Republicans and some Democrats, one could potentially attempt to build support for it by using some share of the revenue for corporate income tax reform, and/or link it to a lifting of the crude oil export ban or approval of new oil and gas infrastructure. Republicans would also likely push for some level of pre-emption of EPA and/or state GHG regulations, so proper sequencing with 111d would be critical so as not to undermine the Clean Power Plan.¹

2.) Encouraging Clean Energy Competition

Putting aside a GHG fee or other comprehensive energy/climate legislation, Secretary Clinton could advocate for additional executive action and small-scale legislation that would drive deeper reductions than President Obama's existing and planned policies and regulations achieve.²

¹ In 2008, Senator Clinton proposed a cap-and-trade program that auctions 100% of permits alongside investments to move us on the path towards energy independence

² Regulations have already been promulgated for the largest emission sources, and many of these regulations last until 2025 or 2030 (e.g., current GHG/CAFE standards for light duty vehicles run through 2025 and the CPP targets run through 2030). Regulatory action in other sectors is possible, including methane regulations on existing oil and gas wells, continued action on HFCs and 111(b) and 111(d) regulations for other stationary CO2 emissions sources. Finding ways to get additional abatement from the power and transport sectors will also be important.

Using this approach, she could call for a clean energy competition that rewards states that exceed their Clean Power Plan emissions targets. For instance, a reverse auction could be launched where states compete for federal block grants that cover the cost of CO₂ emission reductions beyond what is required in the CPP. States could bid in a quantity of excess abatement (measured in tons of CO₂e) and a price for that abatement (measured in dollars per ton). The federal government would use whatever resources were available in the program to buy the greatest amount of abatement at the lowest cost.

We are exploring a range of potential revenue sources to fund such a program. President Obama's FY2016 budget requests \$4bn for a very broadly defined Clean Power State Incentive Fund that could be tapped for this if it receives any funding, or the revenue from ending oil production subsidies or reformed fossil fuel royalties could be used (see following section for opportunities and limitations in this space).

If there were interest in going further, she could consider a bold reform to clean energy subsidies as well. The Production Tax Credit (PTC) and Investment Tax Credit (ITC) – which are becoming increasingly expensive and less effective in the face of the CPP, other climate policies (e.g., state renewable portfolio standards), and general technological development – could be phased out, with savings re-invested in this clean energy competition or other forms of state-level clean energy leadership. While there could be some risk in such an approach, it would mark a clear departure from the Obama administration (which has called for extending the PTC and ITC in perpetuity), and would make it that much harder for opponents to continue to argue for maintaining fossil fuel subsidies.

The clean energy competition might also be extended to the transport sector to reward states, and cities that take a leadership position on climate and put in place low-carbon transportation policies, like zero emission vehicle (ZEV) mandates and express lanes, EV charging infrastructure, mass transit support, and others. A key question is the extent to which federal transportation funding could be tied to such policy action, and what happens to highway trust funding in the years ahead (also discussed in more depth in the following section).

In addition to the extra GHG reductions, a Clean Energy Competition would 1) create opportunities for Secretary Clinton to highlight examples of state leadership in clean energy (such as Iowa in wind generation, and North Carolina and Arizona in solar power), 2) position the federal government as empowering states to achieve their own objectives, and 3) cast Republicans as not only doubting climate science, but also the American ingenuity and entrepreneurialism that stands ready to be unleashed. We believe transition assistance for coal miners and communities will be critical under a Clean Energy Competition approach as well, and are evaluating possible revenue sources and distribution mechanisms.

3.) Section 115

A third option for driving deeper emission reductions in 2025, 2030 and beyond is through an EPA rulemaking process under Section 115 of the Clean Air Act. Section 115 covers “international air pollution” and can be invoked if a) a pollutant coming from the US is found to be endangering the public health or welfare of a foreign country (endangerment finding), and b) the foreign country has given the same rights with respect to the prevention or control of air pollution occurring in that country as is given that country in section 115 (reciprocity). Once

both criteria have been satisfied, EPA can order states to develop or adapt “state implementation plans” (SIPS) to reduce the pollutant. These SIPS could cover GHG emissions far beyond the power sector, and either complement or supersede the SIPS developed for the Clean Power Plan.

While Section 115 may provide a legitimate – albeit untested – regulatory tool that could be utilized at some point, we have not seen the benefits of featuring it *per se* as a central part of a campaign platform and the idea has not been met with enthusiasm in the context of the policy team discussions. Featuring Section 115 would attract the normal claims of regulatory overreach and burden at the same time that Sec 111d must be vigorously defended, as well as additional criticism given the broad scope and need for international reciprocity that would presumably come through a politically binding agreement rather than a ratified treaty.

Responding to the Domestic Oil and Gas Boom: Safe and Responsible Production, Reducing Consumption

The implications of the US shale boom and changes in global energy markets will likely receive considerable attention in the course of the campaign. While Republican candidates will claim that we can drill ourselves to economic prosperity and low oil prices, there is an opportunity for Secretary Clinton to provide the necessary historical and international perspective that the “energy abundance” narrative distorts the truth, and instead advance a vision for America’s future that is not dependent on the mercurial nature of global oil and gas markets³.

Without ignoring the potential benefits of safe and responsible domestic oil and gas production, Secretary Clinton could emphasize the importance of seizing this moment of low oil and gas prices to double down on reducing US oil consumption. Recent vehicle efficiency improvements have played a significant and underappreciated role in the recent drop in oil prices. And while we will never be in control of what happens to oil prices going forward, we can reduce the impact of oil price volatility on our economy through continued efficiency gains, electrification, and alternative fuels development. All of which could help to help cut GHG emissions too.

