

Output-Based Rebates:

A Proposal to Address the Impact of Federal Climate Policy on Energy-Intensive Manufacturing Facilities Exposed to International Competition

Purpose

In a cap-and-trade climate policy, an Output Based Rebate (OBR) can keep American energy-intensive manufacturers competitive globally by compensating eligible facilities with a payment that is directly proportional to the cost of carbon permits acquired. OBRs are compatible with a variety of allocation and auction combinations, and to avoid undue windfalls, the policy design aims to compensate eligible firms only for the cost of acquired carbon permits while preserving incentives for performance improvements.

Eligibility

Facilities that principally manufacture iron, steel, aluminum, pulp, paper, cement, and certain chemicals could be eligible for the Output Based Rebate. A rule-making process¹ is necessary to identify more specifically the categories of output within each of these industries that would define eligible manufacturing facilities.

Design

The Output-Based Rebate would be calculated as the sum of both the direct (e.g. coal) and indirect (e.g. electricity) costs of purchasing carbon permits for compliance with the climate policy.² It would be updated to reflect current market conditions and be complementary to other domestic and international measures and agreements meant to address related competitiveness issues.

Direct Compliance Cost

$$\text{Output} \times \frac{\text{Sector Average (or Best Practice) Coal}}{\text{per Unit of Output}} \times \frac{\text{ton CO}_2}{\text{per ton Coal}} \times \frac{\text{Permit Value}}{\text{per ton CO}_2} = \text{Rebate } \$\$$$

Indirect Carbon Costs

$$\text{Site Output (production)} \times \frac{\text{Sector Average (or Best Practice) Elec.}}{\text{per Unit of Output}} \times \frac{\text{Utility ton CO}_2}{\text{per Electricity}} \times \frac{\text{Market Value of Carbon Permit}}{\text{per ton CO}_2} \times \frac{\text{Portion of Permit Costs Passed by Utility}^3}{100\%} = \text{Rebate } \$\$$$

Example: Output of 1 metric ton of Steel

Direct

$$\mathbf{1 \text{ mton Steel}} \times \frac{\text{Avg 1.2 ton Coke}}{\text{per Ton of Steel}} \times \frac{\text{3 mtCO}_2}{\text{per ton Coke}} \times \frac{\text{\$50}}{\text{mtCO}_2} = \mathbf{\$180 \text{ Rebate per ton of Steel} }^4$$

Indirect

$$\mathbf{1 \text{ mton Steel}} \times \frac{\text{Avg 0.45 MWh}}{\text{per Ton of Steel}} \times \frac{\text{0.67 mtCO}_2}{\text{per MWh in Ohio}} \times \frac{\text{\$50}}{\text{mtCO}_2} \times 100\% = \mathbf{\$15.08 \text{ Rebate per ton of Steel}}$$

¹ Based on research currently underway.

² Natural gas may be direct or indirect depending on where the point of regulation is assigned by the legislation, meaning either formula could apply. The value of the OBR is the same in either case.

³ See discussion on page 5.

⁴ The price of steel currently exceeds \$800 per metric ton (U.S. spot price for hot rolled steel sheet).

Policy Challenge: International Competition May Motivate Some Firms to Relocate

The U.S. has a national interest in the performance of a few industries that could be particularly sensitive to the effects of a federal climate policy with a price on greenhouse gas pollution. If such a policy would make U.S. production of energy-intensive commodities uncompetitive in their global markets, then their products would be replaced by those produced abroad – displacing both jobs and emissions without either economic or environmental benefit.

For example, domestic steel for auto manufacturing would become more expensive than steel from countries with no carbon costs. If imported steel were taxed to make up the difference, then it could become cheaper to make the entire car abroad and just import the finished product. If energy-intensive manufacturing relocated under competitive pressure, the U.S. would lose jobs as well as the opportunity to engage essential industries on the path to climate stabilization.

All industries should contribute to climate stabilization. However, global trade patterns for energy-intensive commodities suggest that an U.S. economy-wide climate policy would need to extend to an international context. Because strong unilateral action by the U.S. or any other country could induce accelerated relocation of energy-intensive manufacturing facilities, international agreements are the most appropriate level of negotiation to reduce emissions from these industries. Without exempting specific industries, the U.S. must move ahead with economy-wide action on climate change while reducing intermediate incentives for manufacturers to relocate.

