

Discussion Paper

CAMR Market Update

Based on IPM modeling performed in July 2006

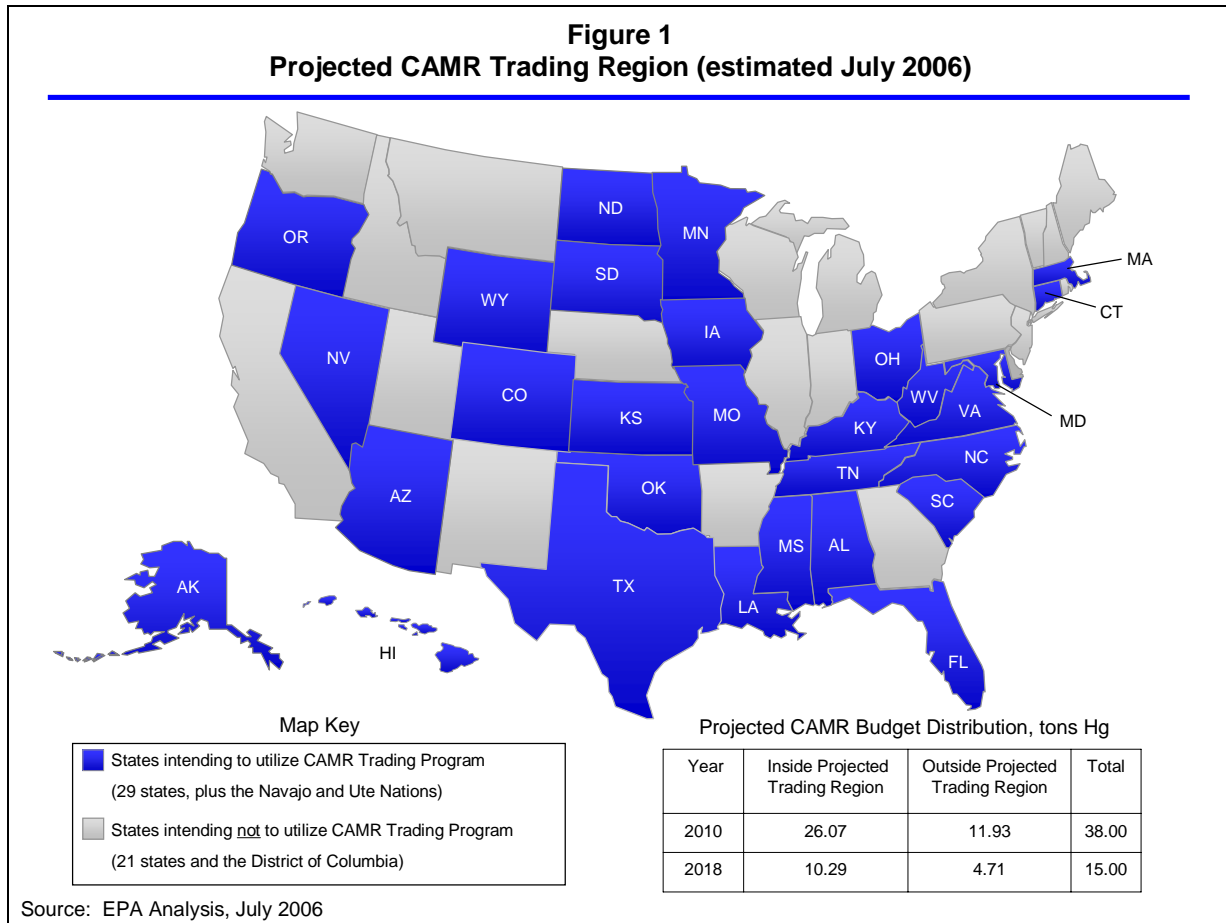
The Clean Air Mercury Rule (CAMR) promulgated by EPA on May 18, 2005, assigned each State and two Tribes an emissions “budget” for mercury. EPA slightly modified budgets during reconsideration. 71 Fed. Reg. 33,388 (June 9, 2006). CAMR limits mercury emissions from new and existing coal-fired power plants, and creates a market-based cap-and-trade program, that will permanently cap annual utility mercury emissions in two phases: the first-phase cap is 38 tons beginning in 2010, with a final cap set at 15 tons beginning in 2018. Each State must submit a State Plan detailing how it will meet its budget for reducing mercury from coal-fired power plants.

