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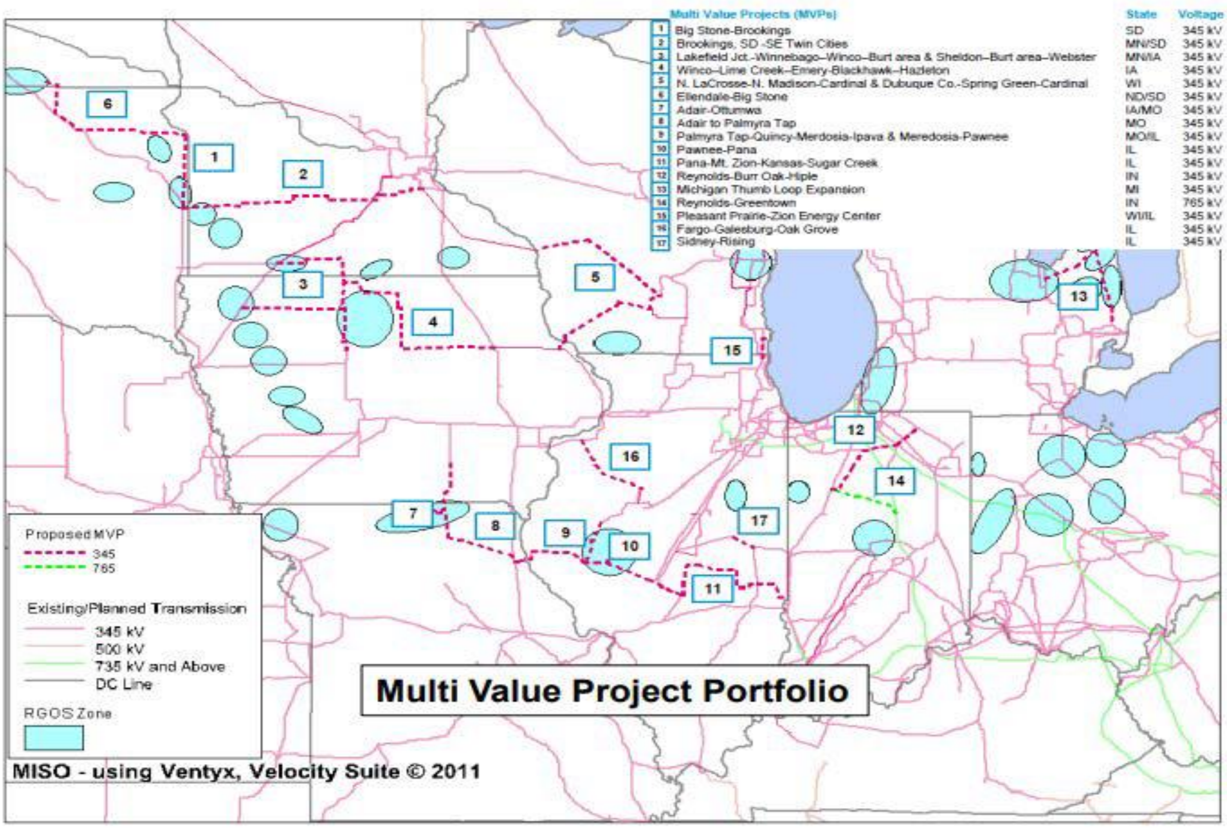
A Transmission Success Story:
The MISO MVP Transmission Portfolio

By AESL Consulting, David Boyd & Edward Garvey[1]

On July 15, 2010, the Midwest Independent System Operator (MISO)[2] filed on behalf of itself and its transmission-owning members, the Multi-Value Project (MVP) tariff with the Federal

The Final MVP Map: Zones and the 17 MVP Transmission Projects



[1] DISCLAIMER: This paper was sponsored by the Edison Electric Institute. This "story" is the authors' story. As participants and direct observers in the MVP process, it is based on our memory, experiences and to some extent refreshed by reviewing our files and public information. David Boyd was Co-Chair of the UMTDI, a member of the MN Public Utility Commission from 2007 to 2015 and its chair from 2012 to 2015 and VP for Government and Regulatory Affairs at MISO from 2015 to 2019. Edward Garvey was a member of the MN PUC from 1997 through 2002; was Deputy Commissioner of Commerce for Energy & Director of the MN Office of Energy Security where he was the chief policy advisor to then MN Governor Tim Pawlenty from 2003 to 2008.

[2] In 2010 MISO was called the Midwest ISO instead of the Mid-Continent ISO and included much of Ohio and part of Pennsylvania, but not Mississippi, Louisiana, Arkansas, and Texas in its footprint, as it does now.

Energy Regulatory Commission (FERC). On December 16, 2010, FERC conditionally accepted the proposed tariff (*See* Docket No. ER10-1791-000). This order, and the subsequent approval by the MISO Board of Directors on December 8, 2011, of a portfolio of 17 MVP projects with an estimated investment cost of over $5B, were the culmination of more than six years of effort to develop a regional transmission plan and a way to pay for that development. This paper tells the story of that effort in hopes that some of the lessons from that process can help inform regional transmission development efforts going forward.

The story that follows has six overlapping parts.[3] The first part covers the beginning years, 2004 to 2008, summarizing the drivers that led up to the MVP process. Part two, Transmission Planning Catalysts: Governors and UMTDI 2008-2010, describes the role that governors played in initiating the process and the creation of the Upper Midwest Transmission Development Initiative (UMTDI) each as catalysts for this transmission development process. Part three describes the development of energy zones and the process by which transmission projects were selected to connect those zones to the grid through the MISO Regional Generation Outlet Study (2007 to 2010). Part four is devoted to the cost allocation debates that eventually led to the tariff MISO filed with FERC on July 15, 2010. Part five is a summary of what happened after the filing, from July 2010 to the present: the business case for the portfolio of MVP lines, MISO's approval, and the lines' construction. Finally, the paper concludes by highlighting the key factors that made the MVP process a success.

We hope that by summarizing the MVP history and the processes employed, along with some ingredients that made it successful, there are features that can be useful in today's (and tomorrow's) transmission planning and development discussions.

Opening remarks offered by UMTDI co-chair David Boyd on January 30, 2009, at an UMTDI work group meeting in St. Paul, MN:

> *Our nation is in a period of change and uncertainty with regard to our energy future. We anticipate development and widespread deployment of new technologies but have an obligation to provide reliable service in the interim period. We are challenged by rising demand, an aging infrastructure, variable though generally rising fuel costs, and issues related to control of source pollutants. Perhaps most significantly, a variety of state and federal policies targeting conservation, renewable portfolio standards or goals, and carbon control have become law or are anticipated in the future.*
>
> *Our transmission system is not sized nor deployed to accommodate these factors. Progress on the design and construction of necessary grid elements proceeds, but not at a pace that matches our emerging needs. Transmission projects are controversial and expensive, and especially difficult when*

[3] Key dates and events discussed in this paper are summarized in Appendix A.

[transmission] lines cross state lines. Ironically, while transmission remains a relatively small part of the cost of delivered electricity, it is the stumbling block that limits our ability to upgrade service.

Against this backdrop we hear rumblings that very serious questions are bubbling to the surface regarding federal control of siting, permitting, and cost allocation of transmission projects. The reasons for this include the fact that transmission has evolved into interstate commerce, coupled with a sense of frustration over our ability as state regulators to deliver projects in a timely manner. It is clear that the states have a limited period of time to demonstrate that they have the will and ability to repair our current practices. This fact adds one more element of urgency to transmission planning.

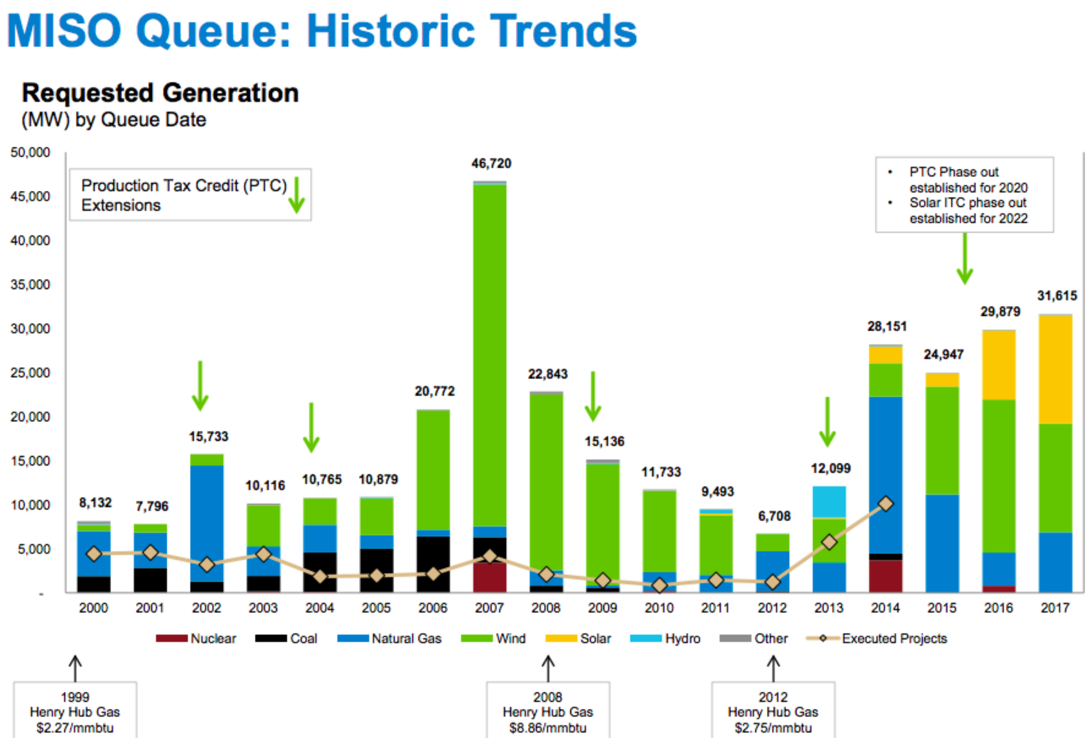
Last fall, the Governors of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin announced the formation of the Upper Midwest Transmission Development Initiative and asked the group to find a different way of delivering new transmission capacity to deliver electricity from wind rich generation zones to load centers within the five states. Thus, our goal is to create an environment for transmission planning that is regional in nature, to suggest a cost allocation scheme to pay for the new transmission, and to accomplish these tasks in a very short period of time.