The historical lesson is to avoid a repeat of the 1980s, when we abandoned clean energy and efficiency deployment as soon as oil prices dropped. This left our economy vulnerable when oil prices spiked again in the 2000s. It would be equally foolish today to bet our economic future on the theory that OPEC will continue to maintain production at current levels and that there will not be a major supply disruption elsewhere in the world – particularly when we can take control of our destiny and make our economy resilient to any oil price future.

Finally, Secretary Clinton would leverage her diplomatic experience and expertise and call for a coordinated global effort to reduce oil consumption (and related CO2 emissions) by some defined amount through multilateral coordination on vehicle standards, elimination of expensive fossil fuel subsidies, renewable energy deployment in countries that rely on oil for power generation, and international initiatives on marine and aviation fuel use. The benefits of international action to reduce oil demand for American consumers and the US economy is both significant and quantifiable.

³ House E&C Chair Fred Upton’s proposed legislative framework, “Architecture of Abundance”, provides a boilerplate for the standard Republican position. Notably, Jeb Bush opposed offshore oil and drilling when it came to Florida, but not elsewhere.

By planting this flag early, her foresight – and Republican myopia – will be increasingly clear if and when oil prices rise as is projected between now and 2017.

Safe and Responsible Oil and Gas Production

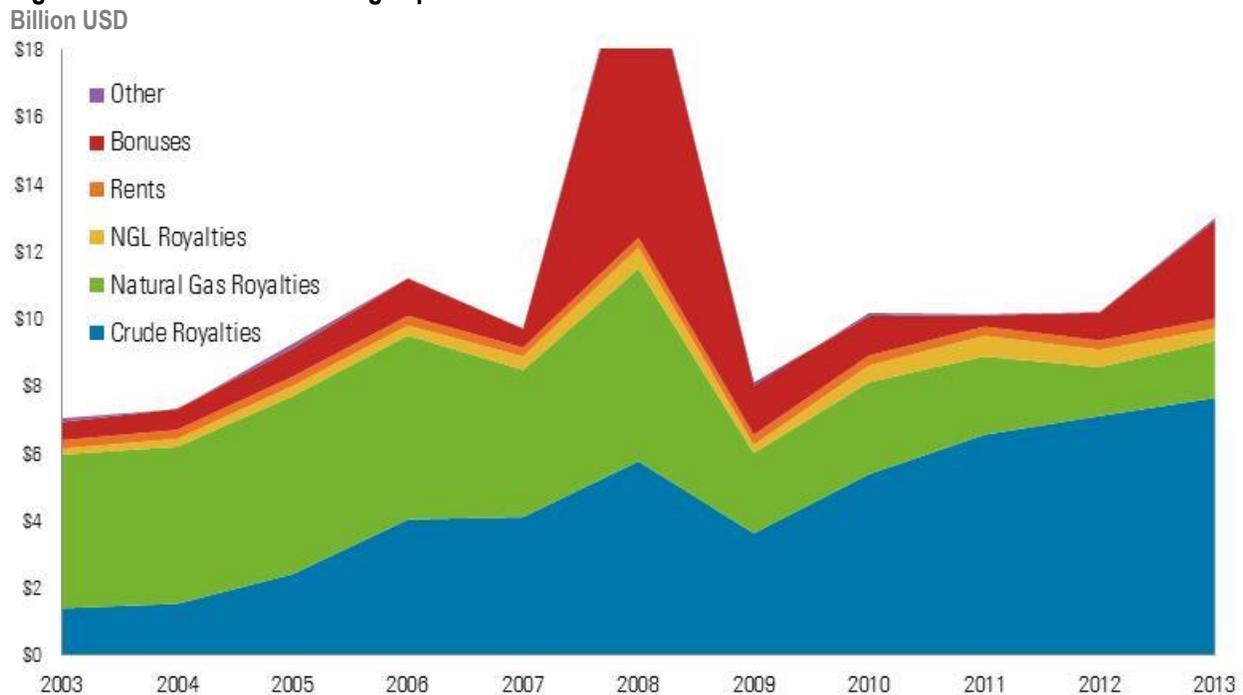
While the shale-driven surge in domestic oil and gas production has in fact delivered significant (though often overstated) economic benefits, it is also true that those benefits have not been evenly spread, and the boom has introduced new environmental challenges that need to be managed. We are evaluating policy options for ensuring fair and responsible oil and gas production through reform of oil and gas subsidies and royalties, better regulation of oil and gas production, and sustainable energy infrastructure development.

Oil and Gas Subsidies and Royalties

In recent years, oil and gas companies have received roughly \$4bn per year in subsidies through the tax code. While eliminating these subsidies would not decrease US fossil fuel production (or have much impact on gasoline or natural gas prices), it would provide revenue that could be used to incentivize CPP over compliance and/or provide transition assistance to coal miners and communities. If oil prices stay at current levels, however, the value of the subsidies (and revenue received from removing them) will be significantly reduced.

The same is true for royalty revenue from oil and gas production on federal land. The federal government collected \$13 billion in revenue from oil and gas production on federal lands and waters in 2013, up from \$7 billion in 2003 (Figure 3). Of that \$13 billion, roughly \$10 billion was royalty revenue and the rest came from lease bonuses and rents. \$5 billion went to the states through revenue sharing programs. Another \$3 billion went to the Reclamation Fund and the Land and Water Conservation Fund, leaving roughly \$5 billion in general revenue.

Figure 3: Revenue from oil and gas production on federal lands and waters



Significantly, nearly all of the growth in revenue from oil and gas production on federal lands between 2003 and 2013 was due to the rise in oil prices during that period. Crude oil production on federal lands has stayed relatively flat since 2007, and revenue from natural gas production on federal lands actually fell from \$6.8 billion in 2003 to \$3.9 billion in 2013 as production volumes on federal land declined by 43%.