CAMR includes a model cap-and-trade program that States can adopt to achieve and maintain their mercury emissions budgets. Some States and sources have expressed concern that if other States do not participate in the trading program, the market may not be “robust” enough to succeed. This paper provides an EPA analysis of the resultant trading program assuming that not all States participate in the trading program. For purposes of this analysis, the group of States that EPA assumed to be participating in the trading program is based on State draft rules as of July 2006. Since the analysis has been performed, there have been some changes to these projections. EPA believes that this snapshot provides useful information to look at the impact States’ decisions with regards to their response to CAMR may have on the trading market. EPA’s review of actions announced by the States as of July 2006 showed that it was reasonable to assume that approximately 29 States and the two Tribes would participate in the national trading program (see Figure 1). A more recent analysis suggests that thirty-three (33) States and the two Tribes will participate in trading. Notably, until all States complete their needed regulatory and legislative processes now underway, there will be uncertainty in all estimates.¹

Based on EPA’s preliminary review in July 2006, approximately twenty-one States and the two Tribes appear to be considering adopting CAMR “as is” utilizing the full budget set by EPA. Approximately eight States appear to be considering using tighter budgets than set by EPA (i.e., lower emission rates) or have placed other restrictions on mercury emissions (such as a percent mercury removal requirement or rate-based emission limit) while still electing to participate in the national trading market. States have adopted these tighter limits either as a part of distinct mercury legislation or as part of multi-pollutant legislation. As of July, States projected to

¹ EPA’s analysis is based on a preliminary review of projected State actions as EPA understood them as of July 2006. States are still actively working on their plans in various types of stakeholder processes and will continue their work over the next year or so. While EPA intends to issue a final rule identifying States which did not meet the November 17, 2006 deadline for submitting State Plans as a necessary predicate to proposing and ultimately promulgating a Federal Plan which will apply to EGUs not covered by an approved State Plan, EPA will continue to accept and take timely action on State Plans submitted after the effective date of that rule. Any such State Plan which is ultimately approved will apply in the State in lieu of the Federal Plan. The final list of States implementing trading is likely to be different than the preliminary analysis presented in this discussion paper. This paper is meant to show the robustness of a trading market even if a number of States do not participate.

implement more stringent requirements include Colorado, Connecticut, Florida, Maryland, Massachusetts, Minnesota, North Carolina, and Virginia.²