In order to accomplish these objectives, we are asked to suspend "business as usual" attitudes and practices and to work cooperatively as a group of five states. While this may be a new experience and an uncomfortable one at times, we have been presented a great opportunity by our Governors to improve transmission in our region, and to show other entities that sub-regional planning is possible and can be successful.

I. The Beginning Years: 2004 to 2008

The mighty Mississippi River is the fourth largest watershed in the world, draining the heart of North America. Raindrops in eastern Montana, western Pennsylvania, and northern Minnesota all flow into tributaries of the Mississippi and ultimately into the Gulf of Mexico just south of New Orleans. Coincidently, the upper Mississippi watershed, with the notable exception of Michigan, includes the entire 2011 MISO footprint. So, raindrops in the Upper Mississippi watershed, with its capillaries and tributaries, is a good analogy for the MVP Transmission story, especially regarding the "formative" years of 2004 to 2008. Like raindrops scattered across Middle America, there were many activities in these early years across the MISO footprint that flowed and combined into rivulets, then streams, then a river, then larger rivers and ultimately into the final "MVP channel." This chapter summarizes the rainfall across the MVP watershed.

The Interconnection Queue Problem
As the following bar chart depicting the number of interconnection requests illustrates, starting in roughly 2003 and accelerating significantly in the following years, there was dramatic growth in the number of wind projects seeking to interconnect with the transmission grid.



Most of these requests were for wind projects proposed to be built in the Upper Midwestern states of Iowa, North Dakota, South Dakota, and Minnesota. While MISO was also receiving interconnection requests for natural gas and even coal plants during this time, the wind development interconnections were far and away the most numerous. This was problematic for three reasons. First, the sheer number of interconnection requests was unprecedented. Second, wind developers often chose to build projects where the best meteorological wind regimes existed, which were generally distant from load centers that necessitated transmission construction. Third, and perhaps most important from MISO's perspective, unlike traditional resources like coal, natural gas and nuclear, wind resources were intermittent—thus requiring a different and entirely new MISO analysis for interconnection and operational impacts. The safety and reliability of the grid is MISO's paramount concern, and the number of wind interconnection requests took time to process. Given the interdependency of the grid as an alternating current (AC) electricity system, each interconnection request needed to be analyzed and processed sequentially to make sure that it did not create any problems elsewhere on the network. In short, wind interconnection requests took longer to assess. The result was the MISO interconnection "queue" got bogged down.

In an effort to address this backlog, MISO initiated a series of queue reforms to its interconnection process, which helped alleviate the short-term backlog problem, but the reforms could not mitigate the underlying problem of a transmission grid that was either already running at capacity or did not exist where the new development was being located. These issues could only be addressed by expanding the transmission grid system to extend lines to the locations where the wind developers were building and remove constraints and bottlenecks on the grid by adding transmission capacity.

2004: CapX2020—Transmission Owners Coming Together

The MVP headwaters start in the summer of 2004, when a group of transmission owning and operating utilities in the Upper Midwest joined together to form the *CapX2020* group. CapX2020 stands for "Capacity Expansion Needed by 2020." The original members of the CapX2020 Group included Investor-Owned Utilities (IOUs), Generation & Transmission (G&T) cooperatives, and municipal power authorities such as Xcel Energy, Great River Energy, Otter Tail Power, Minnesota Power, the Southern Minnesota Municipal Power Authority, and the Missouri River Energy Services. Ultimately, the CapX2020 group turned into a formal coalition of 11 utilities, all serving customers in North and South Dakota, Minnesota, and Wisconsin. Each was confronting interconnection problems and transmission constraints and realized that to address those problems they needed not only to work together but also to promote a regional, multi-utility approach to transmission planning.

The 2003 East Coast Blackout was a wakeup call illustrating how close to the edge the grid was operating. That realization, plus the CapX2020 members' "obligation to serve" were key factors in their early alignment. Renewable energy was emerging as an important issue but was only a modest (10% in Minnesota) "objective" at the outset. The CapX2020 partners qualified their initiative as not trying to solve all these related problems, but to get the system back to a reasonably robust state as a first step.

The CapX2020 utilities began studying their systems' and region's transmission needs. This led to the identification of possible transmission projects throughout the Upper Midwest that could promote access to and interconnection of the growing demand for renewable generation development while improving regional reliability, resiliency, and economic dispatch. Many of those early transmission lines identified by CapX2020 became lines MISO analyzed in the coming MISO studies and one became an MVP project. The CapX2020 group ultimately invested $2 billion into building over 800 miles of new high-voltage transmission infrastructure throughout the Upper Midwest.[4]

[4] For a detailed and comprehensive discussion of the CapX2020 effort see *Transmission Planning and CapX2020: Building Trust to Build Regional Transmission Systems*, an April 2016 report by the University of Minnesota Humphrey School of Public Affairs.

As a coalition of utilities and transmission-owning/operating entities, CapX2020 became a powerful underpinning to much of the work done by governors, utility regulators and stakeholders to lay the foundation for MVP. That beneficial underpinning took three main forms:

1. Offering a collective industry voice promoting the need for new regional transmission investment. This united electric company voice encouraged elected officials to move forward to break down barriers to transmission development.
2. Another tributary benefit of the CapX2020 effort was its substantive analysis of what transmission projects were needed and where they may be located as inputs into the larger MISO analysis.
3. Finally, the coalition of electric companies coming together under the CapX2020 rubric was proof that companies could work together to propose, develop, and construct transmission lines providing regional benefits, beyond just providing individual utility system benefits.

The CapX2020 coalition members continue to collaborate today as they seek to address current and future needs as the renamed Grid North Partners, (see www.gridnorthpartners.com).

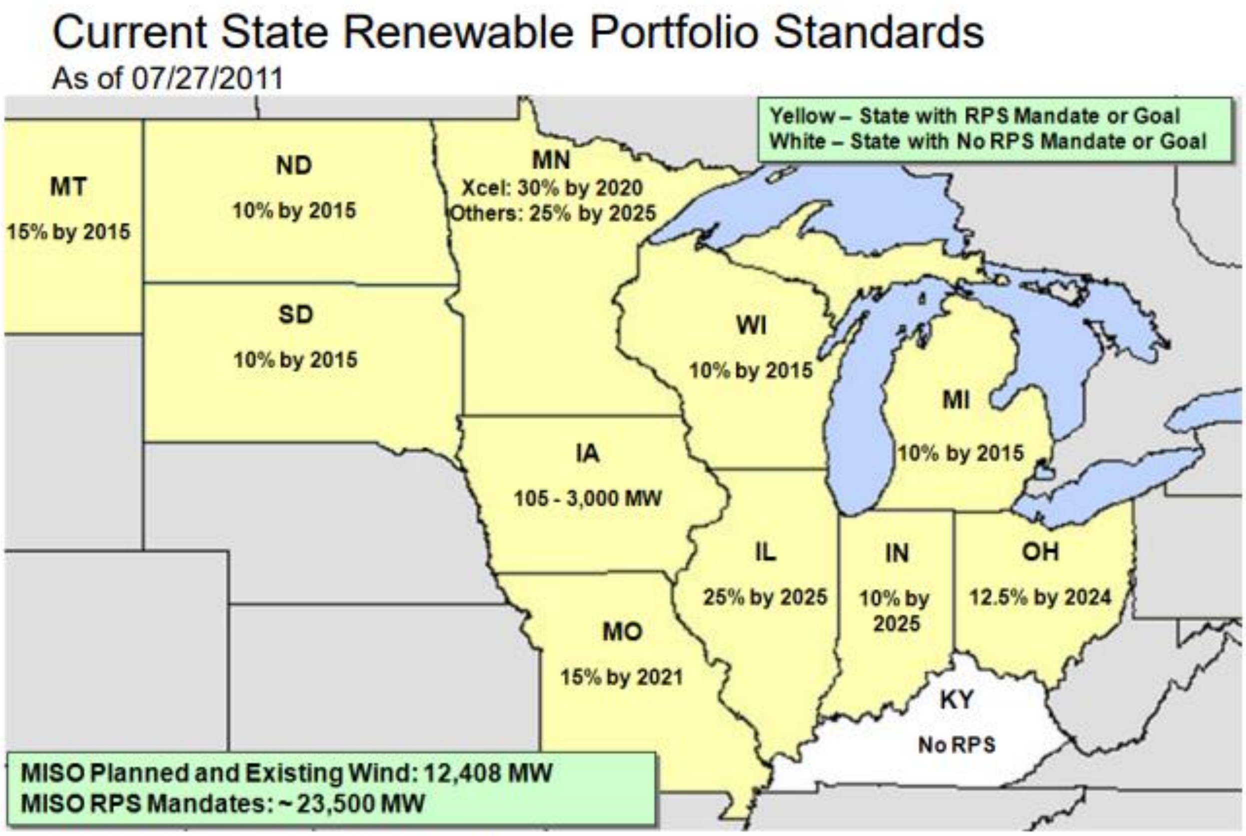
2005: Minnesota Regional Transmission Legislation

