

Advancing Zero Emissions Objectives through PJM’s Energy Markets

The role nuclear generation plays in meeting state goals for carbon-free electricity is a concern that has prompted recent state policy initiatives. PJM is working to offer options to state policymakers to pursue carbon policy objectives in a manner compatible with the security constrained economic dispatch operation of the PJM markets. States interested in pursuing this policy choice would address the external cost of carbon by pricing it so that the cost of carbon is internalized by emitting suppliers. This cost will find its way into suppliers’ offers in the energy market, and will ultimately be reflected in LMP.

Although a regional approach is preferred, PJM recognizes the diverse perspectives of the states comprising the PJM region. Accordingly, we believe a coordinated carbon policy could be advanced through the PJM market by a willing sub-region of states prepared to adopt a common set of business rules that:

1. Enable state policies;
2. Preserve orderly and competitive economic dispatch across the entire footprint; and
3. Largely avoid, through rule design, the impacts of the sub-region’s policy choices on non-participating states.

Elements of a Carbon Pricing Framework

A carbon pricing framework would establish a price per ton of carbon emissions. Whether the framework is regional or sub-regional, the carbon price would:

- 1) Apply to carbon-emitting suppliers on a per-ton basis and be reflected in offers
- 2) Be revealed in wholesale market prices
- 3) Align with economic dispatch
- 4) Improve the relative competitiveness of resources that do not emit carbon, and
- 5) Provide a revenue stream to participating states based on unit-specific carbon emissions, which could be tracked through PJM Environmental Information Services (EIS).

In order to be effective, a carbon pricing framework would require:

State Buy-in	Determine which states agree to put a price a carbon emissions, and which states will not. This will establish the "carbon price sub-region" and "non-carbon price sub-region."
Agreement on the Carbon Price	To avoid significant complexity, a single carbon price would apply across the carbon price sub-region. Otherwise, a price adjustment would be needed between individual states within the carbon price sub-region.
Price Reflected in Wholesale Market	The price naturally would flow through offers of emitting units. As a result, these units will have increased costs and be dispatched less often. Wholesale market prices within the carbon price sub-region would increase.
Internal Border Adjustment	Would be necessary to prevent leakage and to create an even playing field for resources competing in each sub-region within PJM.
Revenue Distribution	PJM can facilitate the collection and disbursement of funds if the states so desire. Each state would decide how revenue collected as a result of the pricing will be utilized. Allocating some or all of these revenues to mitigate electricity price impacts might be attractive to states. Allocating any of this revenue stream to support generation would amount to a subsidy and defeat the purpose of internalizing carbon costs into supplier energy offers.

Sub-Regional Carbon Price Border Adjustment

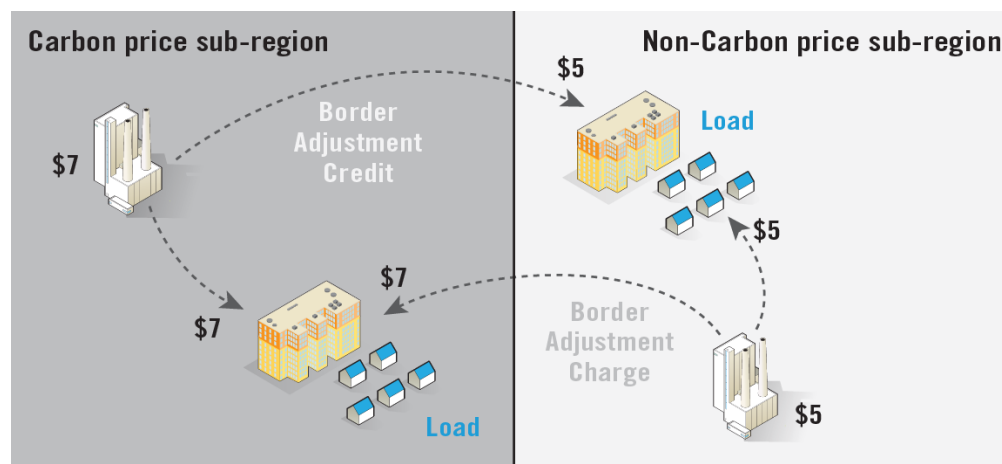
The Regional Greenhouse Gas Initiative (RGGI) is an example of a multi-state initiative to price CO₂ emissions – specifically utilizing an allowance cap and trade. RGGI has not been coordinated with the PJM markets and, because Delaware and Maryland are the only PJM states participating, leakage and the lack of an internal border adjustment have been issues for the RGGI program:

- Price leakage occurs when the increased cost to emitting resources in RGGI states is passed through to consumers in non-RGGI via electricity exports from RGGI states.
- Emissions leakage occurs when fossil fuel based electricity from non-RGGI resources, not subject to the carbon cap, is imported to the RGGI region.

Establishing a carbon price framework that is coordinated with PJM market constructs could more directly address these leakage issues and enhance the policy goals of states that adopt a carbon pricing framework.

A border adjustment would isolate the impact of the carbon price to only those states in the carbon price sub-region in a way that ensures energy exports from the carbon price sub-region could be competitive on equal footing in non-carbon price sub-region. This would preserve PJM's ability to economically dispatch generation over the full PJM region. All resources could competitively participate in the full market, but only consumers in states that have chosen to compensate this policy initiative would pay the incremental costs of a carbon price. Figure 1 illustrates this concept.

Figure 1: Sub-Regional Carbon Price Border Adjustment



In order for the border adjustment to be effective, PJM would need to:

- Measure the transfers of energy into and out of the carbon price sub-region.
- Track CO₂ emissions of each resource in the carbon price sub-region. We would anticipate doing this through PJM EIS.
- Adjust the price charged or credited to transfers by the carbon price.
 - This would involve allocating the tons of CO₂ emitted by a resource to the amount of load in each sub-region served by that resource.
 - In order to minimize the complexity of this adjustment process, it may be necessary to require states in the carbon price sub-region to be contiguous.

- Adjust the zonal definitions for load settlement to match up with the boundaries of the carbon price sub-region. Otherwise, the impacts of the carbon price would affect portions of zones that lie outside the states that have adopted the pricing framework.

Legal Questions

- PJM's proposal starts with the assumption that states can come together, with PJM's facilitation, to agree to price carbon emissions generated in their states and that such action is not subject to FERC jurisdiction. Although the action would undoubtedly affect wholesale electricity prices, courts have noted that just because a state policy affects a cost input to wholesale electricity prices does not make the policy action FERC jurisdictional.
- Accordingly, PJM would propose a common set of rules pricing carbon and applicable to willing states as a separate framework, outside its FERC approved tariff and operating agreement.
- Implementing border adjustments to preserve a non-discriminatory economic dispatch across the full PJM region and to prevent leakage between internal sub-regions raises more difficult questions of FERC jurisdiction over wholesale electricity rates.