As a result, the steep decline in oil prices in 2014 sharply cuts into this revenue stream going forward. If prices settle in the \$65-75/barrel range (as currently projected in futures markets), and if federal production does not begin to wane at this price point, we expect annual royalty revenue to fall to \$6-\$7 billion/year.

President Obama has consistently called for raising the current onshore royalty rate (12.5%) to match the offshore royalty rate (18.75%). However, while there is a logic to doing this and it would raise some revenue (perhaps \$500-\$1bn per year, to be shared with states), it would certainly not return us back to 2013 levels. In addition to the lower baseline given the oil price drop, a higher royalty rate would apply only to new wells and federal production has not been the source of overall production growth over the past few years even at the current royalty rate.

Some smaller, additional revenue could be raised by changes to the way rent is computed for land leases. For example, whereas the rent that oil and gas companies pay for a given block offshore escalates over time if it is not developed thus incentivizing development, onshore operators do not face the same escalation fees.

While raising onshore royalty rates to match offshore levels would likely only have a marginal climate benefit in terms of curbing overall domestic oil and gas production, the revenue could be invested in ways that would have a strong environmental benefit. For instance, Secretary Clinton could link this reform to a defense/expansion of the Land and Water Conservation Fund (LWCF) -- arguably the most popular conservation program operated by the federal government. Under the authorizing legislation, \$900 million per year from offshore oil and gas drilling revenues are to be directed to the LWCF to be dispersed as 1) grants to state and local governments to fund local parks projects and 2) to federal land management agencies to fund land acquisition for key conservation projects. Although \$900 million per year is directed to the LWCF, spending from that account is subject to appropriation by Congress; Congress typically only appropriates \$250-\$350 million from the LWCF each year, diverting the rest of the fund for other unrelated spending.

The authorization for the LWCF will expire in 2015, so may very well disappear in the coming months if Congress does not act. With 2016 being the centennial of the National Park Service, this might be a propitious time to tie the need for royalty reform directly to the LWCF, and rebrand it the "American Parks Fund"

There are also proposals that pertain specifically to coal production on federal lands. CAP and others have proposed reforms that could generate up to \$700 million/year in revenue by changing the point at which the royalty is assessed (assuming coal production remains constant at the higher royalty rate) and by capping allowable deductions for coal washing and transportation costs.

The Department of the Interior recently proposed a rule that takes a first step toward coal royalty reform by closing a loophole that allows coal companies to sell coal to their own subsidiaries through non-arm's length transactions and then pay a royalty on that price. The DOI rule would require royalties to be paid on the first arm's-length sale of coal to a non-affiliated third party.

Secretary Clinton supported eliminating fossil fuel subsidies and raising oil and gas royalties in the 2008 campaign as part of an effort to ensure that "oil companies pay their fair share in royalties when drilling on public lands."

Fracking and Methane

We are assuming the Obama administration will issue rules to control methane emissions from new oil and gas wells, but there will be an opportunity for her to take the next important step by supporting controlling methane from existing wells and distribution system. We are also exploring options for addressing local air pollution beyond the EPA's 2012 VOC rules, and the right balance of federal and state action in safeguarding local water supply.

One step should be to call for closing the "Halliburton Loophole" – which exempts fracking fluids from the protections of the Safe Drinking Water Act and other environmental laws. As a Senator, Secretary Clinton voted against The Energy Policy Act of 2005 (Pub.L. 109–58) that created the loophole. She raised the issue during the 2008 primary as one way to differentiate her from then-Senator Obama, who had voted for the bill.

Exports and Infrastructure

Oil and gas exports and pipeline infrastructure have also become major issues for the environmental community and will likely feature in the 2016 campaign. For instance, beyond Keystone, there will continue to be questions about the Secretary's positions on oil and LNG exports, as well as on future international pipelines. We are exploring potential positions on likely export and infrastructure-related issues. We believe a concerted push to reduce global oil consumption (outlined below) will address some of the climate-related anxieties surrounding specific infrastructure and export policy decisions.

Reducing Global Oil Consumption

Secretary Clinton could announce a global oil demand reduction initiative, with both domestic and international components. Growing US oil production will increase global CO2 emissions and undermine our efforts to combat climate change, unless matched with steps reduce oil consumption, both at home and abroad. The recent drop in oil prices makes demand reduction policies all the more important, from vehicle efficiency standards to electrification initiatives, to prevent consumers from backsliding into oil dependency and related economic vulnerability.

Domestic

This administration has taken impressive steps to reduce oil consumption in the transportation sector, largely through GHG/CAFE standards for heavy and light duty vehicles. Defending these regulations will be a top priority – the mid-term LDV review will likely be completed in the first few months of the new administration. But the next administration will also have the opportunity to extend these standards, and include other transportation sources like aviation. California is slated to begin their post-2025 LDV standards process this year, making a post-2025 federal rulemaking process likely during the first term, and aviation standards could be possible in that time period as well. New efficiency standards for appliances and household and industrial equipment have the potential to deliver meaningful oil demand reductions in the buildings and industrial sectors as well.⁴

We are also exploring strategies for reducing oil demand through mechanisms other than GHG and efficiency standards. The RFS and the Highway Trust Fund will likely become issues on the campaign and we are evaluating possible positions on both and reform options that would deliver meaningful oil demand and GHG emission reductions (understanding how challenging the politics are surrounding each). For example, the unsustainability of the gasoline-funded Highway Trust Fund could create opportunities to change the way we both raise and spend transportation-related revenue in a way that accelerates the deployment of electric vehicles and mass transit solutions.

International

A domestic oil demand reduction agenda could be paired with initiatives that reduce oil consumption globally. The drop in oil prices creates headwinds for renewable energy development in emerging economies, but provides opportunities for removing diesel, gasoline, and kerosene subsidies that have served as a major impediment to efficiency and clean energy development in the past. A combination of domestic leadership, diplomatic pressure, and policy and technical collaboration could deliver a significant reduction in oil demand around the world, putting further downward pressure on prices while simultaneously reducing CO2 emissions.