Another early tributary to the MVP river started to flow on May 25, 2005, at 12:40 p.m. when then Minnesota Governor Tim Pawlenty signed into state law CHAPTER 97 (Senate File #1368). In addition to permitting rider recovery for new transmission investments, this law amended the Minnesota law pertaining to the Certificate of Need criteria requiring the Minnesota Public Utilities Commission to consider regional (not just state-specific) needs and benefits for new transmission projects. Specifically, the new law added language requiring the PUC to consider the "benefits of enhanced regional reliability, access, or deliverability to the extent these factors improve the robustness of the transmission system or lower costs for electric consumers in Minnesota" for high-voltage transmission lines. (See current MN Stat. Sec. 216B.243, Subd. 3(9)). Prior to this amendment, Minnesota law limited consideration of any new transmission lines to in-state benefits, not regional accessibility, nor deliverability.

This is a small textual change, but a significant one and hugely symbolic for three reasons. First, it shows that elected state officials realized the need for and significance of transmission generally. Second, it recognizes that transmission is not only valuable intrastate, but that the nature of the transmission grid is regional, and those regional, networked benefits should be considered by regulators when evaluating a particular transmission project that is proposed for regulatory approval. Third, and, perhaps most important for this MVP story: this law change gave permission and political "cover" to Minnesota's regulators and administrative policymakers to start thinking regionally, which ultimately led to the creation of the UMTDI three years later.

Renewable Energy Goals

Regarding CapX2020, if the MISO queue issues and legislation changes were raindrops, the rise of state renewable energy goals and standards were rainstorms. Iowa was the first state to establish a mandate in 1983, but a key step was taken on March 9, 2006, when, in his State of the State Address, then-Minnesota Governor Tim Pawlenty set a goal that 25% of Minnesota's electricity should come from renewable resources by 2025. Almost one year later, on February 22, 2007, Governor Pawlenty signed the first part of what was called the "Next Generation Energy Act," which included specific language mandating the implementation of the "25 by 25" standard. (MN Stat. Sec. 216B.1691 (2006)). After Minnesota, nearly every state in the MISO footprint adopted some form of forward-looking legal, policy or political statement supporting the development of renewables. A summary of the goals and mandates in the MISO footprint is illustrated below:



Planned and Existing Wind as of 3/28/2011

The clean energy goals adopted by the states in the MISO footprint were significant for several reasons. First, it made clear to MISO that the large number of current interconnection requests was just the beginning and current transmission constraints would not go away but could get worse with more requests in the coming years. Second, it was not a single state issue. To the contrary, since nearly every state in the MISO footprint was adopting new goals, the expected interconnection requests would come from every state, not just the wind-rich states in the western part of the MISO footprint. Accordingly, any solution had to be region or footprint wide.

Finally, and important to the MISO planning process, the various state renewables goals gave MISO specific timeframes and quantifiable wind amounts to plan toward.

Governors & Clean Energy

The interconnection queue issues led the governors of Illinois, Minnesota, Ohio, Wisconsin, Iowa, North Dakota, and South Dakota, on November 5, 2007, to send then MISO CEO Graham Edwards a letter highlighting their "growing concerns over the crisis wind energy developers face today as a result of current [MISO] policies governing the interconnection of wind resources to the transmission grid." This letter served as a lightning bolt to MISO as well as to the stakeholders by dramatically raising the profile of the issues at stake. The governors were telling MISO and everyone else to fix the problem. It also illustrated the growing political influence of the wind developers.

While not explicitly connected to the November 5 governors' letter to MISO, but almost contemporaneously on Nov. 7, 2007, the Midwestern Governors Association (MGA), in its *Energy Security and Climate Stewardship Platform*, set the following measurable goals for the region:

- By 2015: 10 percent of electricity consumed in the region (equivalent to 103 million MWh of retail sales) will be from renewable resources.
- By 2020: 20 percent of electricity consumed in the region (equivalent to 219 million MWh of retail sales) will be from renewable resources.
- By 2025: 25 percent of electricity consumed in the region (equivalent to 293 million MWh of retail sales) will be from renewable resources.
- By 2030: 30 percent of electricity consumed in the region (equivalent to 376 million MWh of retail sales) will be from renewable resources.

The MGA *Energy Security and Climate Stewardship Platform* specifically endorsed a collaborative regional transmission approach. The text of the MGA recommended policy options to promote renewables and to meet the above-mentioned regional renewable energy goals is illuminating and speaks for itself:

- Expand collaborative regional transmission planning and siting to enable future development of renewable electricity generation. Inter-jurisdictional transmission planning and siting involving state regulators, utilities, regional transmission organizations, project developers, advocates, and others must be strengthened to optimize future transmission investments and ensure that the region's grid infrastructure enables robust development of renewable electricity generation and ensures broader system adequacy. In addition, state regulatory commissions need to be empowered to define the "public interest" more broadly to include regional benefits.
- Incorporate transmission development requirements into existing state renewable energy objectives and standards. Given the potential mismatch in timing between rapid wind farm development and the much longer time required to study, approve, and construct electric transmission lines, adequate transmission needs to be coordinated with state

renewable energy standards and objectives. States should engage interested parties in integrated resource planning, including the identification of additional transmission resources needed to meet state renewable energy obligations. Approval for transmission improvements should be sought through the appropriate utility regulatory process, and construction should commence, to enable timely development of renewable generation facilities.

- Pursue a multi-state transmission initiative to facilitate construction and delivery to market of a large amount of new renewable electricity generation, together with power from other lower-carbon generation facilities. Utility transmission planners have long identified bottlenecks in the transmission system that must be addressed in order to deliver to market large quantities of new wind energy as well as other renewable and low carbon electricity. Policymakers and other stakeholders need to engage in regional integrated resource planning efforts to identify multi-state transmission and generation initiatives. In conjunction with this effort, a cost-benefit analysis and cost allocation issues must be addressed.

A Tariff Problem: 50-50 Interconnection Cost Allocation

At the time, the MISO transmission tariff allocated interconnection costs on a 50-50 basis: 50% of network upgrade costs associated with interconnection were assigned to the generator and 50% of the costs were assigned to the local load (note that if the network upgrade was 345 kV or greater there was a 10% postage stamp and the remaining 40% stayed local to the zone where the generator was interconnecting). The impact of this 50-50 tariff cost allocation placed significant burdens on smaller utilities in the high wind areas of the MISO footprint. For example, Otter Tail Power is a small energy company serving northwestern Minnesota, eastern North Dakota, and northeastern South Dakota with a total load of approximately 600 MW in 2007-08. Yet, there was almost 10,000 MW of wind generation seeking to interconnect in the Otter Tail Power zone. Allocating 50% of those interconnection costs to Otter Tail Power's customers was both significant and disproportionate since they were not driven by local needs but intended for export to the high-load areas in other parts of MISO. Thus, the 50-50 cost allocation was unreasonable and led some electric companies to consider exiting MISO if it was not reformed.

Texas Example

The Upper Midwest was not the only area of the country looking at transmission planning for renewables. In fact, an important undertaking was happening in Texas, or at least the ERCOT part of Texas. Adopted by the Texas legislature in 2005 and implemented by the Texas PUC in 2008, Texas decided to identify high-wind zones in the western portion of the state and then develop transmission lines to connect those zones to the load centers in the eastern portion of the state. They called the wind generation areas *Competitive Renewable Energy Zones* (CREZ), and when completed in 2013, this effort resulted in the development of roughly 3,600 miles of transmission lines capable of carrying 18,500 MW of electricity. (See https://poweringtexas.com/wp-content/uploads/2021/01/Transmission-Fact-Sheet-Web-Version.pdf). CREZ became the forerunner of the Upper Midwest Transmission Development Initiative (UMTDI) and ultimately the MVP concept.

Federal Efforts to Promote Transmission

There were three actions taken by the Federal government that flow into the MVP Transmission story. In 2005, Congress passed amendments to the Federal Power Act that included language (in section 219 of the Federal Power Act) to encourage the development of transmission investment. FERC implemented those new provisions in 2006 & 2007 in Order No. 679. Consistent with the statute that Order offered critical financial incentives to utilities that invest in new transmission.

