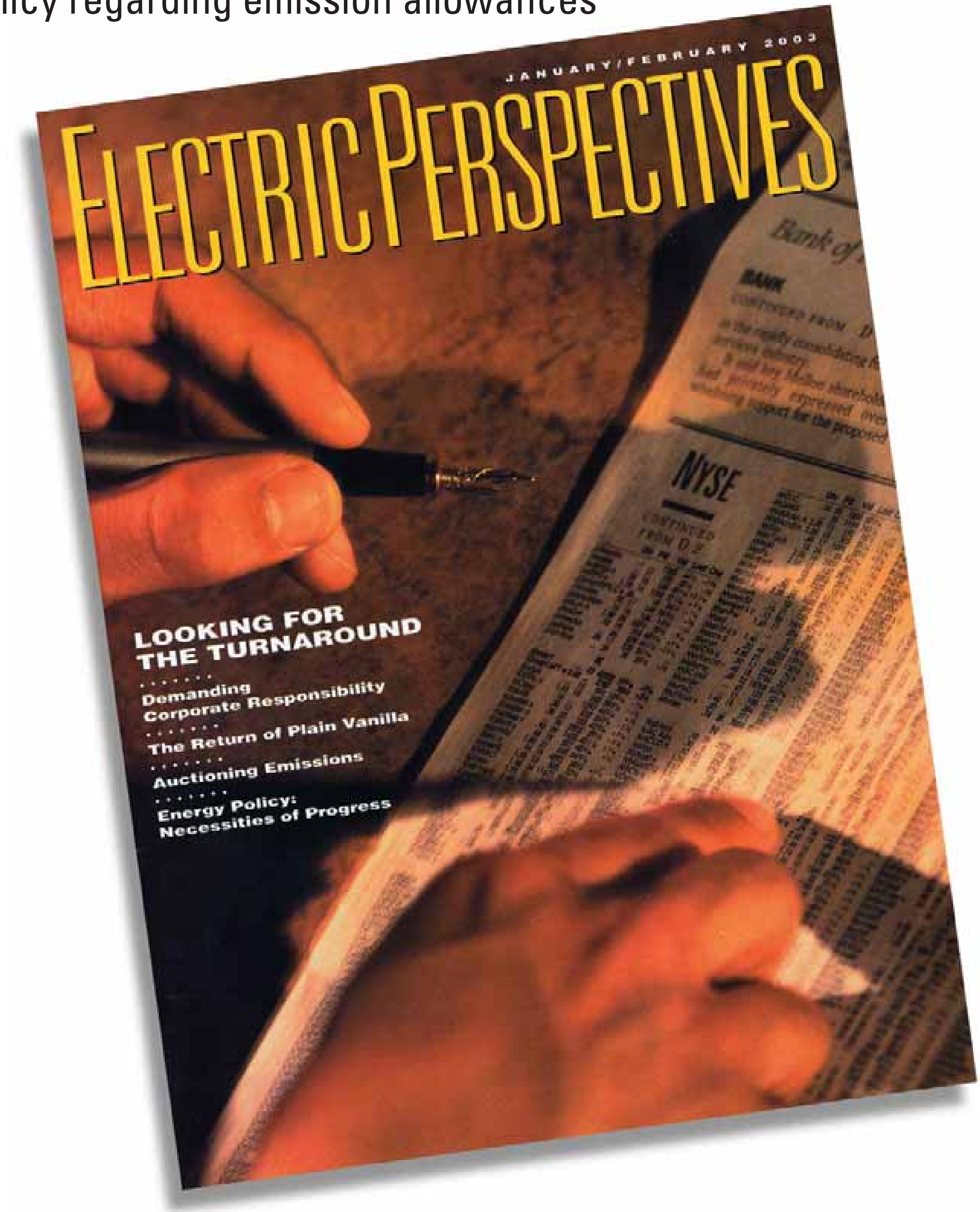
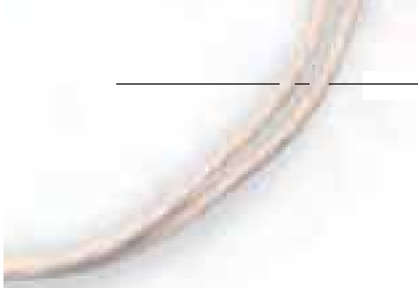
# Auction vs Allocation:
## Why common sense and not counterintuitive economic modeling should dictate public policy regarding emission allowances