One of the most successful areas of collaboration between the US and China has been in appliance efficiency standards. By sharing policy lessons learned and tools developed in the US, DOE, EPA and civil society partners have had a significant impact on the appliance efficiency process in China. EPA and DOT have begun engaging in the same type of collaboration surrounding light duty and heavy duty vehicle standards. Raising the profile of this work, broadening its scope and expanding it to other countries, could transform the global vehicle market.

A number of countries still use oil for power generation, from Japan to Jamaica. For large countries, US LNG exports can provide an affordable alternative and existing terminal approvals should help reduce oil-fired power generation, particularly in Asia. For smaller countries (as well

⁴ In 2008, Senator Clinton proposed an energy efficiency agenda to reduce electricity consumption 20% from projected levels by 2020. In addition, she supported a plan to catalyze a thriving green building industry by investing in green collar jobs and helping to modernize and retrofit 20 million low-income homes to make them more energy efficient.

as India), rapidly declining solar and battery costs provides an environmentally attractive alternative to diesel generators, but the economics are now being challenged by the oil price decline. Expanding OPIC's successful Power Africa program to countries could help catalyze private investment in renewable alternatives.

Fossil fuel subsidy reform would further improve the competitiveness of renewable energy in countries still relying on oil-fired power generation. The oil price decline makes subsidy reform easier to achieve and India, Indonesia and a handful of other countries have already taken steps in this direction. The next administration could work through the World Bank to launch a Subsidy Phase-Out and Reform Catalyst Bonds (SPARC Bonds) program or other initiative to accelerate this progress.

Finally, in the follow-up to Paris, there could be new space for international climate action on oil and gas-related emissions unlikely to be covered in a COP agreement. This includes international action on bunker fuels in aviation and maritime transport, and on methane emissions from oil and gas production.

Unlocking American Innovation

The United States is home to the most advanced research institutions in the world. Public funding for these institutions has led to transformative innovation, not least in clean energy. The development and deployment of peaceful nuclear energy came out of our national laboratory system's weapons program. Solar PV technology emerged from DOD-supported Bell Labs in California in the 1950s. DOE and national lab research played an important role in enabling the shale gas revolution.

Public support for clean energy innovation has accelerated in recent years, thanks in large part to Recovery Act funding. In addition to research at DOE and the labs, stimulus funding has supported academic and private sector clean energy R&D. Regional clean energy innovation clusters are bringing public and private sector researchers together in developing local climate solutions. There has been a meaningful uptick in climate resilience research as well, from drought-resistant farming practices to better water management systems.

While the gains to date are impressive, additional technological advances are required for long-term decarbonization and effective climate risk management. Though the United States is a leader in federal R&D funding overall, we continue to significantly underfund energy R&D relative to other areas of similar national importance. Energy R&D is even more neglected by the private sector, at roughly 0.5% of industry sales, compared to 8% for computers and electronics and 21% for pharmaceuticals.⁵

We are beginning to solicit ideas from a select group of trusted experts (such as Arun Majumdar) on how to modernize our innovation system to empower Americans with the tools and support they need to develop next generation clean energy and climate resilient solutions, as well as new opportunities for effective international collaboration in this area.

⁵ In 2008, Senator Clinton proposed doubling of federal investment in basic energy research, including funding for an ARPA-E, a new research agency modeled on the successful Defense Advanced Research Projects Agency

APPENDIX A

MEMORANDUM FOR HILLARY RODHAM CLINTON

From: Pete Ogden, Trevor Houser, and Ben Kobren

Date: January 20, 2015

Re: Questions Regarding Climate Change Framing Memo

Madam Secretary, this memo provides an initial response to your questions regarding our “Climate Change Framing Paper” of December 23, 2014. We have research underway exploring a number of your questions in greater depth and will provide additional insight in the weeks ahead.

Where is the fee applied?

Unlike cap-and-trade or EPA regulations, a GHG fee could be applied upstream when the fossil fuel is extracted (e.g. at the coal mine or oil and gas well) or imported, rather than downstream where it is combusted (e.g. at a power plant or industrial facility). The company extracting or importing the fuel would be responsible for paying the tax. The fee would be rebated for coal, oil and natural gas exports.

While CO₂ from fossil fuel combustion accounts for 82% of total US GHG emissions, other sources are also important, including methane from oil and gas production and highly potent gasses emitted in industrial production, and should be considered for inclusion in a GHG fee system. The right place to apply a GHG fee varies for these non-CO₂ gases.

Assessing the distributional effects of a GHG pollution fee

Assessing the distributional effects of a GHG fee (both by income level and geographic region) is more complicated than for many other types of revenue collection. The goal of a GHG fee is to encourage energy producers to switch to cleaner fuels, energy consumers to improve efficiency and businesses to reduce greenhouse gas emissions beyond CO₂ in the energy sector. The availability and cost of alternative energy sources, energy efficiency improvements, and non-CO₂ abatement options will shape the impact of a GHG fee on businesses and households.

For our December 23 paper, we focused on a GHG fee applied exclusively to energy-related CO₂ emissions. To assess the impact of a GHG fee on energy supply, demand, and prices, we modeled a GHG fee set at the US government’s current estimate of the social cost of carbon (SCC), roughly \$42 a ton in 2017.⁶ A fee set at this level would ensure polluters are paying the

⁶ In real 2012 USD and rising by roughly 2% per year. The distributional dynamics of other price paths (which we are in the process of analyzing) are similar but the magnitude both of the costs incurred and revenue generated differs. We employed the National Energy Modeling System (NEMS) in our analysis, which is the model that the Energy Information Administration (EIA) uses for their annual energy forecasts and to evaluate major energy and environmental legislation and regulations

damage to the climate their emissions cause and would create a powerful incentive for clean energy deployment and energy efficiency improvements.