The Energy Policy Act of 2005, among other things, authorized the Department of Energy to designate National Interest Energy Transmission Corridors (NIETCs) along heavily congested portions of the grid. In tandem, the Act also allowed FERC to exercise "backstop" siting authority within these corridors under certain conditions. While these authorities were subsequently limited by the courts there was the considerable chatter by those promoting transmission development about Federal pre-emption of state authority over transmission permitting. The argument was that states were a barrier to new transmission investment because of local politics, *i.e.*, those near the proposed new powerlines opposed them and blocked their construction. Accordingly, to overcome these roadblocks and because the regional and national interest outweighed local interests, some argued that the Federal government needed to assume the siting and routing authority for transmission, like there is for pipelines. Or, at a minimum, the Federal government needed to reduce the ability of states to block transmission investments. While state policymakers and regulators may strongly disagree with each other on many things, they all agree that any Federal encroachment on their state authority was anathema. Thus, this pre-emption threat incented states to work together to avoid any Federal pre-emption.

Finally, there were the financial incentives to promote clean energy development. The Federal Production Tax Credit (PTC) was first enacted in 1992 as part of the Energy Policy Act of 1992 (EPACT92; P.L. 102-486). Since 1999, the PTC has been extended 12 times. In many instances, the PTC lapsed before being reinstated. The PTC promoted not only the development of renewables but also its on-and-off nature had the perverse impact of often creating a gold rush-like mentality for development, *i.e.*, developers had to rush their projects forward to avoid any legislative sunset or risk losing available federal incentives. This put both numerical and project timing pressures on MISO and the transmission grid.

To go back to the watershed analogy, by mid- to late-2008, there was a lot of rain in the watershed. This was a good news/bad news story for MISO. The bad news was the transmission grid was oversubscribed, the MISO queue process was being overwhelmed, the cost allocation tariff needed to be adjusted and, more rain was forecasted with the state renewable goals across the MISO footprint. In addition, there was "lightning with that rain" as the governors started to weigh in. The good news was just about everyone recognized the need for new transmission. The utilities, in the form of CapX2020, were banding together and starting to prepare for the rain; there were clear planning targets because of state renewables goals; Texas offered an idea; and incentives were in place to build the transmission.

To mix metaphors, what was needed was a catalyst to channel all the rain into a river. That catalyst came on September 18, 2008, when the governors of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin collectively announced the *Upper Midwest Transmission Development Initiative* (UMTDI), a joint planning effort to promote regional electric transmission investment. The governors charged UMTDI to:

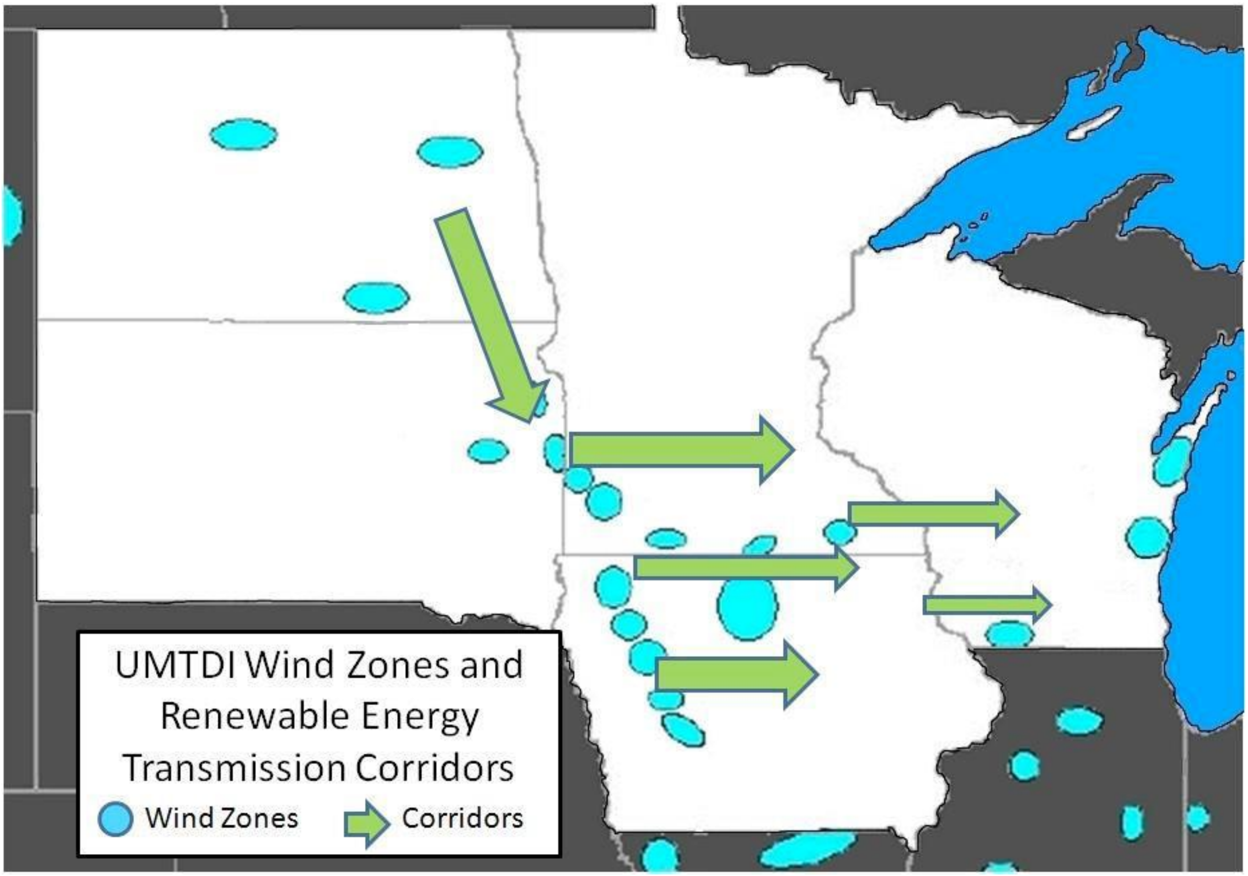
> [*I]dentify wind generation resources, transmission projects and infrastructure needed to support those resources in a cost-effective manner…and…determine a reasonable allocation for the costs of the region and will lead to the development of a concrete plan or tariff proposal for the Midwest Independent Transmission System Operator (MISO)*.

The actions of UMTDI, together with the Regional Generation Outlet Study (RGOS) that MISO initiated in 2007, brought focus and tangible progress to regional transmission planning as described next.

II. Transmission Planning Catalysts: Governors and UMTDI 2008-2010

In September 2008 the governors of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin collectively announced the creation of the *Upper Midwest Transmission Development Initiative* (UMTDI), made up of their gubernatorial staffs and commissioners from their respective state utility commissions. The governors asked UMTDI to identify and resolve regional transmission planning and cost allocation issues associated with the delivery of renewable energy from wind rich areas within the five-state footprint to load at the lowest possible delivered cost of electricity.

In its September 2010 Final Report, UMTDI unanimously identified wind zones and related transmission corridors illustrated in the following picture:



Bi-Partisan UMTDI Charge & Organization
Iowa, North Dakota, and South Dakota had modest RPS goals and standards and excellent wind resources, but their ability to export excess wind power was dependent on adequate transmission capacity, which was limited at the time. Conversely, Wisconsin's relatively poor wind resource left the state dependent on imported wind power to meet its RPS. Minnesota had the most aggressive RPS standard and good wind resources, leaving it as a net importer or exporter of wind, depending on the situation. Additionally, these states also had a history of working together on common issues.

UMTDI was a bi-partisan, non-partisan entity. For their own internal political, policy and economic development reasons, Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin each saw the development of renewables, especially wind, as an important and growing resource. The Republican governors of Minnesota, North Dakota and South Dakota joined the Democratic governors of Iowa and Wisconsin to unite their policy staffs and utility regulators and tasked them to break the logjam around interstate transmission.

UMTDI & RGOS I Governors in 2008-09		
Iowa	Governor Chet Culver	Democrat
Minnesota	Governor Tim Pawlenty	Republican
North Dakota	Governor John Hoeven	Republican
South Dakota	Governor Mike Rounds	Republican
Wisconsin	Governor Jim Doyle	Democrat
RGOS II Governors (2009)		
Illinois	Governor Rod Blagojevich	Democrat
Indiana	Governor Mitch Daniels	Republican
Michigan	Governor Jennifer Granholm	Democrat
Missouri	Governor Jay Nixon	Democrat
Ohio	Governor Ted Strickland	Democrat

Specifically, the governors charged UMTDI to:

- Identify regional renewable energy zones as the areas within the region most likely to support substantial wind development;
- Identify renewable transmission corridors as potential primary paths for the next buildout of transmission in the region in order to support the region's economic, energy, and environmental goals; and,
- Develop a set of cost allocation principles.