**A reprint from Electric Perspectives magazine**

An Edison Electric Institute Publication © 2003
For information, contact Eric Blume at eblume@eei.org


# ...TO THE HIGHEST-BIDDING ELECTRIC UTILITY, WHO WOULD HAVE OWNED IT ANYWAY AND NOW HAS TO PAY FOR IT AND WHO WILL NEED TO TRADE IT AGAIN AND STILL NOT BE AHEAD OF THE GAME.




BY BRUCE BRAINE

The emissions trading marketplace is successful because companies receive emissions credits—allowances granted to a generating facility to release a certain amount of emissions, like sulfur dioxide ($SO_2$) and nitrogen oxide ($NO_x$), up to a predetermined "cap." And the process has worked.

Witness the $SO_2$ program under the Clean Air Act Amendments of 1990 (CAAA), and the $NO_x$ trading programs in the Northeast Ozone Transport Region and the Eastern/Midwest Ozone Transport Assessment Group. Now, companies that can meet the cap at a relatively low cost often have leftover credits, which have value for companies that can't meet it. A company can earn a profit or offset compliance costs by selling its extra credits to a buyer. It's a good incentive for both parties to participate in the market.

Over the past couple of years a new concept has emerged in the debate over future emissions reduction programs and greenhouse gas legislation. Rather than a free allocation of credits to electric power generators, $SO_2$, $NO_x$, mercury, and even carbon dioxide ($CO_2$) allowances would be auctioned. Proponents of auctioning argue that under the current allocation scheme the costs of clean air compliance are more than captured in higher prices to customers and the prices of allowances. Indeed, they argue, net profitability and asset values of these electric generators are higher (rather than lower) versus no program in the first place. (However, it should be noted that economic studies of auction vs. allowance methodologies have been exclusively focused on $CO_2$, and there has been no published analysis to date analyzing the economic impacts on $SO_2$, $NO_x$, or mercury.)

A fair program, they contend, should require electric generators to buy a significant portion of their allowances from the government. The auction proceeds would then go to electric consumers or groups that can't take direct advantage of the allowances. They argue that despite large and sometimes enormous anticipated increases in Clean Air Act compliance costs (resulting from higher fuel, capital, and operating costs), electricity prices would rise even more, resulting in higher profitability for generators. The auction concept is included in a number of recent legislative proposals, requiring electric generators to purchase many of their allowances.

But the whole argument is counterintuitive. How can an emissions reduction program with potentially enormous compliance costs somehow result in an improvement in generator profitability and asset values? Often, the studies that underpin the auction concept cite the success of the $SO_2$ trading program as support of auctioning. Yet the studies ignore the fact that the approach, the large-scale trading market it implies, and the huge redistribution of funds are without precedent in the current $SO_2$ or $NO_x$ trading programs and in the Clean Air Act generally. Moreover, a closer look at the economic analysis shows substantial flaws in the auction logic and instead points to the approach as being bad public policy.

### Messing With Success?

Allowance trading on the $SO_2$ market has grown steadily since the beginning of Phase I (1995) of CAAA. Right now, the volume of trade roughly equals the physical volume of annual allocated allowances—though most of this is gross trading volume as opposed to net changes in physical positions of allowances. These net changes have been comparatively small with most companies buying or selling what amounts to a relatively small percentage of their allowances. Nonetheless, by all accounts, the $SO_2$ trading program has been a major success. (See the sidebar, "Emissions Trading—Hot, Not Hot Spots.")