Eligible Manufacturing Facilities

Four key criteria can be applied to the North American Industry Classification System (NAICS) to identify facilities that could be eligible for special treatment in a federal climate policy:

- (a) *energy-intensive* energy costs are a high proportion of variable costs ⁵
- (b) *global commodity* subject to international competition ⁶
- (c) *limited cost pass-through* product price is established in international market ⁷
- (d) *potential for “leakage”* net imports increase in response to higher energy prices ⁸

⁵ Variable cost data is not widely available. However, energy costs as a proportion of shipment value is a reported statistic and could be used to define the eligibility criteria for energy intensive output.

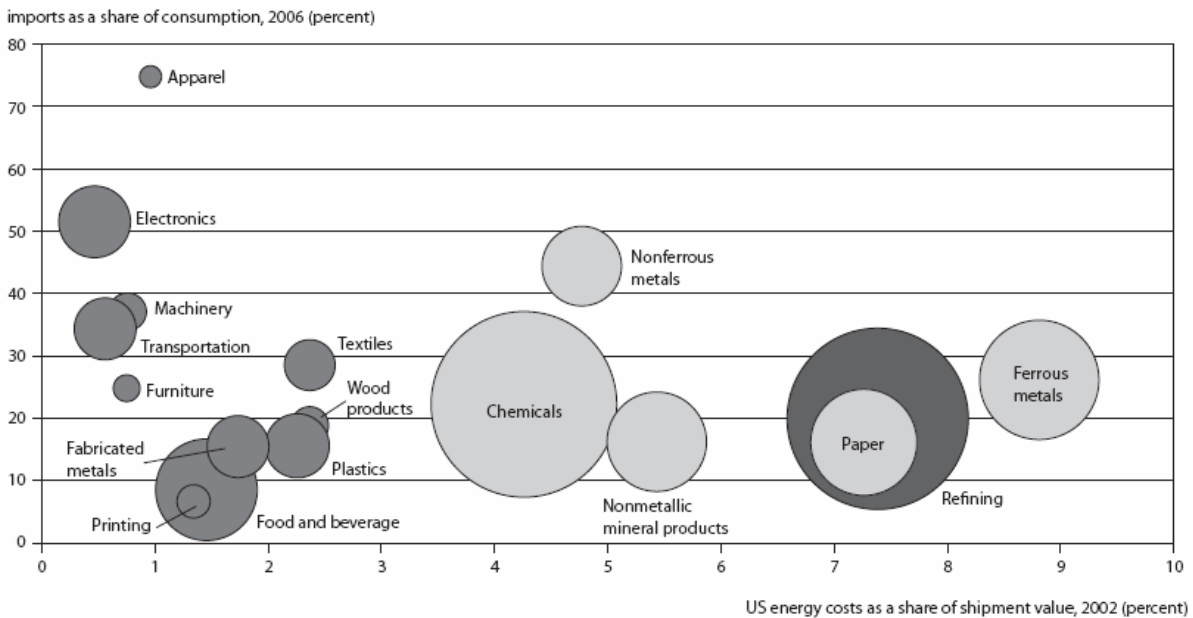
⁶ This may be measured as the portion of imports as a share of domestic consumption; and exports as share of domestic production.

⁷ Eligible output types would be homogenous commodities with an international price.

⁸ Substitution with imports can be observed when domestic demand is very inelastic yet domestic production is highly elastic as energy prices rise.

Eligibility should be determined through a formal rule-making process based on the criteria above to identify specific industrial output categories.⁹ The figure below indicates facilities that principally produce primary goods in sectors like iron, steel, aluminum, pulp/paper, cement, and certain chemicals may qualify.¹⁰ However, these are high-level categories, and the criteria would not be met by all the subsectors.¹¹ The rule-making should determine eligibility at the highest level of sector specificity in the NAICS classification system, and eligibility may be updated periodically as market conditions change (e.g. 5 year reviews).