Structurally, the UMTDI was composed of one regulator and one governor's designee from each state and was led by two co-chairs (Eric Callisto of Wisconsin and David Boyd of Minnesota). The initial members of the UMTDI were:

- Iowa:
  - Commissioner John Norris, Chair, Iowa Utilities Board
  - Roya Stanley, Director, Office of Energy Independence
- Minnesota:
  - Commissioner David Boyd, Chair, Minnesota Public Utilities Commission
  - Joshua Gackle, Office of the Governor, State of Minnesota
- North Dakota:
  - Commissioner Susan Wefald, President, North Dakota Public Service Commission
  - Commissioner Tony Clark, North Dakota Public Service Commission
  - Sandi Tabor, Director of North Dakota Transmission Authority
- South Dakota:
  - Commissioner Gary Hanson, Chair, South Dakota Public Utilities Commission
  - Hunter Roberts, Energy Policy Director for the State of South Dakota
- Wisconsin:
  - Commissioner Eric Callisto, Chair, Wisconsin Public Service Commission
  - Nate Zolik, Executive Assistant to the Chair, Wisconsin Public Service Commission

Each UTMDI state represented their jurisdiction's specific goals, established their specific priorities, and shared this information. UMTDI met biweekly telephonically and periodically in person. Stakeholder sessions were also held to gather input to inform the UMTDI and to share results with stakeholders. UMTDI members worked closely and found that familiarity and open communication allowed members to find common ground so they could pursue mutually beneficial opportunities rather than becoming paralyzed by their differences. In fact, nearly every decision made worked to assure mutuality and consensus.

UMTDI—A CATALYST FOR INFORMATION GATHERING & DECISIONS

UMTDI was not intended to (and in fact did not) replace or duplicate the other regional transmission planning or cost allocation efforts already underway. Rather, it was designed to offer policy and regulatory insight into other ongoing discussions. It started by gathering transmission planning information. In an October 28, 2008, letter UMTDI asked stakeholders:

1. How much renewable energy should the upper Midwest states plan for, over what timeframe, and in what increments?
2. What voltages, how many miles of new or upgraded transmission and how much related infrastructure is needed in the upper Midwest region to meet our states' renewable electricity goals, ensure regional reliability, and promote economic dispatch?
3. Where are the greatest potential renewable resources located in the upper Midwest? Where are the most accessible potential renewable resources located in the upper Midwest? Where are the markets for that energy? What are the likely and most appropriate means to deliver renewable generation to load?
4. Once potential generation sites are determined along with development timeframes what are the estimated costs of constructing an economically and operationally optimal network of needed transmission additions or upgrades? Over what timeframe?
5. What options exist to control or mitigate the costs of transmission construction?
6. How should the costs of needed transmission construction be apportioned across the region? For example, should producers and/or sellers of the energy interconnected to a particular transmission line be apportioned a certain percentage for delivering their product over that line? Should energy buyers/users of energy delivered by a specific powerline bear a cost allocation percentage for that line? Should States through which a transmission line crosses but does not necessarily provide energy pay a portion of the costs of the transmission line?
7. What benefits from transmission additions can be demonstrated, how are they measured, and what is the business case for investments in these facilities?
8. The Executive Committee collected the replies, shared them with stakeholders, and used the information in establishing its goals.

UMTDI followed this letter with a formal stakeholder meeting on November 7, 2008, at MISO's control center in St. Paul. The request-for-information and later in-person meeting allowed UMTDI to assure stakeholders their interests were understood and respected. This trust was maintained throughout the UMTDI process as UMTDI worked very hard to seek and incorporate all stakeholder perspectives.

UMTDI formed two work groups that were chaired by one of the co-chairs and staffed by members of the state commission staffs. Iterative written and oral feedback from stakeholders was solicited and received throughout the process. The transmission planning work group had two tasks. First, it was to select generation zones that could be used in design studies of potential transmission projects that would facilitate delivery of energy to load centers within the five states. This task was to be completed in about 60 days. Then, the work group was to select generation zones and create a list of candidate transmission projects that were designed, among other benefits, to further energy reliability and state policies by linking the selected zones to load centers in the five states. To do this, the UMTDI work group interacted closely with MISO and the analysts performing the Regional Generation Outlet Study (RGOS). It also gathered input from transmission owners and stakeholders through in-state meetings and written responses. This work is discussed in much greater detail below in the RGOS section.

The other UMTDI workgroup on cost allocation had a longer-term timeline and was tasked with designing 2-3 stylized tariff proposals for the Governors to consider by fall 2009. This work group initially collected and refined a series of important issue questions that guided their work. Like other groups discussing cost allocation at the time, this UMTDI work group debated the strengths and weaknesses of MISO methodologies and evaluated the existing legal framework for state cooperation among participating states to assess whether joint proceedings could improve the timeliness of permit reviews. As this UMTDI work was underway, the Organization of MISO States (OMS) initiated their own process to evaluate cost allocation, called *Cost Allocation Regional Planning* (CARP), discussed below. Given these parallel processes, UMTDI deferred additional work on cost allocation and focused on the energy zones and selecting the optimal outlet transmission projects.

MISO & UMTDI…A Symbiotic Relationship

MISO provided extensive support to the UMTDI effort. That support was logistical and administrative as well as technical, analytical, and included scenario alternative modeling. As UMTDI and its members thought through issues, considered scenarios, and asked "what if" questions, MISO provided invaluable real-time technical expertise. MISO also created an internal Technical Review Group open to all stakeholders to provide input and feedback to the UMTDI analysis.

As described in detail below, even before UMTDI was created by the governors, MISO had started gathering data and doing some quantitative analytical work on possible renewable energy zones in its footprint. MISO worked to synch that analytical work with the policy and regulatory goals of the UMTDI to identify which of the possible zones would work "best" for each state. "Best" in this context meant meeting both quantitative and qualitative criteria. Qualitative criteria were set by UMTDI and their states. Economics played a role, but so did other factors like where the states saw wind being developed (and not developed) for local economic development reasons and for local natural resource and environmental protection reasons.

In addition to economics, there were delicate political balancing issues. The analysis showed that all the region's clean energy goals could be met by zones located in wind-rich states like Minnesota and North Dakota, which meant in theory, no wind development would be needed in Iowa, South Dakota, and Wisconsin. From one perspective this may be an ideal outcome, but it did not necessarily suit the policymakers who were looking to the clean energy development as much for its job creation and economic development benefits as for its environmental benefits.

From MISO's and the UMTDI's perspective, transmission planning was not simply conducting an exercise of planning wires connecting to locations with the highest wind capacity factor. In fact, since a geographically concentrated set of wind development zones was not only not the least cost solution it did not meet the collective goals of the UMTDI governors. A plan where wind development zones were more dispersed yielded the lowest cost of delivered energy. Plus, balance between policy and political (but not partisan) interests was required. Thus, a symbiotic relationship developed between MISO's RGOS analysis and UMTDI policy-driven perspectives. UMTDI worked with MISO to optimize an iterative transmission planning process where each state received some zones to accommodate local economic development and promote fairness between the states, confirmed that each state met its renewable goals, and simultaneously enabled the lowest cost delivered energy for customers throughout the MISO footprint. Collectively, this led to the portfolio that was the least expensive collection of generation development zones and transmission.

Gubernatorial Reporting

Since the UMTDI representatives were appointed by their governors, each set of representatives developed their own internal reporting mechanism. UMTDI as a group did not report back to the governors, rather that was left up to the state representatives. The result was regular and repeated feedback from the governors allowing for rare course corrections but more often affirmation that the effort was on the right track.

Further, as the UMTDI/RGOS transmission efforts progressed, there were "check-ins" and briefings by MISO and state officials for the governors and their staffs to update them and seek their input (and when possible, approval) for the path the UMTDI/RGOS was on. As MISO fine-tuned the quantitative aspects of energy zone analysis, the UMTDI members encouraged MISO to step beyond its quantitative and analytical role to interact directly with UMTDI and OMS commissioners, the industry, stakeholders, the Midwestern Governors Association, and to reach out directly to the governors in the footprint states. Accordingly, right after UMTDI started, on December 18, 2008, MISO CEO John Bear and MISO VP for Transmission Planning Clair Moeller met with then-North Dakota Governor Hoeven, and again on June 2, 2010, to brief him and his staff on the various study efforts and provide an update on the results. Similar briefings by MISO leadership were also provided to then-South Dakota Governor Mike Rounds and staff in November 2009 and March 2010, as well as the governors of Minnesota, Ohio and Iowa, and the governors' senior staff from Wisconsin, Illinois, Missouri, and Indiana. In September 2009 and April 2010, MISO provided briefings to then-Michigan Governor Granholm, her staff, and the Michigan PSC on RGOS II and the renewable zone selection process. Each briefing explained the latest RGOS analysis and results, how it impacted their state and most importantly asking for the governor's input, either directly from the governor or through their staff, on whether the results were meeting their goals and whether they had any concerns that needed to be addressed. Thus, the point of these meetings was to gather input, to make sure MISO was on the right track, and to build support for the end product which looked increasingly like a portfolio of transmission projects in multiple states and across the footprint. It is also important to note is that MISO was meeting with both Democratic and Republican governors and gave them the same briefing, changed only to be updated and made current. The issue of transmission planning and development was neither partisan nor political.

Catalysts

As we look back on the MVP Transmission Story, the governors and their creation of UMTDI served as essential and multi-faceted catalysts. UMTDI provided a critical forum for discussion and resolution of key issues related to transmission development. It is significant that the UMTDI united governors' staff and utility commissioners to combine regulatory, policy and political perspectives and look beyond the technical and engineering aspects of transmission planning to the non-technical and qualitative issues. Thus, UMTDI was able to pull together the technical work being done by MISO and the transmission operators and cut the qualitative gordian knots to solve (or at least decide!) the competing issues of location versus economics, parochial versus regional benefits as well as the countless small-scale issues that had stymied transmission planning to date. In short, the UMTDI laid out a foundation for appraising aspects of transmission projects and determined that multiple values needed to be included to meet the region's needs and goals. The need to loop back to the governors added both an imperative and sense of duty and responsibility to work together as a region, find mutually beneficial solutions and deliver results.