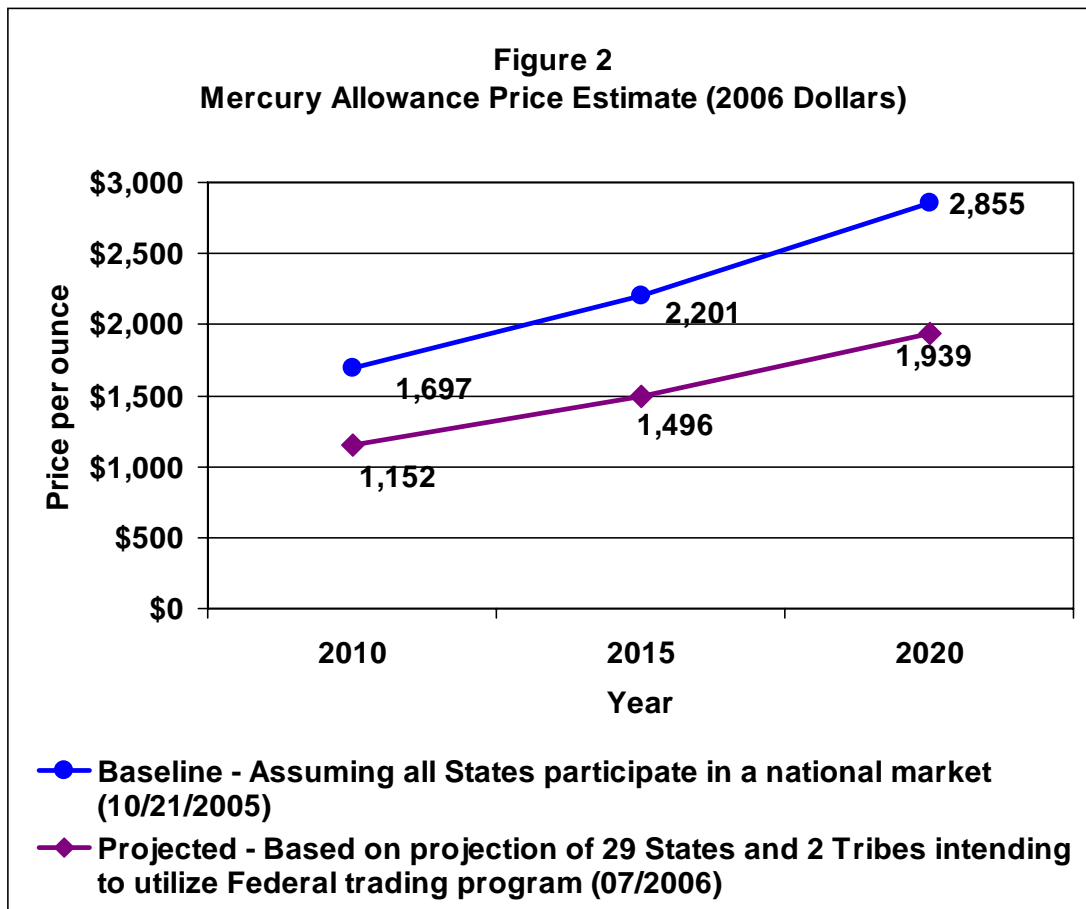
Initial modeling (the “Base Case”) by EPA for a national market with full participation by all States and Tribes estimated the cost of mercury allowances (each allowance covering an ounce of emissions) to be \$1,697 in 2010, \$2,201 in 2015, and \$2,855 in 2020 on a per ounce basis (expressed in year 2006 dollars).³

In support of this analysis, EPA conducted limited modeling that revises the size of the market to include only the 29 States and 2 Tribes that EPA projected, as of July 2006, would be in the national trading program. This market represents States that were allocated close to 69 percent of the initial budget of mercury allowances and is comprised of over 700 units representing over 200 GW of capacity from the participating States and Tribes. Notably, this is nearly equivalent to the number of coal-fired units in the very successful NO_x Budget Program.

² Constraints in the IPM model were configured to match projected State actions. For example, units in Maryland were constrained to meet the Maryland Healthy Air Act which requires 90% mercury removal.

³ Baseline costs were presented in the *Cost and Energy Impacts Technical Support Document*, dated 10/21/2005, available on EPA’s web site at <http://www.epa.gov/ttn/atw/utility/cost-TSD-112.pdf>. Note that costs in that report were expressed in 1999 dollars, while the costs expressed here are inflated to 2006 dollars.

Based on this modeling, prices for mercury emission allowances are expected to decline by more than 30 percent to \$1,152 in 2010, \$1,496 in 2015, and \$1,939 in 2020 (expressed in 2006 dollars). Figure 2 compares the original and revised mercury emission allowance price forecasts. As is more fully discussed below, factors leading to the lower price include the decision by several high-demand States not to participate in the market and a greater reliance on lower cost activated carbon injection (ACI) for compliance.



Source: EPA Analysis

The IPM modeling done for this paper focused only on the expected price of mercury allowances within the revised market region, considering the participants in the market and their anticipated control strategies. EPA made no attempt to model the specific mercury controls of any State not participating in the federal trading program (other than already promulgated rules for mercury) and merely represented CAMR in these states by modeling state specific caps equivalent to state CAMR budgets. The Clean Air Interstate Rule (CAIR) and Clean Air Visibility Rule (CAVR) requirements are covered for all states in the modeling. EPA did observe reductions in mercury in all States due to CAIR and CAMR's existence. Because we determined in the Section 112(n) Revision Rule that after implementation of CAIR, utility-attributable mercury emissions are not reasonably anticipated to pose a hazard to public health or result in utility-attributable hotspots, changes in how States respond to CAMR should not change our conclusions.⁴ As we have

⁴ 70 Federal Register 16027-16028, March 29, 2005.

previously noted, if presented with new information that raises the possibility of utility-attributable hotspots, EPA will evaluate the situation(s) and take appropriate action as described in the Preamble.