Part of the success is due to the fact that the program has engendered strong competition among fuel suppliers and pollution control equipment vendors. For example, the amount of Western coal shipped East rose dramatically during the mid- and late 1990s; scrubber costs declined; and low-sulfur coal prices in the East did not increase as dramatically as some had feared. The allowance trading market (and the mere threat of allowance purchases or altered powerplant dispatch) was enough to engender competition among several compliance options without a large amount of trading actually occurring.

That competition has lowered compliance costs. According to the Environmental Protection Agency's (EPA's) "Acid Rain Program: Annual Progress Report 2000," the CAAA "program's flexibility significantly reduced the cost of achieving these emissions reductions as compared to the cost of a technological mandate.... The cost of reductions continues to be lower than anticipated when the Clean Air Act Amendments were enacted, and the price of allowances reflects this."

There is a small annual auction in the $SO_2$ allowance market, but only for about 2 percent of the yearly allowances allocated to electric generators. This auction is for price-discovery reasons, and the proceeds are simply real-

*Bruce Braine is vice president of strategic policy and analysis at American Electric Power in Columbus, OH.*


Courtesy: AEP

**Costly compliance: Last year, American Electric Power spent $346 million on selective catalytic reduction at the Amos plant in St. Albans, WV—which will reduce $NO_x$ emissions by 85-90 percent.**

located to generators. So where is the precedent for holding a redistributive auction? There is no evidence regarding how it would function in the real world.

**Double Regulation Jeopardy**

Lack of precedence is not necessarily a reason not to do something. But the studies conducted by Resources for the Future (RFF) and others on the benefits of emissions auctions have either ignored or oversimplified the confusing regulatory landscape that most electric power companies face. Several studies assume, for example, that the electric power industry will be fully deregulated in the longer term. The reality today and in the foreseeable future, however, is that the industry will remain only partially deregulated. Right now, less than half the nation's power-plant capacity is in deregulated jurisdictions. RFF's most recent study did factor in continuing regulation, but (for example) its regional aggregations put Ohio, western Pennsylvania, and Illinois in a group of "regulated" states (even though they are deregulated). Moreover, in one scenario, the study assumes full deregulation in the United States by 2008, which most would acknowledge is unlikely, particularly given today's business and industry atmosphere.

In states where generation remains regulated, consumer prices theoretically increase to cover higher costs, and prices are set equal to average costs. In reality, customer rate freezes mean that there will be either a substantial regulatory lag in recovery or less than full recovery of costs. Historically, as well, higher costs are more likely to be the subject of commission disallowances, which has traditionally resulted in the net price paid by customers to lag average utility costs. This results in reduced profitability. In regulated jurisdictions, therefore, profits and net asset values will *decline,* not increase, when emissions allowances are allocated. In addition, customers will pay higher prices.

If allowances are auctioned, electric generators are likely to face double jeopardy. Not only will they need to seek recovery for higher compliance costs, but they also will need to recover the costs of purchasing allowances. As a result, the auction will exacerbate the effects of regulatory lag and rate freezes on utility profits, and increase the probability of disallowances.

Finally, some utility companies in deregulated jurisdictions in the United States face provider of last resort requirements, which obligate them to continue providing power to certain customers at a fixed rate for a number of years. To the extent that these rates remain frozen for significant periods of time, utilities will not be able to recover the emissions compliance costs and will face an even worse situation in the event of auctioned allowances.

