

Midwest ISO Advisory Committee Hot Topic  
Cost Allocation – Wind Integration  
February 17, 2010

Response of the Organization of MISO States

- 1. What are the key considerations in developing a transmission expansion and network upgrade cost allocation methodology that addresses the needs of wind integration? (e.g. balancing costs/benefits between generators and load, ensuring RPS standards can be met, considering future changes to energy flows such as increased exports, considering future changes to generation patterns such as decreased coal generation, etc.)**

It is difficult to answer this question because of its breadth. The OMS Cost Allocation and Regional Planning (CARP) group offers this “foreword” as conceptual background to our specific answers to questions 2 through 5.

A key consideration is the balancing of costs and benefits. Different states balance costs and benefits differently. Another key consideration is the public policy of a state, group of states, region, or the nation as a whole. Some states have renewable portfolio standards, and others do not. The states have different viewpoints on the beneficiaries and cost causers with respect to cost allocation for wind integration. In order to address this topic more fully, the OMS formed the Cost Allocation and Regional Planning Task Force (CARP). CARP has been meeting monthly since early 2009 and has considered a broad range of subtopics to this question.

Inherent in this question is the other side of the coin, which is: what are the “needs” of the existing ratepayers that have been directly paying for all of the transmission expansion heretofore, and what is a “fair” allocation of costs to load, existing generators, and new generators that require interconnection to the grid? The wind advocates have argued that if the costs are relatively higher in the Midwest ISO, wind farms will be constructed in other locations and in other RTOs. The flip side of this argument is that if the costs are not accurately assigned, it creates a financial windfall for the wind developers in the Midwest ISO by altering the competitiveness of their energy, all financed on the backs of stressed ratepayers. Due to the large geographical areas under consideration for transmission development in the Midwest ISO, it may be that it is “fair” that some potential wind farms face larger costs here than in other RTOs because they may be facing significant transmission constraints. Interconnection costs for remotely sourced wind could undoubtedly be lowered by the construction of a transmission overlay, but this potential is tied up in the question of how and where the needed overlay construction occurs.

Another key consideration is to allocate the costs of new transmission facilities used to integrate wind to both those entities that cause the transmission expansion and those who benefit from the installation of those facilities in a manner that is proportionate to those entities’ contribution to the causation of construction and/or acquisition of benefits. If this is done

correctly, then the “Otter Tail Problem”, which manifests itself as transmission costs being allocated to local load that has not caused the costs to be created and does not benefit in proportion to the costs allocated, would be remedied. Another consideration which may be addressed through the cost allocation methodology is the expected increase in east and southeast-bound exports. This problem is legal and technical, and therefore is not addressed solely through the cost allocation method.

Important to developing the appropriate allocation methodology is explicitly recognizing the reason for this undertaking. A new allocation methodology is being developed to provide an established source of funding for new transmission facilities that would facilitate the siting, construction, and interconnection of wind turbines in geographic regions with the highest potential output although the electrical energy may not be needed in those areas.

The causation and beneficiary paradigm is like two sides of the same coin. The two rely on different rationales, but in the end reach the same conclusion. There are two tractable causers/beneficiaries from the transmission expansion needed to integrate wind resources, loads and generation. Reasoned arguments can be constructed based on both the principle of causation and benefits for both loads and generators.

The loads have caused the need for the new transmission expansion by electing representatives who legislated renewable portfolio standards. The load then benefits if the new transmission enables a larger quantity of wind energy to be generated and consumed at lower total costs than developing local wind resources. However, there remains a disconnect between the installation of an increasing number of renewable energy resources and reduction of carbon dioxide emissions. The real benefit, carbon reductions, to loads may not be achieved on the order of magnitude that was expected when renewable portfolio standards were enacted. The efficacy of renewable portfolio standards and the production tax credits in light of the real public interest should be a consideration.

Wind generation resources also have caused the need for the new transmission because the most productive (i.e. highest capacity factor), sites are typically located where the capacity is not needed to serve local energy needs. It is the existence of wind resources in the upper Great Plains and the desire for power companies to locate there for their own pecuniary benefit which has caused the need for grid expansion. Generation resources, generally, benefit from the transmission system because it allows them to move their commodity to market, and receive revenues which may return to them a profit on their investment.

## **2. Can the injection / withdrawal method sufficiently address those key considerations? Why or why not?**

Majority Comments:

The CARP has focused on the theory and quantitative implications of the Injection/Withdrawal (I/W) cost allocation method. A recent vote by CARP advised the Midwest ISO to begin developing the draft tariff language that would be needed to implement the I/W method. The vote was 9 in favor, 3 against, and 1 abstention. The comments herein,

will include both the views of those who voted in favor and against the development of tariff language to implement the I/W method.