The effective cap for the projected CAMR trading market is approximately 26 tons. IPM modeling of the projected market estimates emissions in 2015 will be approximately 19.4 tons, resulting in an annual banking of approximately 6.6 tons to 8.8 tons between 2010 and 2017 in these States. This bank is drawn down starting in 2018 during the second phase of the CAMR program at a rate of approximately 6.3 tons per year.

A robust low-cost market is expected in the projected trading region due to a relatively reduced need for mercury reductions in the states projected to remain in the trading program and a greater percentage of allowance banking that takes advantage of relatively cheaper Activated Carbon Injection (ACI) near the margin in both Phases. Table 1 compares the variations in mercury controlled capacity within the projected trading region only for the national and partial trading cases.

Demand for mercury reductions in the projected trading states is reduced in Phase I in part due to the expectation that several States that were projected to have high demand for mercury allowances are not a part of the market in the first phase (2010-2017). Under the national trading case, utilities were expected to bank approximately 6.7 tons of allowance per year, or approximately 17 percent of the allocated pool of 38 tons of allowances in the first phase. However, in the projected trading case, utilities are expected to bank at least 6.6 tons per year, representing 25 percent of the effective allocation of 26.07 tons of mercury per year. In the second phase, if Arkansas, Georgia, Illinois, Michigan, Nebraska, Pennsylvania, and Wisconsin do not participate in the trading program, this will remove 3.83 tons per year of projected allowance demand from the market as compared to the national trading case analysis.

The banking during the first phase in the projected trading case results from the 4.8 GW and 5.6 GW increase in capacity of units retrofitted with activated carbon injection (ACI) in 2010 and 2015, respectively. The ACI retrofits occur when less retrofitted capacity for flue gas desulfurization (FGD or “scrubbers”) and selective catalytic reduction (SCR) units occurs because there is less need for obtaining co-benefits for mercury, NO_x and SO₂. Less need for SO₂ allowances in the partial trading case allows for greater use of ACI. The benefit to the mercury market of this changing dynamic is that the shift to greater reliance on ACI as a mercury control technology in the trading region reduces the overall cost of mercury control since the cost of mercury control via an FGD system is higher than the cost of mercury control through ACI.

**Table 1
Control Comparison***

Control Category	2010 (GW)		2015 (GW)	
	National Trading Case*	Projected Trading Case*	National Trading Case*	Projected Trading Case*
ACI	1.5	6.3	1.6	7
SCR	32	30.5	46	45
FGD	36	35	60	56

Source: EPA Analysis

* Compares controls only in the 29 states and 2 tribes projected to adopt the federal trading program per EPA's July 2006 estimate. Controls in the non-trading states are not included in the above values.

As supported by the analysis of the projected market, EPA expects a viable mercury allowance market and considerable efficiency gains under CAMR even though the mercury allowance market is smaller due to certain States choosing not to participate in the EPA-administered cap-and-trade program. These results are consistent with EPA's experience with cap-and-trade programs where many of the efficiency gains come from intra-state or intra-company trades. Further, as demonstrated by the successful allowance market that has developed under the NO_x Budget Trading Program,⁵ achieving the economic and environmental gains from cap-and-trade does not require an allowance market that is national in scope.

⁵ The NO_x Budget Trading Program initially included eight States (Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, Pennsylvania and Rhode Island) and the District of Columbia when it began in May 2003. This area expanded to include an additional nine States in May 2004 (Alabama, Illinois, Indiana, Kentucky, Michigan, North Carolina, Tennessee, Virginia and West Virginia) and will include portions of Missouri and Georgia beginning in May 2007.