Figure 1.3 US Industry exposure to climate costs based on energy intensity and imports as a share of consumption



Note: The size of the bubbles indicates the total CO₂ emissions from the industry in 2002.
 Sources: US Department of Commerce, Bureau of Economic Analysis, Industry Economic Accounts, 2007; US Department of Energy, Energy Information Administration, Manufacturing Energy Consumption Survey 2002. Figure reproduced from *Leveling the Playing Field* by the Peterson Institute, 2008.

Ineligible Manufacturing Facilities

Expanding eligibility to include facilities that use energy-intensive goods as an input is not justified for three reasons. First, U.S. climate policy cannot change the price of global commodities, and indeed, that is a fundamental premise for compensating industries exposed directly to international competition. Meanwhile, under an Output-Based Rebate proposal, manufacturing facilities that use energy-intensive goods would not have a carbon cost passed onto them by either U.S. or international suppliers that also do not face a carbon price.

Second, facilities further down the supply chain are typically in sectors that are less energy-intensive, and not susceptible to being driven from the national economy by climate policy.

⁹ In addition to criteria in the authorizing legislation, the rule-making could include an invitation for explicit comment on the criteria that should be used.

¹⁰ These are broad categories identified by 3-digits in the NAICS system.

¹¹ These are more narrow categories identified by 6-digits in the NAICS system.

They may, however, face other competitive pressures that climate policy is not well suited to address. In the figure above, comparisons between paper and printing or ferrous metals and fabricated metals exemplify why expanding eligibility further down the supply chain is not warranted.

Third, facilities that are eligible for an OBR would be cushioned from the price signal in a *national*, economy-wide climate policy because they operate in a global economic context in which they would no longer be able to compete otherwise. Therefore, *international* agreements are oft considered the best approach to constraining greenhouse gas emissions from these sectors. By contrast, it is impractical to broker international agreements for every industry that makes finished products (e.g., auto parts) using material inputs like steel and chemicals.

Policy Design Criteria

In order to minimize the impact of a carbon pricing on eligible manufacturing facilities, a sound policy design must:

- (1) clearly identify and target eligible manufacturing facilities
- (2) neutralize (or reduce) the cost of carbon in the production costs for eligible facilities
- (3) deliver compensation using a reliable and automatic mechanism
- (4) be easy to understand
- (5) depend only on data that should already be disclosed; no trade secret data required
- (6) send a modest price signal to reward innovation and improvements
- (7) update payments based on actual metrics for output, carbon intensity and carbon prices
- (8) be resilient in the context of changing market conditions
- (9) diminish chances to trigger WTO challenges or aggravate international trade conflicts
- (10) phase out over time while encouraging trading partners to take comparable action
- (11) address direct compliance costs and indirect compliance costs through electricity use
- (12) prevent windfalls to eligible facilities served by regulated utilities receiving free carbon permits
- (13) account for the different carbon price impacts on electricity prices established by a marginal source of supply in competitive markets versus the cost-of-service model for regulated utilities
- (14) limit the quantity of compensation to the amount that is necessary to preserve the competitiveness of facilities selling to the domestic and international markets

Policy Solution: Output-Based Rebates

Output Based Rebates return to eligible manufacturers a direct payment to reduce the costs of carbon emissions under a cap-and-trade climate policy. By both motivating mitigation and allowing growth in production, it effectively preserves international competitiveness without providing windfall profits.

Eligible facilities could claim an OBR payment from auction revenue, a portion of which would be reserved for the purpose, or carbon allowances of equivalent value (see section E). The rebate is designed as transitional support and is not intended to persist in perpetuity (see section D).

A. Rebating Direct Compliance Costs for Process-based Emissions

If a manufacturing facility *eligible* for an Output Based Rebate is also a *covered* facility under a national emissions cap, then it must purchase carbon allowances for *process-based emissions* to meet a compliance obligation. For example, coal is used heavily in the production process for steel and other energy-intensive industries that would likely be covered under a cap and trade policy. Some climate policy proposals designate industrial consumers of natural gas as points of regulation. In these legislative frameworks, the purchase of carbon permits for natural gas consumption would be a direct compliance cost.

Prior to a phase-out, the value of the Output-Based Rebate should be approximately equal to the average (or best practice) cost of purchasing pollution permits to comply with the climate policy.