### Doubling the Costs

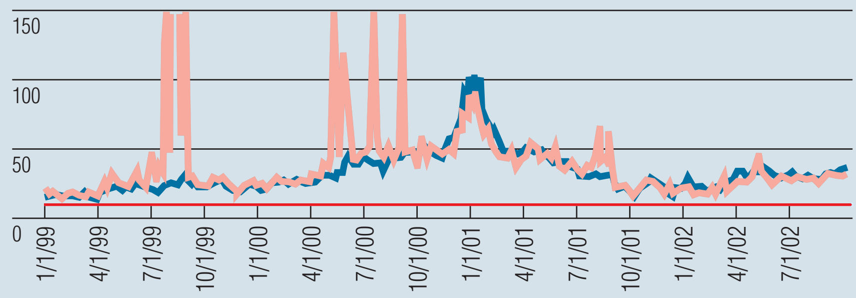
One argument in support of a redistributive auction is that it will increase generator profitability and asset values—which provides the rationale that the excess profits should be shared with disadvantaged sectors. In fact, generator profitability most likely will decline as a whole under multi-emissions legislation largely because of the expense of emissions reduction technology. Under the Clear Skies proposal, for example, EPA and Energy Information Administration (EIA) studies suggest massive additions of retrofit scrubbers (generally more than 100 gigawatts' worth), selective catalytic reduction (about 100 gigawatts), and carbon injection for mercury control—all big-ticket capital cost items.

Coal-fired generators will bear virtually all of these capital and incremental operating costs. Natural gas plants produce no mercury or $SO_2$ and low $NO_X$ emissions and thus face little or no compliance costs. However, wholesale market prices are set in most hours by gas- and oil-fired generation. In some North American Electricity Reliability Council regions, such as the East Central Area Reliability Coordination Agreement (ERCOT), the Western Systems Coordinating Council, and the Southwest Power Pool, as well as in the Northeast and Florida, wholesale market prices are set in virtually all hours by oil and gas plants. In the Midwest and Southeast, about half the hourly prices are set by oil and gas units rather than coal. For example, ERCOT daily power prices are almost always at or above the marginal costs of gas-fired generation. (See Figure 1.) The marginal costs of coal-fired generation are typically well below these levels. Thus, the market prices of wholesale power are only partially affected by multi-emissions legislation. Instead, wholesale coal-fired generator profitability could be substantially reduced, and in some cases serious financial difficulties could arise.

FIGURE 1

**POWER PRICES TRACK GAS-FIRED GENERATION**

Comparison of ERCOT natural-gas based generation cost and power prices




Note: Representative gas generating marginal cost assumes Henry Hub gas prices at 10,000 MMBtu/KWH heat rate.

Source: Historic ERCOT fuel and power price data

The various legislative proposals that include allowance auctioning recommend it be implemented gradually—e.g., no one is proposing a 100-percent auction overnight, at least not yet. Still, if allowances are auctioned, the compliance costs borne by utility shareholders and ratepayers will increase still further—approximately doubled with no recovery in deregulated power markets. This simply will make the most expensive pollution control program in the history of the power industry twice as expensive. For example, EPA's study of Clear Skies legislation estimates costs of about $65 billion (net present value), with annual costs in the final phase reaching $6.5 billion. This does not include the costs to the sector of purchasing allowances. If government policy were to shift to a 100-percent auction, it would impose another $6 billion of costs per year onto electricity generators (according to EPA's estimated marginal costs), roughly doubling the costs of compliance to the sector. Studies by EIA and others show a similar doubling of costs if allowances are auctioned.

### Power Markets Are Not Economic Models

The studies also show that the cost of "free" allocation of allowances in the case of a $CO_2$ emissions program will rise more than the costs of compliance. In deregulated markets, utilities will earn excess profits, according to these studies. While this is untrue in the majority of the still-regulated United States, in those states where deregulation has occurred or in the event it does, this premise is based on the assumption that the wholesale market behaves like an economic model.

Virtually all such studies assume that prices rely on long-run marginal costs, so that the costs of new generation required to serve demand are recovered in the marketplace. By extension, RFF's study assumes that marginal cost pricing will prevail under a $CO_2$ reduction program, leading to higher electric price revenues even with the additional compliance costs.