Wind integration involves a multitude of transmission projects. There is the actual radial, or single use, generator interconnection. There are then network projects needed further inside the grid that have multiple uses. Because wind power is an acreage intensive technology per MW produced, wind developments are large and are spread out geographically. Most data suggest the better wind environments are in the western part of the Midwest ISO footprint. For this reason, overlay transmission projects are also needed to develop these resources.

The OMS believes that the I/W method is a cost allocation approach that could address the key considerations related to wind integration.<sup>1</sup> The I/W method is an innovative approach focusing on the use of and access to the system.<sup>2</sup> The method requires injectors or generators to pay for the right to sell their commodity over the system, and it also requires the load or withdrawers of energy to pay for the right to receive energy from the system. The exact balance between the two groups and the various parameters that go into the method are currently being examined in the Midwest ISO RECB stakeholder group, as well as by the OMS CARP group. The number of parameters is also lengthy, and the eligibility criteria for projects that would become part of the I/W cost allocation process have yet to be determined.<sup>3</sup>

Finally, The OMS believes that the dynamic nature of the I/W method transcends the old method of static cost allocation assignments that do not change over the life of a transmission project. For instance, a large wind farm may cause the need for certain transmission projects, but it also benefits by access to the larger transmission grid and has the opportunity to make a profit on its investment. Similarly, public policy processes may cause the need for wind development because the technology does not have the emissions associated with a fossil unit. Yet at the same time residents in load centers benefit by the use of more environmentally-friendly resources. An appropriately designed I/W method could be the cost allocation approach that addresses FERC Order requirements to alleviate what has become known as the “Otter Tail” issue as well as development of a robust transmission system that can deliver remote generation resources to load centers.

*Minority Comments:*

*The I/W method has no commonly understood definition at this time. This is a major reason why the I/W method may not be able to address the key considerations. The I/W method being discussed in the RECB WG and CARP has been altered, attenuated and amended considerably since the method was first proposed. In order to provide feedback the following discussion will presume that the I/W method is consistent with the allocation of costs based on the type of power flow analysis that was performed by MISO for the purpose of presentation to CARP and RECB.*

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<sup>1</sup> The OMS States are not unanimous in this position. The CARP vote was 9-3-1.

<sup>2</sup> The terms use and access are surrogates that are derived from the more concrete notion that transmission charges will be billed based on both MWhs and MWs while traditional methods focus on MWs. For this reason some OMS members do not believe that the I/W is an innovative approach, but is, instead, merely a variant on common cost-spreading techniques.

<sup>3</sup> In addition to projects for wind integration, other projects could be brought into the IW method such as those projects presently receiving RECB1 or RECB2 treatment.

*An allocation based on power flow samples may be able to allocate the costs of new transmission facilities used to integrate wind to both those entities (generation and loads) that cause the transmission expansion and those who benefit from the installation of those facilities in a manner that is proportionate to those entities' contribution to the causation of costs and/or acquisition of benefits. However, it would only be coincidental, because the cause and benefits of the transmission expansion are not directly related to the power flows on existing transmission facilities. The power flow analysis within the I/W method uses power flows on existing facilities to estimate average power flows for different sets of transmission facilities. Any one measured line within a set may have a very divergent character than the average in the set. Given the nature of the transmission expansion, it is even more probable that any future line will have a different character than the estimated average line.*

*The allocation of costs based on an engineering analysis utilizes an abstraction about the geographic layers (local, sub-regional, regional) to be assigned costs, which is not reflective of reality. The analysis divides the set of electrical buses (generation and load substations) in the region into decreasing sized subsets comprised of mutually exclusive sets of electrical buses. Then the cost allocation method assigns cost to all entities to the designated sets of buses in each geographic layer, both simultaneously and on an average basis. The problem with such an approach is that an entity that does not contribute to the power flows on any one particular line, will unjustly be assigned costs solely because it is located within the same geographic layer as another entity that contributes to power flows. This is one of the fundamental divergences between the cost causer/beneficiary paradigm and the estimation of shares of costs to be allocated to loads and generation associated with the I/W method.*

*The use of the current system is not a good approximation for the use of future facilities. Especially, given the fact that the nature of future facilities, such as the interconnection of remote renewable resources, are significantly different than the average current facility. The allocation of cost based on average power flows over the system would be appropriate if future lines were representative of the average existing line. However, the proposed transmission expansion focuses on a set of facilities that are fundamentally different than the average existing facilities. This is another fundamental divergence between the measured benefits in the power flow analysis and the assignment of costs to beneficiaries.*