While oil, natural gas, and coal companies would be responsible for paying the fee, they would likely pass a significant share of the associated cost on to their customers. In our analysis, for example, a \$42/ton GHG fee increases gasoline prices by roughly 40 cents per gallon on average between 2020 and 2030 and residential electricity prices by 2.6 cents per kWh, 12% and 21% above levels projected in the EIA’s 2014 Annual Energy Outlook respectively. Average household energy costs would increase by roughly \$480 per year, or 10% relative to the levels projected in EIA’s 2014 Outlook.

The dramatic decline in oil prices during the second half of 2014 mitigates the potential impact of a GHG fee on household budgets. If oil prices stabilize at \$65-\$75 per barrel (as currently forecast in futures markets), gasoline prices will remain significantly below 2011-2013 average levels through 2040, even with a GHG fee in place (Figure 1). Household energy costs remain considerably below 2011-2013 levels through 2040 as well, falling each year in inflation-adjusted terms (Figure 2).

If oil prices recover to \$100+ per barrel, gasoline prices will still remain below the 2011-2013 average until 2024-2025 with a GHG fee in place, but will then surpass recent levels (Figure 1). Due to efficiency improvements, however, household energy costs remain below 2011-2013 levels, declining in inflation-adjusted terms from 2018 through 2040 (Figure 2).

Figure 1: Retail gasoline prices

2012 USD per gallon

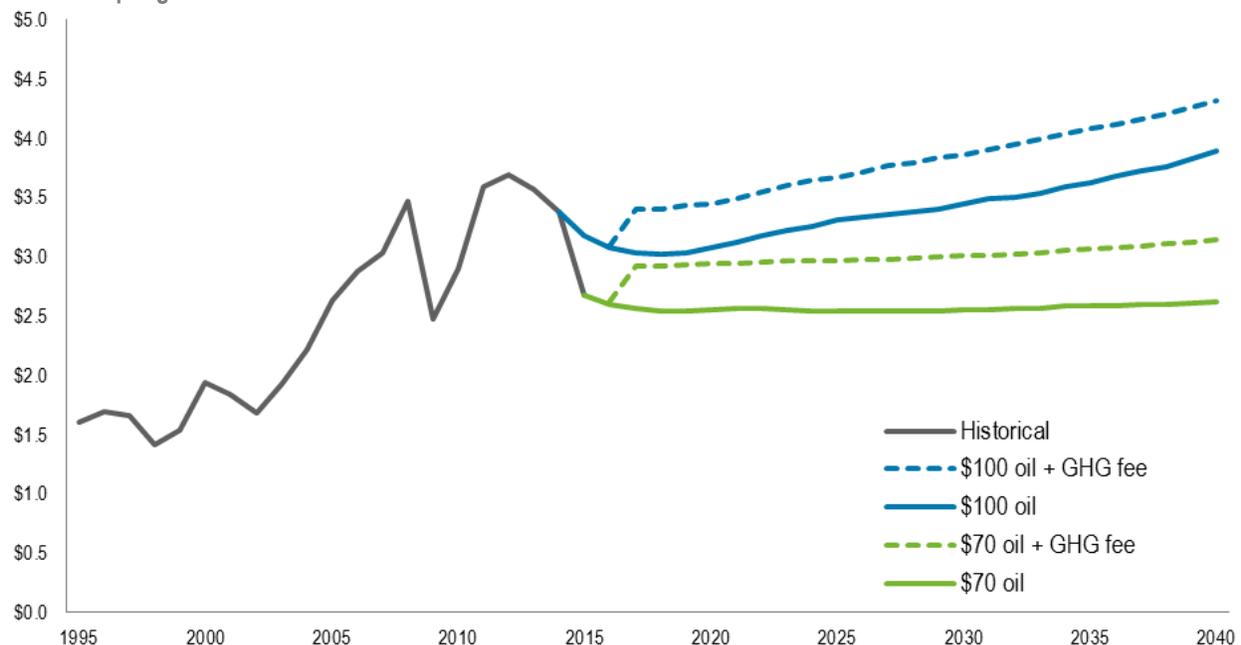
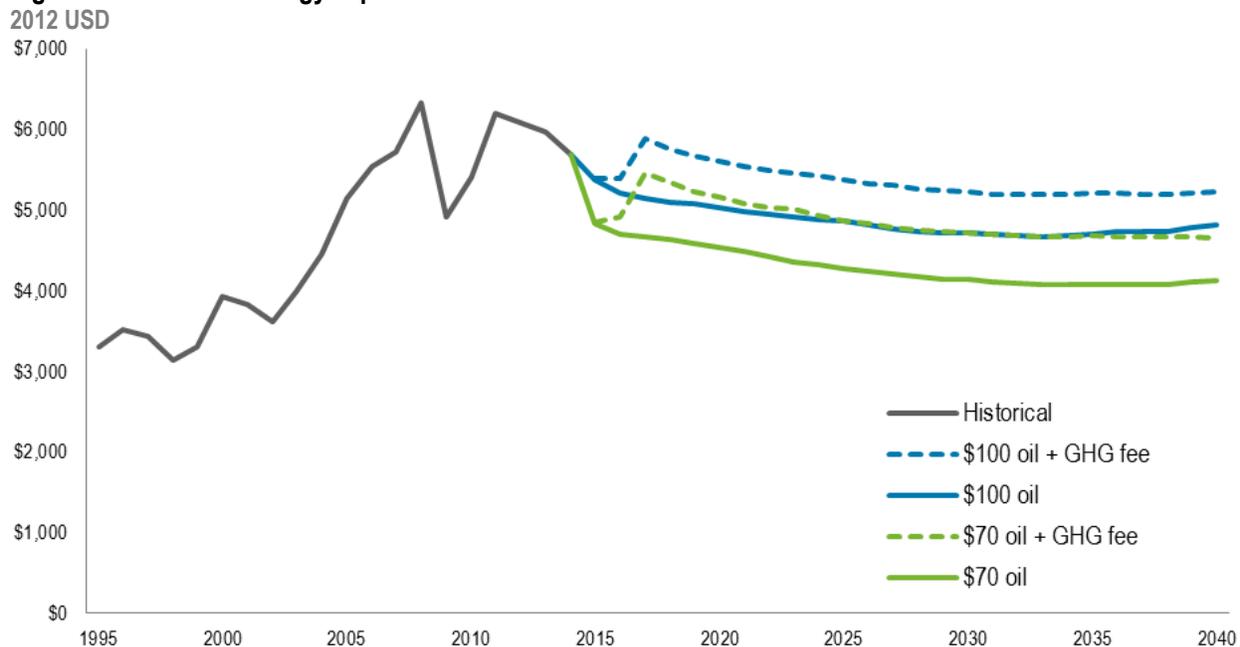