The primary source of difference would be the relative performance of the facility compared to the sector average, which also retains a profit motive for improving efficiency.¹²

The Output-Based Rebate would be calculated as follows:

$$\text{Output} \times \frac{\text{Sector Average (or Best Practice) Coal per Unit of Output}}{\text{ton CO}_2 \text{ per ton Coal}} \times \frac{\text{Permit Value}}{\text{per ton CO}_2} = \text{Rebate } \$\$$$

Example: Output of 1 metric ton of Steel

$$1 \text{ mton Steel} \times \frac{\text{Avg 1.2 ton Coke}}{\text{per Ton of Steel}} \times \frac{3 \text{ mtCO}_2}{\text{per ton Coke}} \times \frac{\$50}{\text{mtCO}_2} = \text{\$180 Rebate per ton of Steel}^{13}$$

Data for each term in this formula could reasonably be expected to be available as a matter of standard disclosure for each eligible manufacturing facility that wished to claim the rebate. The formula can be updated annually or quarterly to reflect the current average emissions intensity performance for the sector and the market value of carbon.

¹² Among energy-intensive industries that would qualify for a rebate, the range is small between the best and worst U.S. facilities compared to the average energy intensity.

¹³ The price of steel currently exceeds \$800 per metric ton (U.S. spot price for hot rolled steel sheet).

B. Rebating Indirect Carbon Costs from Electricity & Natural Gas Suppliers

Under most federal cap-and-trade proposals, electric power generators acquire pollution permits for their fossil fuel power plants, and they incorporate the market value of those carbon permits into their bills to customers. Similarly, gas processors subject to emissions regulations would pass 100% of their compliance costs on to customers.¹⁴ An Output Based Rebate returns to eligible manufacturing facilities a direct payment comparable to those indirect costs of acquiring carbon permits for compliance.

The Output Based Rebate is calculated as follows:

$$\text{Site Output (production)} \times \frac{\text{Sector Average (or Best Practice) Elec. per Unit of Output}}{\text{Utility ton CO}_2 \text{ per Electricity}} \times \frac{\text{Market Value of Carbon Permit per ton CO}_2}{\text{Portion of Permit Costs Passed by Utility}^{15}} = \text{Rebate } \$\$$$

Example: Output of 1 metric ton of Steel

$$1 \text{ mton Steel} \times \frac{\text{Avg 0.45 MWh per Ton of Steel}}{\text{per MWh in Ohio}} \times \frac{0.67 \text{ mtCO}_2}{\text{mtCO}_2} \times \frac{\$50}{\text{mtCO}_2} \times 100\% = \text{\$15.08 Rebate per ton of Steel}^{16}$$

The metrics in the simple formula can be updated annually or quarterly with data that ought to be readily available through a federal greenhouse gas registry.¹⁷

C. Ensuring Appropriate Payments

Sector Average vs. Best Practice Performance

The Output-Based Rebate design presently uses sector average performance for each eligible product category, which would result in a slight overpayment to half of the manufacturing capacity. Use of a *sector average* rather than a *best practice* metric was chosen solely by the policy design criteria of using regularly reported data and avoiding competitive business information.

However, the sector average energy intensity factor could be improved to reflect best practice, a very successful formulation in top-runner programs. In this case, all facility managers would receive a rebate based on the industry best practice, and motivation to improve performance increases international competitiveness overall. Use of best practice in each sub-sector as a basis for the OBR would also reduce the cost of this provision.

¹⁴ Because gas processors are expected to pass on 100% of their costs of compliance, the size of the Output Based Rebate is the same whether compliance costs for natural gas are covered by gas processors or industrial facilities.

¹⁵ See discussion on page 5.

¹⁶ The price of steel has exceeded \$500 per metric ton since January 2004 (U.S. spot price for hot rolled steel sheet).

¹⁷ The OBR should be calculated at a sub-sector level if the average energy-intensity varies widely between sub-sectors compared to the average for the entire sector.

Carbon Content of Electricity: Regulated vs. Competitive Markets

Approximately half of the U.S. buys power through utilities that remain fully regulated, delivering electricity based on the cost of service approved by a utility commission. The other half now uses electricity that has been acquired through a competitive wholesale electricity market, where the price is determined by the marginal source of supply to a grid managed by an Independent System Operator (ISO). Although deregulation in those states has resulted in a variety of market structures, the principle of pricing wholesale power at the margin is persistent. The *carbon content of electricity* factor should be defined appropriately for each case.