However, such cost-based models do a relatively poor job of projecting actual wholesale market prices. For example, historic prices at the Cinergy hub, the major power trading hub in the Midwest, during the mid 1990s until early 1998 were well below long-run marginal costs, while during the 1998-2000 period, prices were well above those costs. The pattern is a classic

AP

**A worker at a gas-fired plant construction site. Extra capacity has resulted in lower peak prices and reduced profits—a commodity-cycle factor not included in many studies.**

commodity price cycle, where busts in prices lead to exit from the market, resulting in supply shortfalls and eventual booms and very high prices. This pattern is common in many commodity businesses and has emerged across the United States in the wholesale power markets since their deregulation in the mid-1990s.

In addition to introducing volatility, such commodity cycles also result in prices based on demand-side willingness to pay at peak times, particularly during boom years. Pricing in these periods is unrelated to costs to serve load. It rather represents the marginal willingness on the part of a customer to be interrupted or of the load-serving utility to avoid having to interrupt customers. These true price signals are difficult to evaluate. More important, they suggest that at peak times, wholesale prices are set by customer value (and not marginal costs) and will not tend to increase under $CO_2$ legislation. In addition, because these prices are often subject to price caps, they may not be allowed to increase.

The price increases under multi-pollutant legislation projected by the models will not materialize in the real world during these peak times—and that suggests that higher profits may not materialize, either.

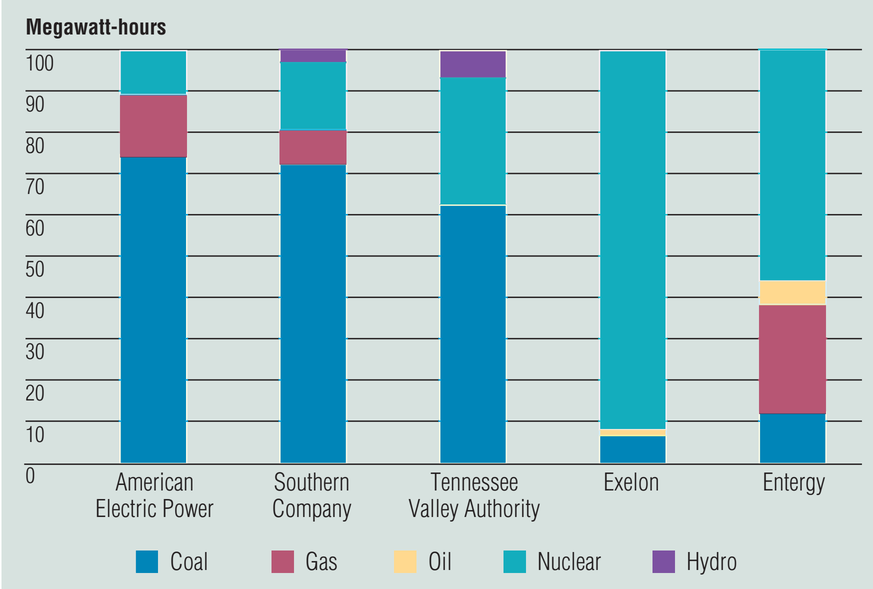
Finally, a $CO_2$ program may actually result in factors that reduce prices during some peak periods: More new combined-cycle gas capacity will be built to use natural gas more efficiently and displace coal-fired generation—but the older coal plants simply will be mothballed, effectively increasing reserve margin and reducing prices during peak load periods. This potentially significant factor is not included in the auction vs. allocation studies.

### Volatility and Risk

The economic studies conducted to date have not assessed the effects of greater volatility and risk inherent in a $CO_2$ program on generating company profitability, either. A $CO_2$ program will increase gas prices and volatility as more generators switch to natural gas and build more gas plants. While higher price volatility does not necessarily come with higher volumes, it is likely that gas prices will be increasingly volatile in both the summer (as power demand becomes a more im-

**FIGURE 2**

**FUEL SOURCES AT LARGE US UTILITY GENERATORS**




AP

**A barge moves coal up the Ohio River to AEP's Gavin powerplant, whose compliance measures include scrubbers and selective catalytic reduction equipment.**

Courtesy: AEP

portant factor) and the winter (as storage fills become increasingly difficult due to the same summer power demand). Gas price volatility will increase power price volatility, which will make profit margins swing. As profits become more volatile and cyclical, the cost of capital will increase further. As a result, power prices and hence, profitability, calculated by simple marginal costs are likely to be overstated.