Figure 2: Household energy expenditures



While all American households would likely pay less for energy in the years ahead than they have in the recent past, a GHG fee would still increase energy costs relative to a future without a GHG fee or any other major climate policy. As poor and working class households spend a larger share of their income on electricity, natural gas, and gasoline than more affluent households, it's important to assess the distributional impact of any *relative* increase in energy costs due to a GHG fee.

Preliminary analysis suggests a \$42 per ton GHG fee would raise average annual energy costs by \$478 per household between 2020 and 2030 (Figure 3). For the richest 20% of Americans, household energy costs would increase by \$711 compared to \$268 for the poorest 20%. But for the poorest 20% that increase would account for 1.9% of projected pre-tax income between 2020 and 2030, compared to 0.3% for the richest 20% (Figure 4). The cost of other household goods and services would increase as well as companies pass forward the higher energy costs paid to produce those goods and services on to consumers. Price increases for non-energy goods would be quite small (generally less than 1%), but given the number of goods effected, the overall impact on household expenditures would be material. As with the increase in energy costs, the increase in the cost of non-energy goods and services would disproportionately impact low-income households.

Higher energy costs for government and for energy-intensive investment materials (e.g. steel, cement) would also likely be passed on to households. How these get passed through is less clear, but would probably be much less regressive than the direct increase in household energy costs and consumer goods. Figure 3 and 4 assume higher government energy costs are paid for

with general tax revenue and that the distributional impact of an increase in the cost of investment mirrors that of corporate income taxation.

Figure 3: Increase in average annual household costs

2020-2030 average, 2012 USD

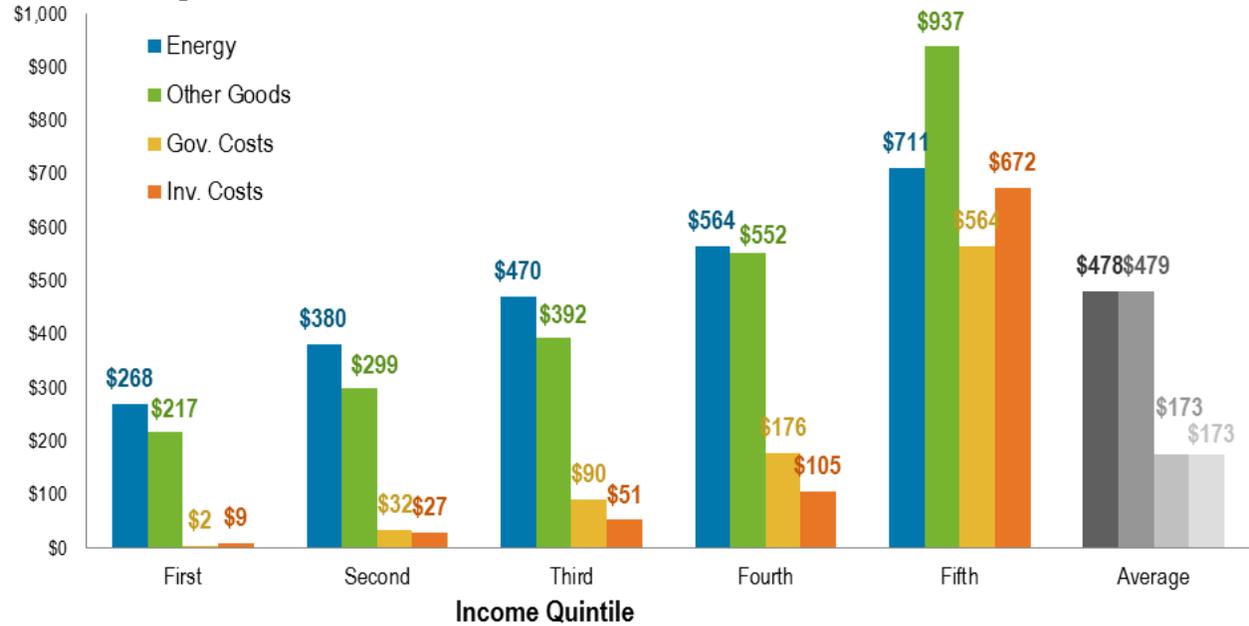
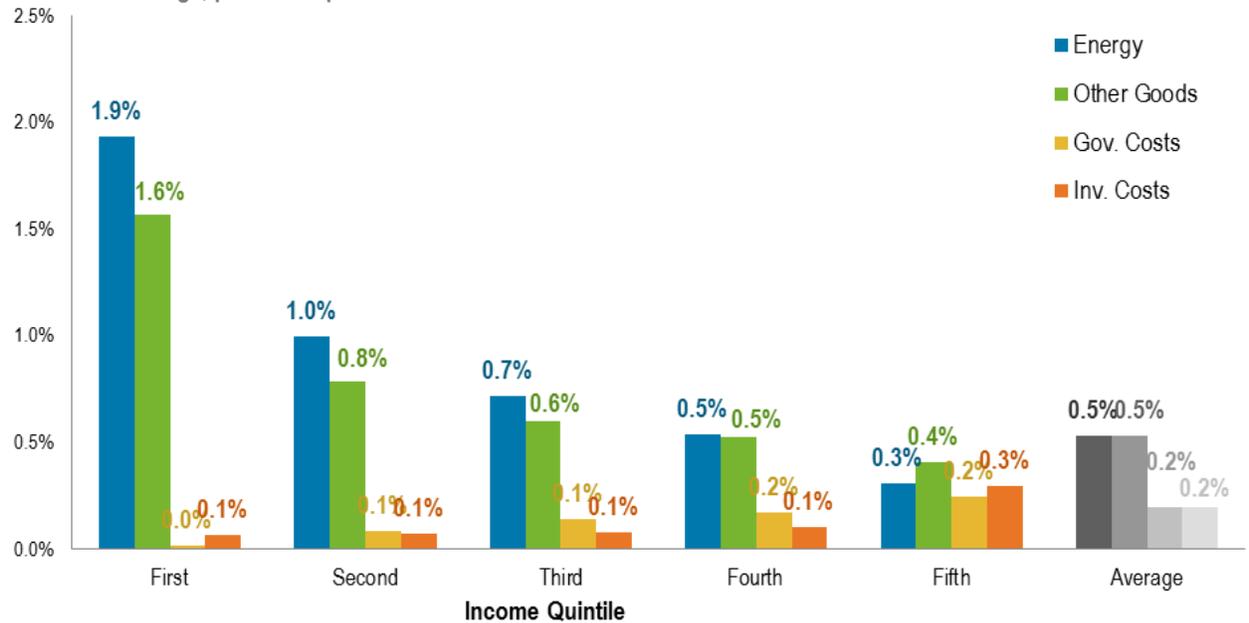