Figure 2 illustrates which states have presently adopted competitive markets, but the market structure for electric power in many states may change over the duration of a federal climate policy. Therefore, an Output-Based Rebate must be able to generally address the two main cases and create decision criteria for which one to apply in markets that are partially deregulated.

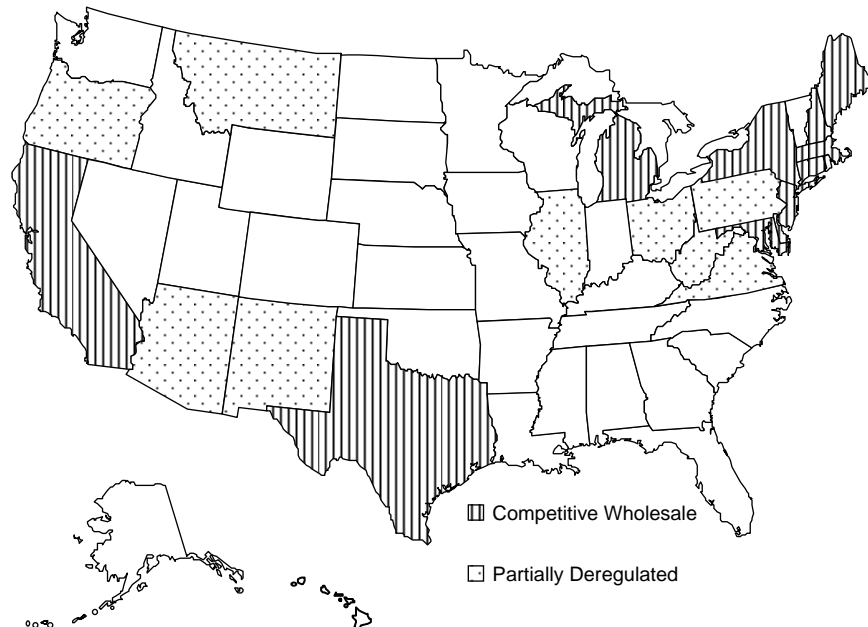
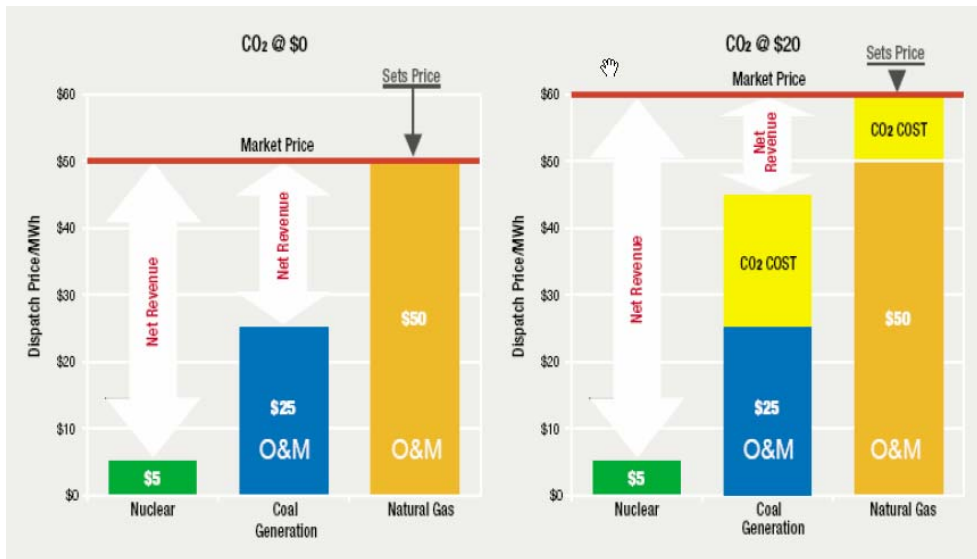


Figure 2. Retail Price Deregulation in the Electric Power Sector.
 Source: *Power in the Public Interest*.