An allowance auction will further increase generators' risk exposure. Greater gas and power price volatility will cause $CO_2$ allowance price volatility as well. In turn, companies forced to buy their allowances through a periodic auction will be in a riskier position. The prospects of an inadequate supply of $CO_2$ allowances at an auction could drive prices to high levels, accentuating the risks. At the very least, the inherent cost of capital would rise.

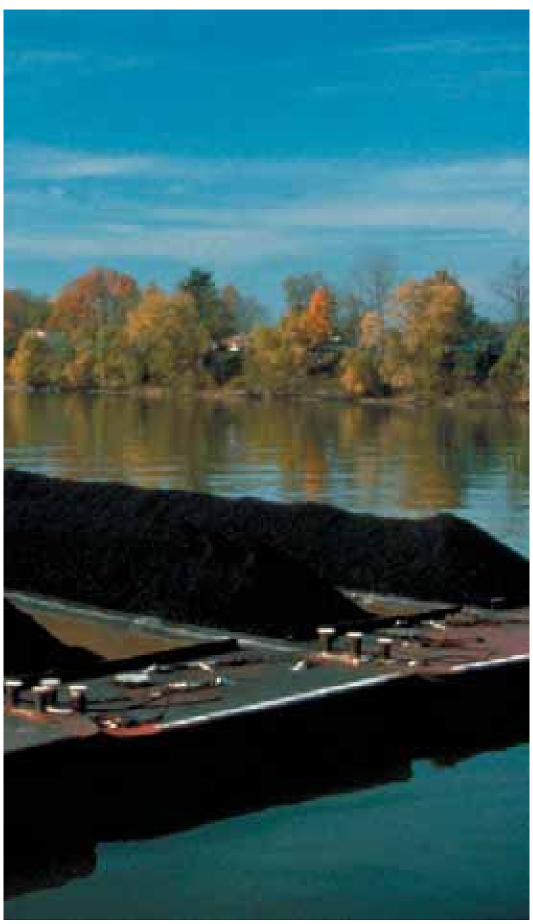
In the end, the "excess profits" finding does not appear to be valid for the

**Retrofit here, extra charge there. Allowance auctions could add even more to the already enormous costs of installing emissions controls at coal-fired powerplants.**

largely regulated generating industry, where price increases probably will lag higher compliance costs. In deregulated markets, the prospect of higher profits with a $CO_2$ program is cloudy. When one considers the inaccuracy of price forecasting tools, the higher risks inherent in these markets, the possibility of lower peak prices under a $CO_2$ program, and the high risks inherent in an auction scheme for companies, it is hard to imagine large excess profits being available.

### Redistribution Problems

Allowance auctioning becomes more problematic with the issue of redistribution of auction proceeds. Under the auction proposal, electric power generators' excess profits will be "taxed" away through an auction and redistributed to those electricity consumers facing the price increases. However, the studies to date focus on overall sector profitability and generally have not assessed the implications of such a "tax" scheme for specific regions and companies.



In fact, the asset values and profitability increases (to the extent they even occur or are permitted to occur) would reside predominantly at large electric generating companies which have a substantial percentage of assets from nonemitting sources (nuclear or hydro) or relatively low carbon-emitting sources (new combined-cycle gas plants). RFF's own studies show firms with more than 60 percent coal-based generation would suffer from reduced profitability. For example, some shareholder-owned companies have a substantial portion of their generation coming from nuclear and use little coal-fired generation. Higher profits would be focused at these companies and companies with a similar generating mix. In contrast, other companies that produce most of their power from coal would have substantial compliance costs with more limited recovery in the market and likely lower asset values. (See Figure 2.)