The soft skills used to build trust and familiarity among the states combined with MISO's analytical support was essential to the success of the UMTDI and subsequent efforts. The ability to focus on common goals, avoid fixating on differences, and the ability to negotiate and compromise were evident and essential.

III. Zones & Wires: Regional Generation Outlet Study (2007 to 2010)

Well before UMTDI's formation in 2008, MISO was already working with the CapX2020 utilities on how to address the problems that growing demand for clean energy were placing on the transmission grid. The solutions to the problems, though big and difficult, were relatively clear: address the interconnection queue so the growing numbers of interconnection applications could be processed more rapidly, extend transmission to places where the wind developers wanted to build their projects, and expand the grid to accommodate the growing amount of energy on the system reducing congestion on the grid and permitting the lowest cost energy to be delivered to the load. Of course, another problem was managing for reliability as the increased variability or intermittency of additional wind energy was being put on the MISO system.

While queue reform and grid reliability management are significant, this MVP history story focuses on efforts to solve the grid extension and expansion issues. The crux of addressing this "extend & expand" problem was building more wires to more places. So, in mid-2007, MISO initiated a study that became known as the *Regional Generation Outlet Study* (RGOS). There were two main components of the RGOS: 1) identify the best wind regimes in the MISO footprint, use that data to create zones, and work with the states to choose the best zones in each state; and 2) identify the optimal transmission projects to connect the selected zones to the rest of the grid. Along the way, the UMTDI was created and became an essential component of RGOS analysis. RGOS also grew to cover the entire MISO footprint.

In crafting the RGOS scope, MISO made five major strategic decisions that laid the path for the MVP Transmission Projects' ultimate success:

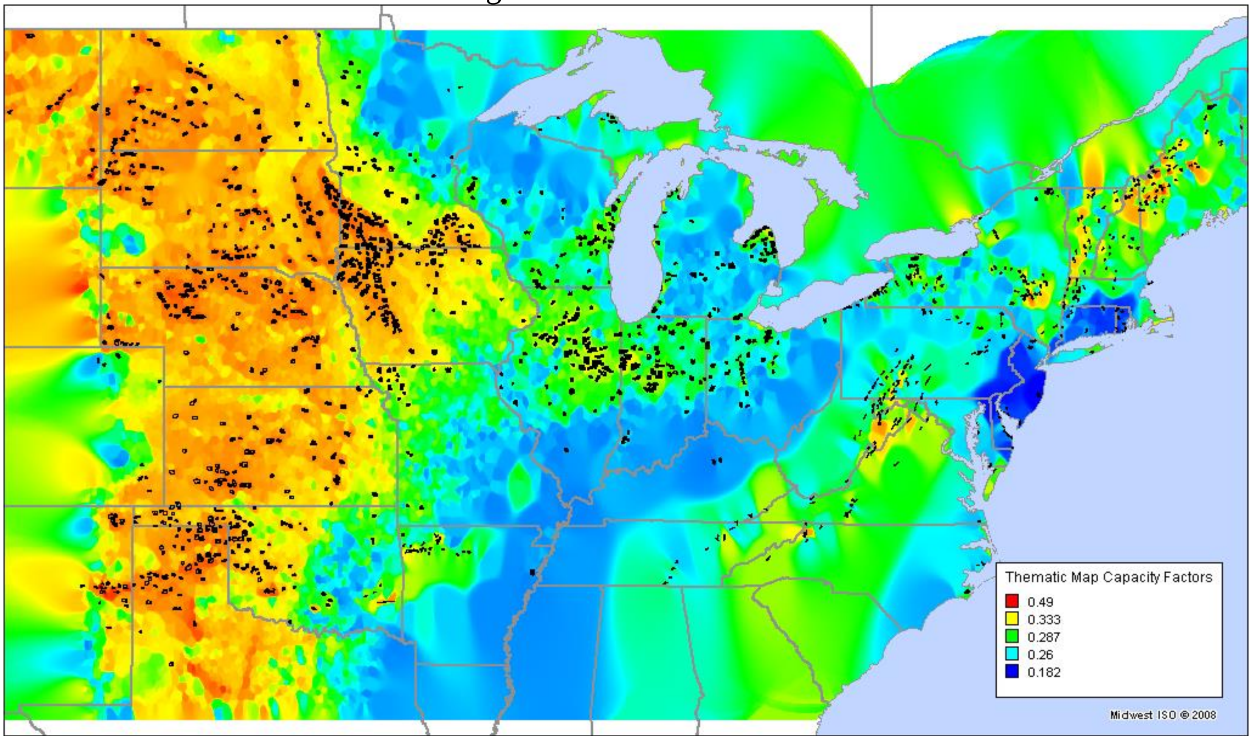
1. The first decision was to follow the Texas example and try to get "ahead" of the wind developers by identifying the places where they most likely would want to site and build projects;
2. Next, MISO decided to address the problem on a footprint or at least a regional basis, *i.e.* not on an individual project, utility-system, or even state-by-state basis.
3. Establish the "lowest cost of delivered energy" as the touchstone criterion for any final transmission solution.
4. "No Regrets." Whatever the final transmission projects might be they all needed to be "no regrets" project options. By this MISO meant transmission projects not only needed to meet the requirements of new generation (mostly renewable) they also needed to meet the high- and low-variations of that goal and fit all scenarios; so there would be "no-regrets" as to which future would occur.
5. Policy-Takers not Makers. MISO worked very hard to not get ahead of the state elected officials, policymakers, and regulators. Rather, MISO would support these groups' policy-making efforts and seek their input in its analytical work every step of the way. Hence its willingness to support UMTDI when it was created.

Wind, Zones and How Much Is Needed?

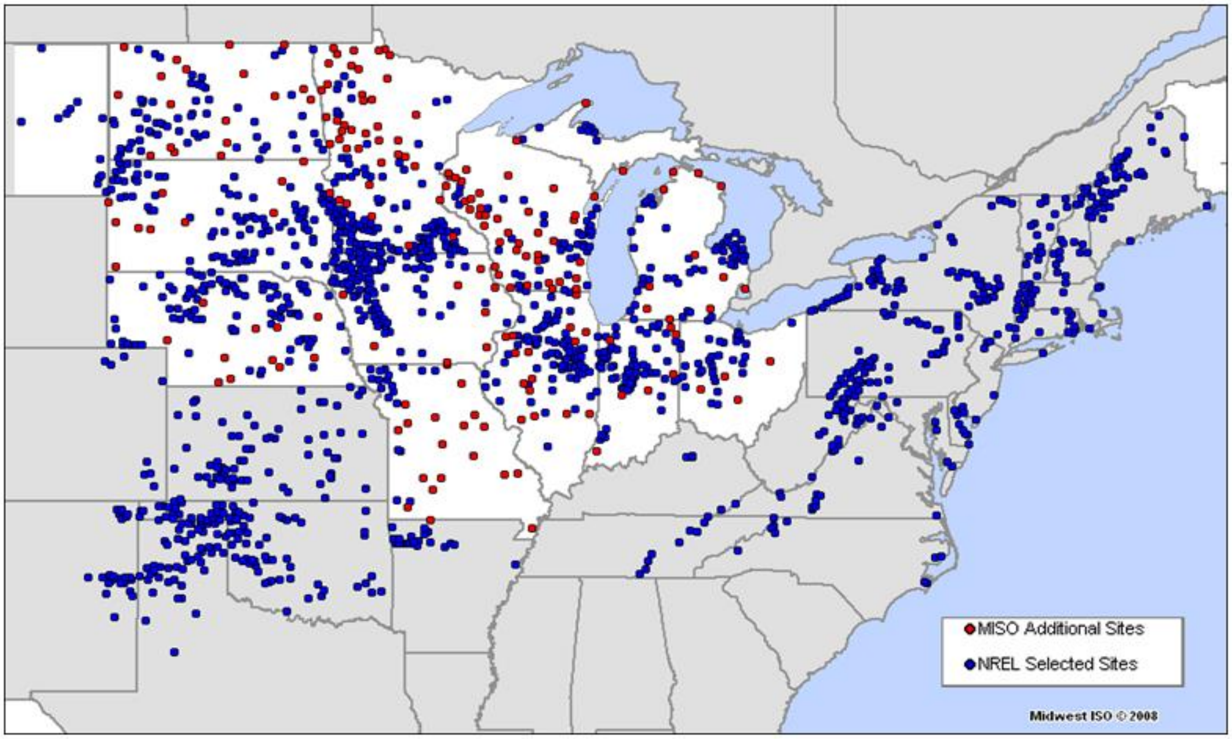
Taking a page from the Texas CREZ effort, MISO started looking for the areas in its footprint with the best wind regimes. For this information, MISO turned to the National Renewable Energy Laboratory (NREL) wind data and DOE's Eastern Wind Integration and Transmission Study (EWITS). One of EWITS's several tasks was to do mesoscale resource modeling across the eastern portion of the U.S. MISO took the NREL data and potential sites and did its own additional analysis to come up with more potential sites within the MISO footprint.