In fully regulated areas, the Output-Based Rebate should be calculated with the *average carbon content of all electricity delivered*.¹⁸ However, in competitive markets, the *marginal* source of generation that sets the wholesale price of power in each hour, so the Output-Based Rebate should return permit proceeds based on the carbon cost of the marginal source. Figure 3 illustrates the effect of a carbon price on electricity in an example when natural gas is the marginal source of supply, which ISO data would indicate is the case most of the time in most competitive markets.

¹⁸ Representative data is available today through the EPA Power Profiler, and a Greenhouse Gas Registry should make this type of data easily accessible.



Source:
The change in profit climate. Public Utilities Fortnightly, May 2007, Victor Niemeyer, EPRI.

Figure 3. Though the carbon cost of coal power is higher than for natural gas, the price of electricity only rises in a competitive market according to the carbon intensity of natural gas, the marginal fuel.

In all competitive markets, the carbon content factor should be the *average carbon content of the marginal source of supply*, which is a simple alternative metric. As part of a complete GHG Registry, this data should be disclosed by each ISO on a monthly basis, if not more frequently.¹⁹

Because there are many electricity procurement variations in partially deregulated markets, the Output-Based Rebate should not be modified to accommodate each one. Instead, a simple rule should be employed to determine the most appropriate carbon content factor for eligible facilities:

All eligible facilities in competitive electricity markets (or those not subject to regulated rates based on the cost-of-service) should use the *carbon intensity of the marginal source of supply*, unless the firm can demonstrate that its electricity prices are insulated from wholesale power prices.

Portion of Permit Costs Passed Through

Some regulated electric power suppliers may seek to dampen the carbon price signal to customers by incorporating into their rates only a portion of the market value of each carbon permit. To avoid windfalls to eligible manufacturing facilities in those service territories, the Output-Based Rebate requires regulators to ensure standard disclosure of the portion of permit costs passed through to customers. To ensure accurate calculation of the Output-Based

¹⁹ Some ISOs have multiple marginal sources due to constraints in different parts of the grid system. The Output-Based Rebate is an approximate reimbursement with a value that is not specific to the cost structure of each facility. Therefore, the carbon intensity factor should be calculated at the most aggregated practical ISO system level.

The energy use of most energy-intensive facilities is relatively constant all year, there is no merit in using an average carbon intensity of the marginal sources that is weighted by the widely varying electricity dispatched in each hour.

Rebate, this policy would also ensure that electric load distribution companies (LDCs) report quarterly both the carbon intensity of the electricity they delivered and the portion of carbon allowance costs passed on to customers

The OBR rule should be designed and enforced to prohibit maneuvers that exploit the rebate calculation.

C. Cost of Carbon Permits for Natural Gas vs. Cost of Natural Gas

The Output-Based Rebate returns to eligible facilities the approximate value they would have paid for carbon permits due to a direct compliance obligation or the obligation of an electricity or natural gas provider. For several reasons, the OBR should not be expanded to cover an increase in the cost of natural gas due to other market dynamics.

First, the U.S. Treasury will only raise a finite sum of money through the auctioning of carbon permits. The OBR provision will no longer be self-funding if it borrows from other carbon revenues to cover natural gas costs for a certain class of consumers. If the economy is at risk due to excessive payments for natural gas, then other policy instruments that are beyond the scope of this provision may be needed.

Second, any payment to offset natural gas expenses for energy-intensive manufacturers would be a government subsidy to a narrow class of industrial consumers. In addition to risking complications with the WTO, such a proposition does not have clear conditions for phase out since natural gas prices in foreign countries is not a subject of international climate negotiation.

Third, natural gas prices are affected by many factors, including resource depletion, access to additional supply, the relative cost of crude oil, the cost of LNG imports, related geopolitical concerns, and long-term global trends toward lower carbon fuel sources. Unlike the cost of a carbon permit, the effect of climate policy on the price of natural gas cannot easily be isolated, and any attempt to estimate this cost would always be contested.

Finally, higher natural gas prices will likely affect all consumers of natural gas, not just energy-intensive manufacturers of global commodities. High prices must be met with a national campaign to reduce demand for natural gas through energy efficiency improvements and the greater use of renewable sources of thermal energy.