An allowance auction, instead of redistributing profits from the potentially favored utilities, would exacerbate distributional inequities. This is because lower-emitting companies or agencies would only have to buy a relatively small share of the auctioned allowances because their emissions are low, while coal-fired generating companies would have to buy a much more sizable share.

The bottom line is that auctioning would end up redistributing profits largely away from those companies that are most financially affected (worsening their financial distress), while redistributing relatively little of the excess profits from companies that potentially benefit. Ironically, one of the purported benefits of auctions—the ability to redistribute impacts more equitably—is in fact a liability when one examines the electric power industry.

State and regional distributional impacts across the United States would follow along the same lines as the company impacts. Midwestern and Southeastern states rely heavily on coal-fired power and would be more adversely affected with an allowance auction, while Northeastern, Southwestern, and Western states, generally relying on gas, nuclear, and hydro, would feel fewer effects. (See Figure 3.)

### Is It Really a Benefit?

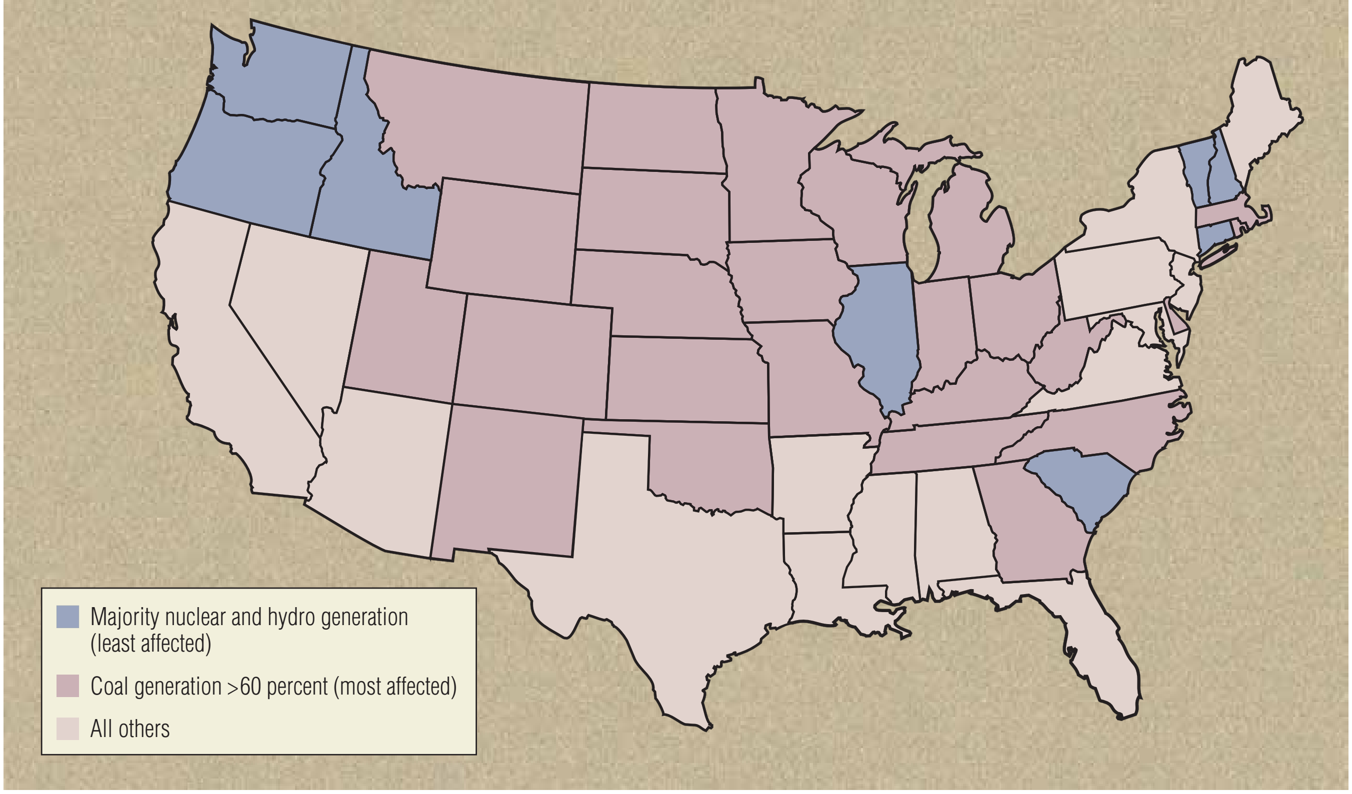
Some auction proponents have touted the overall benefits to the economy. They argue that auctions provide an income source that can be redistributed in an efficient manner (e.g., a cut in marginal income tax rates), resulting in a large net gain for the economy. There is little dispute in macroeconomics that taxing consumption (or auctioning of allowances) and using the proceeds to cut marginal tax rates encourages savings and investment and results in net economic gain.