Figure 4: Increase in average annual household costs

2020-2030 average, percent of pre-tax income



Impact of Revenue Rebating on Distributional Outcomes

It is important to note that any policy that increases energy costs – including the recently announced EPA regulations on power plants and methane emissions -- will disproportionately impact low-income households. The advantage of a GHG fee is it provides revenue that can be used to offset that regressivity. Preliminary analysis suggests that a \$42 per ton GHG fee applied just to energy-related CO₂ emissions and adjusted at the border (with importers of energy-intensive goods paying the fee and exporters receiving a rebate) would generate \$219 billion a year, on average, between 2020 and 2030. Rebating 100% of the revenue in a lump sum would provide each household with \$1573 per year (at projected population growth rates).

That rebate would more than cover the increase in energy costs for all households. Combining all four cost categories shown in Figures 3 and 4, the lower four income quintiles would still come out ahead while the richest 20% would face a significant net cost (Figure 5).

Higher resolution distributional information is available for the direct increase in household energy costs and other goods and services, which accounts for roughly three quarters of the economy-wide total. Comparing these cost increases to a \$1573 per year rebate, 93% of American households would see a net benefit. Using the Bureau of Labor Statistics' 2012 Consumer Expenditure Survey, the current income cut-off at which households would begin to face a net cost is \$150,000 per year (Figure 6). Low income households would receive meaningful income support, with the poorest seeing double digit real income growth.

There are steps the federal government could take to further reduce the increase in energy costs resulting from a GHG fee and further increase the net household benefit. These include policies to improve the energy efficiency of buildings, vehicles and appliances, electricity market reform, and promotion of mass transit and ride sharing solutions.

Figure 5: Increase in average annual household costs vs. GHG fee rebate
2020-2030 average, real 2012 USD