*There also appears to be a significant amount of rhetoric concerning the I/W method's ability to allocate costs based on usage. In particular, in the power flow analysis under the I/W method estimates the MWs of power flowed by generators or loads on each transmission facility under a given set of conditions, e.g. peak day conditions. In a sense, this is a measure of a specific entities' "usage of the system." However, this rhetoric is also utilized when discussing an unrelated facet of the I/W method. That separate facet is the I/W methods' proposal to use MWhs generated or consumed instead of, or in addition to, MW of capacity or peak load as a billing determinant for individual entities once total costs have been assigned to geographic layers. The fact is that the I/W method as originally proposed utilized a MWh billing determinant. The rhetoric is that billing is based on usage which implies MWhs are equal to usage. The problem is not solely in the application of the word usage when MWhs or energy*

*would be more appropriate, but in the generalized and ubiquitous application of the term as evidence of the efficacy of the I/W method when it only serves to confuse understanding.*

**3. What elements of the injection / withdrawal method do you believe are crucial to addressing these considerations (e.g. regional, sub-regional, local designation of revenue requirements, MWh and/or MW based billing charges, higher-of rate application, transmission charges at the borders, first mover late comer, inclusion of new facilities only, etc.)**

Majority Comments:

As part of the CARP process, the OMS has discovered a few areas that are crucial should the I/W method be used for cost allocation. One area concerns the definitions of layers in the I/W method and which transmission projects get assigned to those layers. Specifically, two nomenclatures exist, a strict voltage assignment such as projects 345kV or greater being put in a particular layer, or an engineering assessment which recognizes that projects of different voltages can operate for local, sub-regional, or regional purposes.

As part of CARP, the preference has been for the use of the engineering assessment. Such an assessment uses computer models and the development of generation shift factors which then identify which lines are being used for what purposes. Under the engineering assessment approach, a 138 kV line could at times actually serve regional purposes, and some 345 kV lines may mostly address local reliability needs. In practice, MISO work to date shows that a multitude of uses occurs for lines of different voltages. The OMS believes the engineering analysis is a superior assignment method. The use of an engineering analysis may also help surmount the legal requirements of the recent federal 7<sup>th</sup> Circuit Court of Appeals ruling.

The OMS believes that the I/W method should leave out embedded transmission projects and include new transmission projects. To include existing and already approved transmission projects may needlessly complicate the adoption and construction of the I/W method, especially as it pertains to fostering wind integration.<sup>4</sup>

The CARP process has identified that a three-layer approach may be appropriate, but CARP is still investigating the issue with respect to market operations. Midwest ISO staff are also examining a two-layer approach which redefines the local zone to something somewhat larger than present pricing zones. Results of this work will inform CARP, which will revisit the layer issue.

Finally, CARP has to date rejected what is called a highway/byway approach in which transmission system charges are charged only to load. Some wind developers and other proponents have suggested that highway byway is the only real solution. The CARP at present disagrees, feeling that generators should bear some of the cost of a transmission system build out. One of the reasons is that generators need to face a price signal for more optimal siting of their generating resources.

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<sup>4</sup> The CARP vote to include embedded cost in the new cost allocation method was 4 in favor and 8 against.

*Minority Comments:*

*The I/W method does not properly focus on:*

- *Assignment of costs to generators and loads*
- *The inclusion of only those facilities which are used to integrate remote renewable generating resources*

**4. What are the deal breakers that would keep your sector from supporting Injection / Withdrawal?**

*Majority Comments:*

The deal breakers depend on what would be in the overall Injection/Withdrawal package that is ultimately filed. If a compromise settlement is attempted among all of the stakeholders, the answer is the same—deal breakers are dependent on the overall package.

Many of the western states are concerned with the much higher charges that CARP modeling indicates utilities in the western subregion will experience from an overlay build out. It appears this is largely caused by the potential for having a subregional pricing layer because most of the overlay facilities would be located in the western subregion.

Another concern is whether the “higher of” proposal for generator interconnection upgrades sufficiently addresses the “Otter Tail” problem. It appears native load in wind-rich pricing zones could still experience significantly higher injection and withdrawal charges due to increasing local zone revenue requirements from interconnection upgrades. Perhaps assigning these costs to the regional zone revenue requirement as in the highway/byway proposal is a more equitable solution that better recognizes the regional benefits of lower LMPs caused by increased wind penetration.

*Minority Comments:*

*Deal breakers for the I/W method are:*

- *Failure to assign costs to generators and loads*
- *Including more than those facilities which are used to integrate remote renewable generating resources*

**5. If your sector does not support Injection / Withdrawal, what approach to cost allocation of transmission expansion and network upgrade costs would it support?**

*Minority Comments:*

*The CARP members that are opposed to the I/W method support a benefits metrics approach. A benefits metric approach would allocate costs based on the specific measured benefits accruing to distinct entities from the actual facilities being built. This is contrasted with the I/W which allocates costs based on an estimation of average power flows on existing facilities.*