However, the benefits derived from an auction approach are not unique to this methodology. Any number of alternative methods to effect a "tax" on consumption (e.g., carbon tax, end-use kilowatt-hour tax, etc.) could be used to achieve the same end result. In essence, the benefits of an auction are no greater than any other form of tax-and-redistribution method, each being subject to the inefficiencies inherent in the redistribution process itself.

What is more problematic is the political willingness to take the proceeds and recycle them through changes in tax policy. For example, drafters of legislation have targeted redistribution of auction proceeds to electricity consumers, though this will arguably *reduce* economic efficiency as it will subsidize electricity consumption in a sector that is already subsidized—residential electricity users. One only need

FIGURE 3

ECONOMIC IMPACTS OF ALLOWANCE AUCTIONS ON STATES




consider many of the Congressional spending and tax programs over the past couple of years such as the Agriculture Bill (with inefficient ethanol subsidies) to determine the degree to which economic "efficiency" has much to do with how Congress redistributes its newly acquired revenue sources. Economically efficient fiscal and tax policy is even more unlikely given the current fiscal challenges facing the federal government. Under these conditions, tensions will increase as Congress addresses infrastructure needs, prescription drug benefits for seniors, social security solvency, homeland security, and enhanced military funding. Consequently, the prospects of federal funds being used for efficient tax cuts in the future is quite low.

Finally, the process of redistributing auction proceeds as well as buying auctioned allowances (and the inevitable re-trading of them that occurs as certain allowance-hungry companies are unable to procure them in sufficient quantities in a periodic auction) will almost certainly result in substantial transaction and other exchange-related costs. For example, assuming a price of \$10-\$20 per ton of $CO_2$ would result in approximately \$20 billion-\$40 billion per year in transactions from the auction alone. Even a small percentage transaction cost would result in added costs in the billions of dollars per year.

**No Precedent**

Researchers and legislators are making the case for a redistributive allowance auction on tenuous grounds—the calculation of excess profits in the electric industry sector. In the case of legislation such as Clear Skies, there has been no published analysis that demonstrates excess profits. In the case of greenhouse gas legislation, the calculation of excess profits in the studies conducted to date has been fraught with shortcomings and uncertainties. The uncertainty around future deregulation and competition and the current complexities of rate freezes and price caps make forecasting future electricity prices and rates (and hence profits) a particularly uncertain venture. These uncertainties, when combined with the inability of models to predict wholesale power market prices, makes the profitability prediction an exercise in futility.

Emissions trading programs have helped create compliance-cost competition with relatively little net volume of purchases and sales among generators. Their success in no small measure may be because they did *not* radically change and force substantial market purchases and sales and redistribution of revenues. Allocation, not auction, breeds success. ◆