D. Phasing out the Output Based Rebate

The justification for an Output-Based Rebate rests on uneven costs of production in countries that have not taken action on climate change and those that have. By effectively removing the cost of carbon permits from the balance sheets of eligible manufacturers, Output-Based Rebates counteract a competitive disadvantage introduced by an economy-wide climate policy.

However, the quest for climate stabilization must ultimately engage all manufacturers worldwide, and the U.S. Output-Based Rebate is a temporary and transitional provision. Climate policy regulations are just one of many variables that affect the competitive position of manufacturers

of energy-intensive global commodities, and Output-Based Rebates should not become a surrogate to address other global trade issues.

There are at least four different design alternatives for phasing out the Output-Based Rebate.

- 1) *Scheduled elimination.* The OBR could be reduced by a fixed percentage each year, such as 10% per year over 10 years. Slowly increasing exposure to the full cost of emission allowances could motivate and reward innovation and efficiency. However, as each eligible facility faced a stronger price signal, the pressures for relocation or “leakage” would grow stronger. For this reason, there is concern that a scheduled elimination of the Output-Based Rebate could effectively lead to scheduled relocation.
- 2) *Conditional elimination.* The OBR could remain in place until certain conditions were met that changed the potential for relocation of both jobs and emissions. Those conditions could be satisfied through either international sectoral agreements or a UNFCCC agreement among emitters to take “comparable action” on climate change.²⁰
- 3) *Replacement with border taxes.* Border taxes would require importers to make a payment equal to the cost of carbon permits that would have been paid if the goods were manufactured in the U.S. Because Output-Based Rebates relieve domestic manufacturers of their cost of carbon, OBRs would need to be phased out at the same rate that importers faced rising costs due to border taxes.
- 4) *Presidential determination.* The President could modify the Output-Based Rebate through an executive order or rule-making procedure. Congress can act at anytime.

These four design options are not mutually exclusive, and in fact, some combination among them may be preferred. For example, a scheduled elimination provision provides a strong incentive for leadership in negotiating international agreements that would apply common carbon costs or comparable terms of international trade for energy-intensive commodities, at which point the OBR could be eliminated. In a different context, the OBR could be eliminated in the U.S. conditional on an agreement with other major emitters, and border taxes could still be applied to importers that source energy-intensive commodities from countries not party to the agreement.

E. Delivery Mechanism

The choice of delivery mechanism is affected by considerations regarding reliability, jurisdiction, and transaction costs. For example, jurisdiction over tax credits falls to the Ways & Means Committee rather than Energy & Commerce, which is primarily responsible for developing federal climate policy. Alternatively, the Energy & Commerce Committee may issue eligible facilities a number of free GHG pollution permits equal in market value to the rebate amount.

²⁰ The principle of common but differentiated responsibility and capability suggests that few developing countries will adopt a comparable cost of carbon emissions in the near term, even if they do take “comparable action” to satisfy terms of a UNFCCC agreement. As a result, the competitive dynamics that justify initial use of an OBR may very well persist. Therefore, other measures will be needed to resolve differing national climate policies as a source of major competitive advantage among manufacturers of energy-intensive commodities.

However, since some eligible facilities are not likely to have a compliance obligation themselves, they would need to incur transaction costs to liquidate the permits. A third option is to reserve a number of carbon permits of equal value to the rebate and then use a consignment agreement to allow eligible facilities to assign responsibility for selling the permits to the federal agency that is conducting the rest of the auction, with proceeds directed to eligible facilities.

F. Impact on Cost of Goods

Facilities that are eligible for an Output Based Rebate are price-takers in the global economy. For instance, the price of hot rolled band steel is a widely followed benchmark established through an international spot market. Like other commodities, U.S. manufacturers sell hot rolled band steel at that price no matter what their actual cost basis. As a result, establishing a cost of carbon emissions in the U.S. would not change the price of steel, but rather where it is produced. If U.S. manufacturers are not competitive at that price, then buyers may substitute with imported sources, causing emissions and jobs to “leak” to another country.