The outcome was that MISO began analyzing the suitability of siting wind generation for roughly 1500 sites in its footprint. The analysis for each site considered many factors, but some

NREL Mesoscale Windfarm Modeling and the selected site:



NREL sites plus MISO sites



of the key factors were the site's average capacity factor over one year, three years, and 11 years; the time of day the wind blew the most (important for peak vs. off-peak purposes); and the seasons and months of high and low wind. Other factors considered were where the site was in the MISO footprint, *i.e.*, in which state and where inside that state, and the correlation of the site's capacity and that state's load.

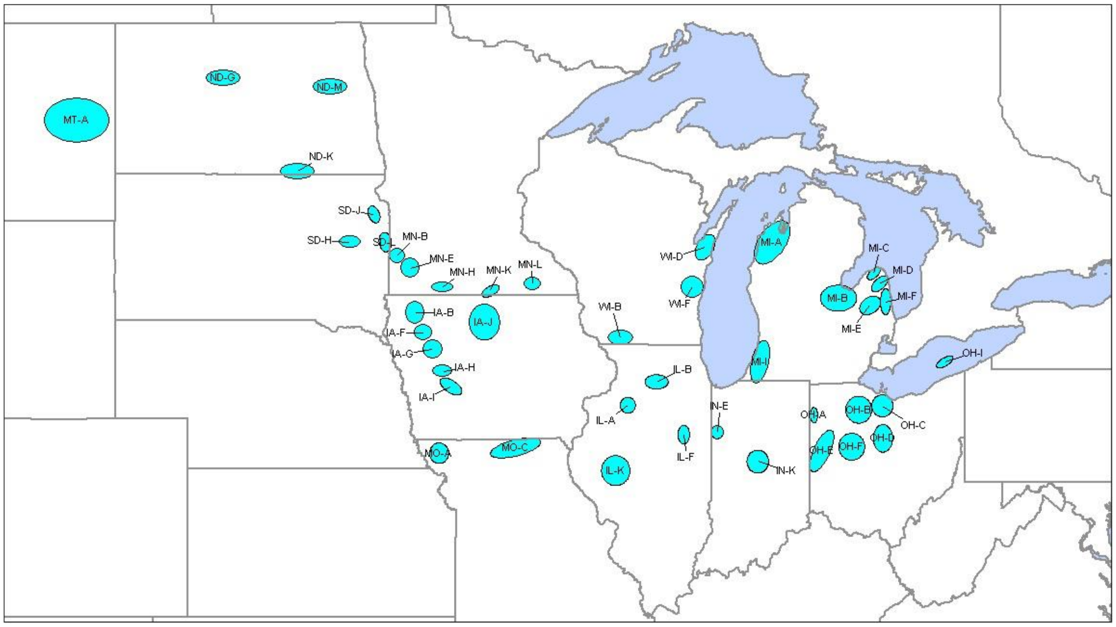
This analysis then led to a grouping of the sites into zones that were then analyzed as single units for their weighted capacity and variability, as well as their distance from load and other infrastructure.

As MISO was analyzing wind data and creating what would become zones, MISO was also calculating how much wind development would be needed to meet the states' renewable energy goals. But, like many things, the actual goal (roughly 22,000 MW of needed renewable capacity for the MISO footprint) is not a single number. Rather, for effective planning, MISO had to consider a range of assumptions and therefore a range of possible capacity needs. Critical assumptions included the location of selected energy zones, how many zones were to be selected, the amount of generation developed in each selected zone and the type and capabilities of the technology used, *i.e.*, size and nature of wind turbines. For example, each zone had a different wind capacity rating, from relatively low 20% to relatively high 43% wind capacity ratings. Thus, more projects of high-capacity turbines in high-capacity zones yielded significantly more energy than fewer, lower capacity turbines in low-capacity zones. MISO then analyzed an array of scenarios using multiple changes to these and many others to develop a range of scenarios that met both the state aggregate and individual goals.

Based on the number of interconnection requests and various state renewable energy goals, and using one set of assumptions, MISO estimated approximately 15,000 MW of new renewables would be needed to meet the goals of Minnesota, Wisconsin, Illinois, and Iowa, and another 7,000 MW for the remaining states in the footprint. The modeling showed that if the system wind capacity factor is 30%, then 15,788 MW of wind was needed to meet the state policy goals. However, if the system wind capacity factor was changed to say 43%, then only 11,015 MW of wind would be needed. Thus, the range of capacity and associated generation investment needed by 2027 could vary by almost 5,000 MW.

Here is an example of what an early wind zone scenario map looked like:

All Zones



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5

By this time, the UMTDI was formed and MISO was able to start reviewing these scenario results with that group of governors' staff and utility regulators and feed the UMTDI preferences back into the RGOS analysis to narrow the scenarios. UMTDI and RGOS developed a symbiotic relationship as RGOS analyzed the data and UMTDI asked how various scenarios affected the region and their respective five states. Through this symbiosis a coalescence occurred as the wind zones were identified, reviewed, and ultimately the "best" ones were selected by the states through the UMTDI, by the Midwest Governors' Association, and individual state governors. For example, the possible zones in Montana and Lake Erie were deemed unsuitable by UMTDI.

From Zones to Wires
Once candidate clean energy zones were identified, the next step was to group those zones into various "system of wires" scenarios, all having different costs and benefits associated with them, so MISO could model the variables and different alternative scenarios, *i.e.*, collection of zones, and quantify their costs and benefits for comparative purposes. The scenario variables included cost per mile of transmission, costs of wind installation per megawatt hour produced, the voltage of wires, 345kV vs. 500kV vs. 765kV, double or single circuits, greenfield routes vs. using current right-of-ways, etc.

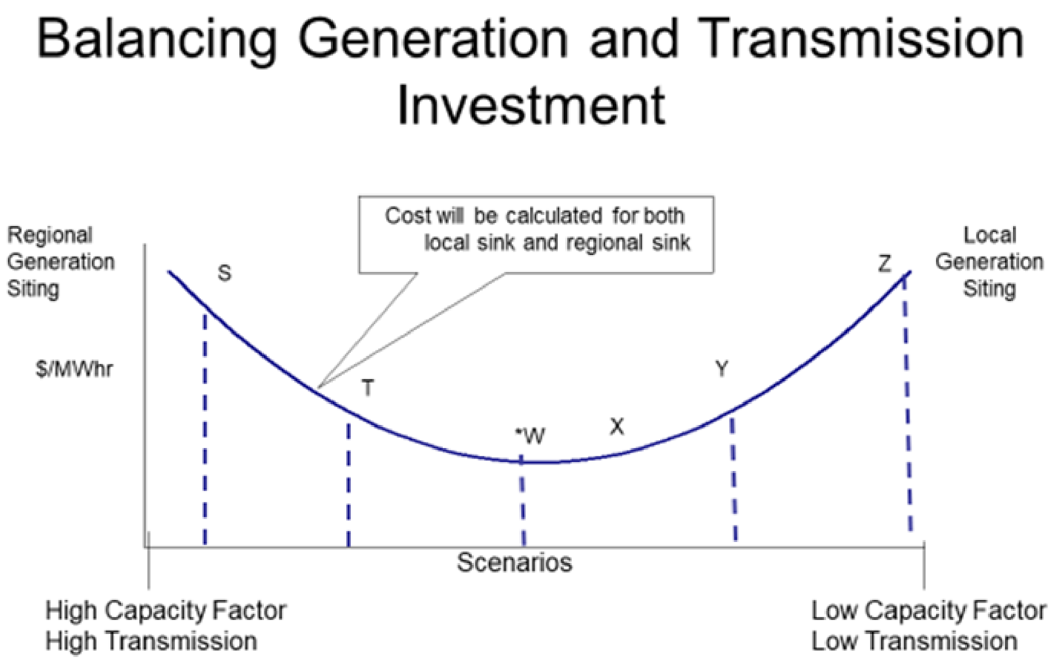
To help with this analysis, in December 2008, MISO formed a Transmission Design team of transmission planning professionals that included experts from Xcel Energy, Otter Tail Power, Great River Energy, Commonwealth Edison, Minnesota Power, American Transmission Company, International Transmission Company, Ameren, Missouri River Energy Services, and MidAmerican Energy. This group met in January 2009 to develop indicative costs for various transmission strategies using combinations of the candidate wind zones to meet the footprint's wind needs. After some preliminary review, MISO and the team decided to focus on three transmission expansion scenarios that emerged as dominant options: (1) a native voltage approach limiting transmission expansion to current infrastructure voltage levels; (2) a 765 kV approach, which allowed for expansion of the 765 kV grid in the MISO footprint; and (3) a native voltage with direct current transmission approach, which relied on technology enabling deliverability across long distances by employing direct current transmission. All solutions were developed with the intent to deliver wind energy to the market while maintaining a reliable transmission system based on NERC reliability standards. As discussed below, ultimately, for various reasons, the "native voltage" scenario became the preferred approach and was advanced.

Least Cost Delivered Electricity

The next question was how to evaluate and then select among the various transmission expansion scenarios. This meant balancing the generation vs. transmission trade-offs, as well as the local economic development desires with access to the region's best wind locations.