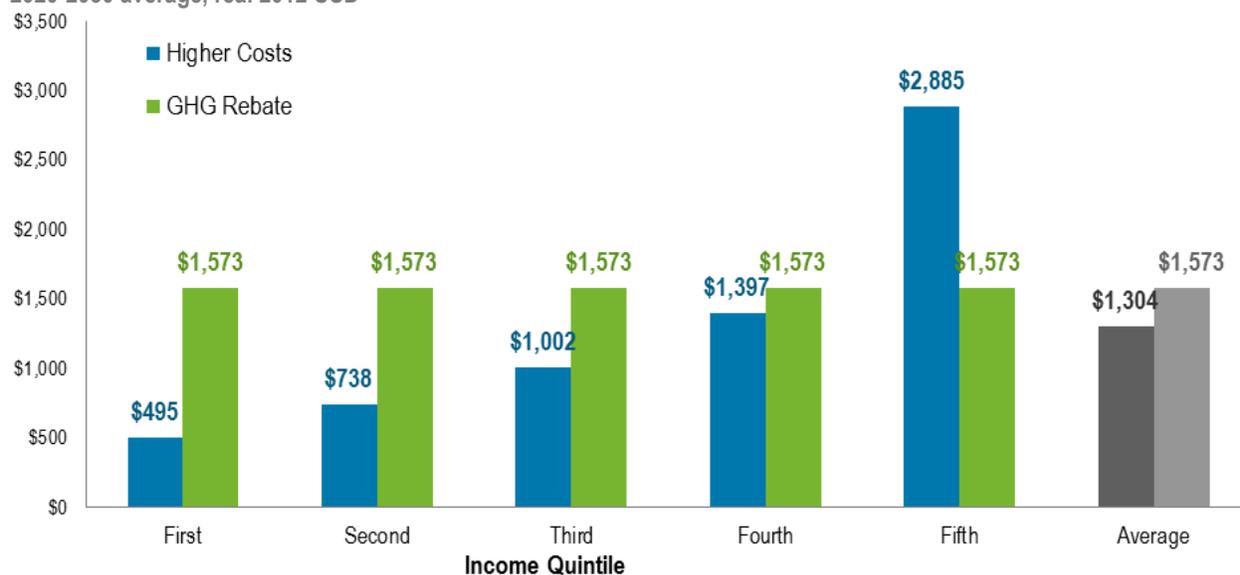
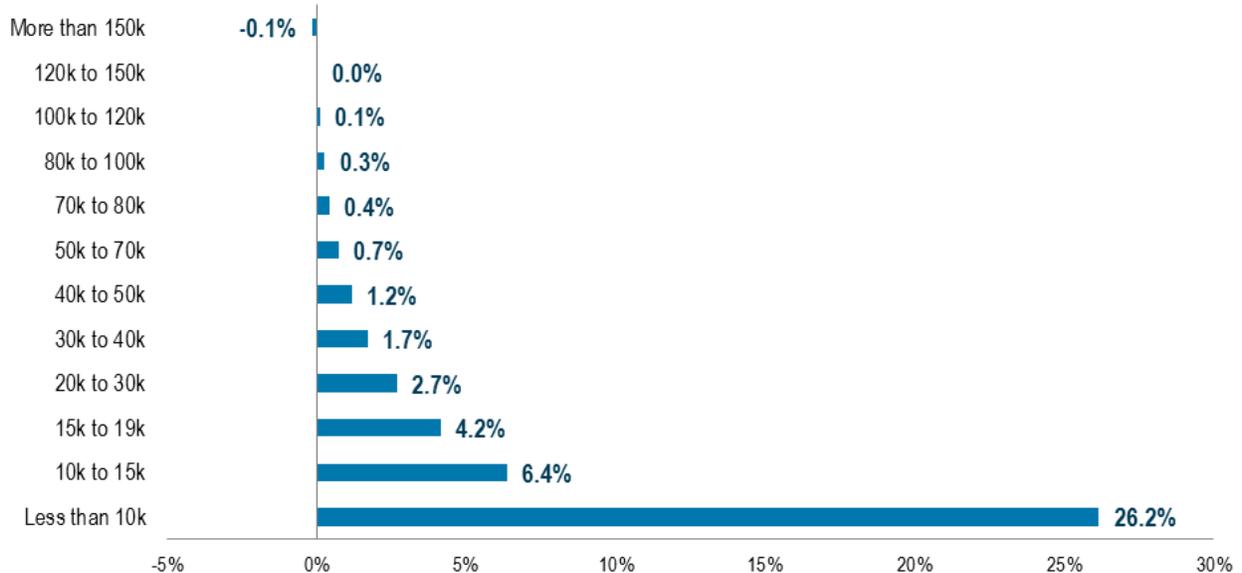


Figure 6: Net benefit from rebated GHG fee

2020-2030 average, percent of pre-tax income, excludes increase in government and investment costs



Transition assistance for coal miners

There are currently approximately 78,000 coal miners in the United States, roughly half of which live in West Virginia, Kentucky, and Pennsylvania. Alabama, Illinois, Ohio, and Wyoming are also home to large coal mining employers.

Low natural gas prices and air pollution regulations have already put considerable downward pressure on US coal demand and production, with the number of active coal miners in the US fallen about 10% since 2011. A number of coal companies have also filed for bankruptcy.

Our preliminary analysis suggests a \$42 per ton GHG fee would reduce US coal demand by more than half between 2020 and 2030. While much of this decline will occur as a result of the EPA's proposed CO₂ regulations for existing power plants, the potential advantage of a GHG fee is that it provides a revenue stream that can be used to help coal miners and their communities adapt.

Three types of transition assistance could be provided:

- 1.) Retraining and wage insurance for active coal miners
- 2.) Pension and medical support for active and retired miners
- 3.) Redevelopment support for coal communities

There are a number of available models for each, from the Tobacco Transition Payment Program (TTPP) to the Federal New Market Tax Credit (NMTC). We are in the process of evaluating the

efficacy of these and other mechanisms, as well as their applicability to current coal mining communities.

The resources required to provide meaningful transition support to coal miners and their communities is modest in the context of the revenue a GHG fee would generate. Total compensation for all active coal miners in 2014 was roughly \$6 billion. Effective wage insurance and/or retraining could be provided for a fraction of that amount.

Equally at risk are the outstanding pension liabilities for both active and retired miners. In 2011, the United Mine Workers of America (UMWA) negotiated the National Bituminous Coal Wage Agreement (NBCWA) with leading coal production companies. The agreement established a funding mechanism intended to lead to full funding of the UMWA 1974 Pension Plan. The plan is multi-employer pension plan subject to requirements of the Employee Retirement Income Security Act (ERISA) and covers all current and retired union mine workers hired before 2012.

The 1974 Pension Plan has been chronically underfunded for years, maintaining a ~77% funding rate. The outlook for the plan is not good even absent a GHG fee or other major climate policy push given the recent decline in domestic coal production and recent and impending bankruptcies. For 2013, the plan was officially listed as “seriously endangered”, and it is projected to remain so. The current NBCWA and 1974 Plan funding mechanism are slated to expire at the end of 2016, raising the prospect of a major fight over coal miner pensions in the middle of that year.

While there is a limited federal backstop provided through the Pension Benefit Guaranty Corporation (PBGC), we estimate this will only cover roughly one third of the current annual benefits of the 94,000 retirees and eligible family members covered by the plan.

The NBCWA only covers 11,000 of the 78,000 current coal miners and any pension support would need to be provided equitably to all impacted miners. We are assessing the possible design and quantifying the cost of a meaningful nation-wide coal miner pension support program and will provide a memo on and other transition assistance needs identified above in the weeks ahead.