Therefore, a cost on carbon established in the U.S. would not be passed on to consumers through energy-intensive manufacturers of global commodities, and *likewise*, an Output-Based Rebate established in the U.S. would also not be passed on to consumers as savings. If the eligibility criteria described on page 3 are implemented well, the OBR would not affect prices further down the supply chain for energy-intensive commodities. The OBR should be designed to only affect the propensity for eligible manufacturers to leave the country when exposed to a serious competitive disadvantage in an international commodity market.

G. Data Disclosure

The Output-Based Rebate involves limited data requirements, drawing on aggregate industry data that is already available and reported for most of the eligible manufacturing facilities. However, those data sources are presently disparate and incomplete. Therefore, the federal Greenhouse Gas Registry ought to be designed to include provisions that specifically collect data for energy-intensive manufacturers of global commodities.

Drawing on hourly generator emissions data already publicly reported, Load Distribution Companies ought to disclose the carbon content of the electricity portfolio they have procured for customers.²¹ Load Distribution Companies should also be disclosing the portion of the compliance costs at a generator-level being passed on to customers. The auction permit price would be the clearing price in a quarterly permit auction, and the Output-Based Rebate can be settled quarterly.

Output data is already reported to the Department of Commerce using the North American Industrial Classification System, and though aggregate data is disclosed as public information,

²¹ This includes purchases from a competitive wholesale market overseen by an Independent System Operator, which should report the GHG emissions intensity of the marginal source of supply in each hour. All the emissions data necessary for the calculation is already reported to the EPA on an hourly basis.

facility-level data could be considered competitive business information. Facility-level data disclosure is needed to identify best practice markers for each output category.

With best-practice metrics available for each of the eligible energy-intensive global commodities, the Output-Based Rebate could be paid based on the best practice rather than the average performance in each eligible output sector. This modification would ensure all industrial facilities are exposed to some carbon price signal and none of the above-average facilities receive windfall payments.

The Output-Based Rebate formula depends on an energy intensity metric for each category of eligible output. A rule-making process should define a consistent calculation method for energy intensity of eligible commodities such as cement, steel, aluminum, paper, and certain chemicals.²² The rule-making should address output at the highest practical level of sub-sector specificity, analogous to the rule for determining which NAICS sub-sectors are eligible. Establishing a reporting requirement for the carbon intensity of energy-intensive global commodities would also support U.S. leadership in the negotiation of international climate agreements affecting these industries, including treatment of imports to the U.S.

Advantages of an Output Based Rebate

In addition to satisfying all the criteria on page 3, this policy design has the following advantages:

1. The rebates would be based on updated performance, not arbitrary historical statistics.
2. The output-basis for the rebate allows for growth in output and jobs while still sending a price signal to reward mitigation.
3. The design is the same for emissions from electricity use as well as industrial processes.
4. If states or regions claim pre-emption from a federal climate policy to establish a carbon price, the Output Based Rebate mechanism easily accommodates varying carbon prices to maintain fair interstate competition.
5. It preserves U.S. competitive access to export markets.
6. Output-Based Rebates motivate investments in efficiency, which helps American industries stay competitive and keep jobs in the U.S.
7. None of the eligible facilities would be exempted from U.S. climate policy.

²² Supply-chain energy intensity metrics established by industrial trade groups may meet the need for a comparable basis of compensation across the industry, and development of an acceptable calculation method within the industry could both expedite the rule-making and reduce regulatory uncertainty.

7. This design is compatible with a climate policy in which any or all permits are auctioned.
8. All firms would face a dampened price signal that motivates investments in improvements.
9. Use of a sector-level metric can be updated from *average* to *best practice* or to another level to increase the incentive for efficiency investments or as necessary to provide the appropriate level of compensation.

WTO challenges or retaliatory actions are expected to be unlikely.

A direct payment may be a “subsidy” under Article I of the WTO Agreement on Subsidies and Countervailing Measures (the definition of “subsidy” in Article 1.1(a)(iii) explicitly includes “fiscal incentives such as tax credits”). However, a subsidy is only subject to challenge in the WTO if it creates “serious prejudice” to a foreign industry (e.g., because the industry loses sales in the United States or third country markets). While there is no environmental exception in the subsidy agreement, a rebate for added costs incurred under a domestic environmental policy would be unlikely to have any demonstrable impact on international competitors.