



## Advancing Zero Emissions Objectives Through PJM's Wholesale Electricity Markets

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By Louisa Lund, Program Director, Consortium for Energy Policy Research

In Monday's energy policy seminar, Stu Bresler, Senior Vice President for Operations and Markets in the PJM Interconnection (PJM), outlined some of the complexities of dispatching electricity in the context of diverse, and sometimes competing, state energy policies. Electricity markets depend on impartial regional transmission operators (RTOs) such as PJM to coordinate the reliable, least-cost dispatch of electricity generating plants across many states. PJM performs this function for all or part of thirteen states plus the District of Columbia. PJM's dispatch task, however, is becoming increasingly complex as states adopt state-specific policies intended to support specific types of generation. Some states, joining the Regional Greenhouse Gas Initiative, have what amounts to a price on carbon. Others are supporting zero carbon electricity generation through dedicated credits. In contrast, Ohio, also in the PJM footprint, is taking steps to preserve its coal generation

PJM, Bresler said, is "struggling" to accommodate these diverse state policies in a way that minimizes market distortion. In his talk, Bresler examined some different options for PJM dispatch, each imperfect in its own way, based on ideas suggested for California, whose Energy Imbalance Market faces the same problem. One option, Bresler explained, would be a least-cost dispatch that reflects price differences based on state policies. Such a dispatch would tend to direct renewable and other low-carbon generation towards states with carbon policies (i.e. – prices on carbon emissions) and concentrate the dispatch of polluting generation within states without such policies. While this approach minimizes costs, it would tend to undermine the policy efforts of the carbon regulating states by effectively allowing carbon-emitting resources to "backfill" non-carbon-emitting resources that are imported into areas with carbon prices from areas without carbon policies—a kind of carbon "leakage."

A second approach would attempt to fix this "leakage" problem with a "two pass" dispatch. The RTO first would calculate a least-cost dispatch for states without carbon prices—one which would presumably include a good share of energy from renewable sources located throughout the region. In a subsequent, second-pass dispatch, the renewable generation originally dispatched to the non-carbon-price states would be set aside, with only excess, uncommitted renewable power available for export to states with carbon prices. Such a dispatch would cost more overall, but would minimize "leakage" of carbon emissions from carbon regulating states into the rest of the system and therefore overall carbon emissions for the region. However, unintended market distorting impacts would remain—for example, Bresler noted, such a dispatch system would reduce the total compensation non-emitting resources in states without carbon policies would receive, since they would not be allowed to export all their production to states which put a premium on carbon free electricity.

A third alternative discussed by Bresler, and based on a [paper](#) by Bill Hogan of the Harvard Kennedy School, would involve keeping the single stage dispatch, but adding charges to imports into carbon-regulated states which would reflect the difference between a hypothetical regional marginal cost of carbon and the actual price premium paid for electricity within the carbon priced state itself. This import fee would prevent carbon emitting generation from receiving premium prices as a result of carbon pricing within individual states.

All of these possible approaches need further investigation, modeling, and discussion, Bresler said. The "easy button" would be a single carbon price across the whole PJM footprint, a policy which would allow traditional dispatch



methods to work without distorting the market. This is unlikely to become reality, however, Bresler said, because “Reaching a common carbon policy in all the jurisdictions in PJM will be difficult.”

Bresler spoke as part of the Kennedy School's Energy Policy Seminar Series, which is sponsored by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.