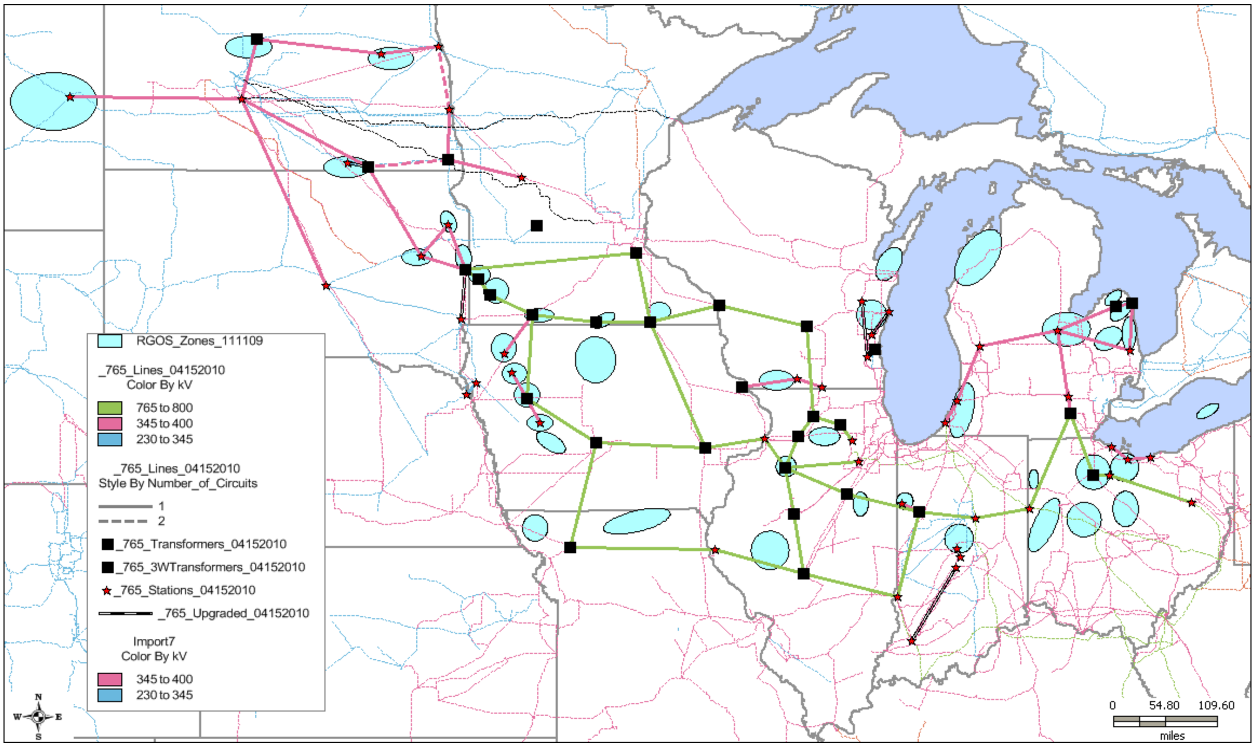
Two key variables in the cost calculations were the capital costs of the new renewable generation and the transmission necessary to interconnect that generation. These calculations showed there is a tradeoff between a lower transmission investment to deliver wind from low wind zones, typically closer to large load centers, and a larger transmission investment to deliver wind from higher wind availability areas, typically located further from load centers. As MISO analyzed the different scenarios, *i.e.*, differing grouping of zones and transmission line configurations, the analysis showed siting wind zones in a dispersed manner throughout the MISO footprint resulted in a set of wind zones that optimized the overall system costs. Experience also suggested that dispersed renewable generation was more easily integrated into the market and used reliably to the maximum extent possible. As depicted below in the transmission versus generation balancing cost curve, the data showed that placing the bulk of the wind zones in the highest capacity factor areas (minimizing turbines and generation costs but requiring more investment in transmission) or placing the wind zones close to load centers (which places turbines in areas with low-capacity factor thus high generation costs but low transmission costs) are both high-cost scenarios. A blend of energy zones yielded the lowest delivered cost of energy.

In short, the process was very iterative as zones were fine-tuned for their wind producing capabilities, the policy and regional balance, transmission system costs and benefits. Finally, it cannot be understated that the existing infrastructure, such as transmission and natural gas pipelines, also influenced the flexibility and effectiveness of the zones. So, even though the zones were created to serve the renewable generation mandates, they could be used for a variety of different generation types to serve various futures and generation policies. This flexibility is consistent with MISO's technology agnostic "no regrets" philosophy as well as its multiple future scenario planning principles.



Given the public policy (and political) implications of this kind of cost decision, UMTDI became an invaluable forum to address the issue. This discussion went beyond just the engineering and economic analysis that MISO was doing to include policy, regulatory and even political aspects. After deliberating and seeking additional analytical information from MISO, the UMTDI agreed that the best way to proceed was to optimize the region's energy costs and not to optimize any specific project, state, or subregion of states. This regional optimization approach became known as the "least cost of delivered energy," and guided all the subsequent decisions on which zones to select, the balance between generation and transmission, the size of transmission considered and ultimately types of projects recommended for approval. With that guidance in hand, the members of UMTDI negotiated with each other on the placement of the wind zones and transmission expansion designs that met the economic and policy drivers of all five states.

Here is one of the many early scenario pictures of the zones and wires MISO analyzed:



Differences Between RGOS I and RGOS II

As the UMTDI and RGOS efforts successfully moved forward, the other states in the MISO footprint (IL, IN, MI MO, & OH), were also developing their own renewable goals and sought to participate--not in UMTDI--but in the RGOS, so MISO expanded that effort and christened it RGOS II and followed much same path:

- Identify the range of incremental additional energy and capacity needed to meet the additional state renewable goals;
- Study the respective states' wind regimes & identify the possible wind sites; and,
- Combine those sites into zones and analyze possible transmission needs to connect those zones to the grid, while determining which zones to avoid and pursue for on-the-ground, non-quantitative reasons.

While there are some similarities between the RGOS I and II states, there are also some significant differences: The RGOS I states have favorable wind resources that they wanted to export, are contiguous, have overlapping utilities and a history of working together through the old Mid-Continent Area Power Pool (MAPP). In addition, there are only a few dominant utilities and lots of cooperatives and municipals in the area. The RGOS I states were part of UMTDI and had a built-in forum to address the often touchy political, policy and regulatory issues that come up during the analysis and planning process. This allowed MISO to remain in a more analytical and administrative support role.

Conversely, the RGOS II states had different characteristics: Their wind resources were more limited, they had larger, more consolidated populations, they were dominated by large Investor Owned Utilities (IOUs), and the distance from generation to load was shorter, so their transmission constraints were caused by a different set of problems. Finally, RGOS II states and their important stakeholders had little history of working together.

IV. Cost Allocation

Up until now this paper has focused on the transmission planning aspect of the MVP story, but cost allocation, or who pays for the transmission projects developed by the UMTDI and RGOS effort is another and arguably a bigger and more intractable aspect of the MVP story. This issue can easily get complicated and convoluted, so what follows is a very rough summary of the processes and discussion around cost allocation.

A Deadline Is Set: July 15, 2010.
In the mid-2000's it became clear that there were two related but severable cost allocation problems. One problem was the very specific 50-50 interconnection cost allocation problem mentioned earlier, where the applicable MISO transmission tariff allocated 50% of the network upgrade costs to the Interconnection Customer and the remaining 50% to the local load zone even if the entire purpose of the upgrades and the electricity generated was for customers in other load zones. This was creating some very concrete and unacceptable problems for certain MISO members.

The other problem was that MISO had limited cost allocation models in its tariff at that time. There was a cost allocation method for Baseline Reliability Projects or "RECB I" projects and one for certain types of economic projects that also have some regional benefits, referred to as Regionally Beneficial Projects or "RECB II projects" (subsequently called Market Efficiency Projects). However, there was no accepted cost allocation method for projects that would have both reliability and economic benefits and were primarily designed to help states meet their public policy goals. This issue was highlighted by Organization of MISO States (OMS) in a filing to FERC where it stated:

> *The current criteria and cost allocation for the two [RECB] categories of reliability and economic transmission projects do not sufficiently address the growing need for a new type of project needed to address documented public policy mandates or laws passed by the Midwestern state governments, and current and potential changes from the federal area*.

MISO and its members decided to break these two problems apart. On July 9, 2009, MISO filed with FERC the first of what became a two-phase transmission cost allocation approach. Phase I, as the July 9, 2009, filing was called, addressed the 50-50 interconnection issue by revising the costs of network upgrades for generation interconnection projects in a more equitable manner. In that filing, MISO told FERC that it would continue to work with its members and stakeholders on Phase II and develop a tariff for a new category of cost sharing for transmission projects driven primarily by the need to integrate large quantities of remote generation resources. On October 23, 2009, FERC conditionally accepted the Phase I filing and set July 15, 2010, as a deadline of for MISO to make the Phase II filing.

There was now a deadline for a cost allocation tariff.

Regional Expansion Criteria and Benefits (RECB) Task Force
The *Regional Expansion Criteria and Benefits* (RECB) Task Force, led by stakeholders with input from a MISO liaison and technical contributors, is the principal forum for stakeholders to discuss existing or proposed criteria and cost allocation policies for transmission projects that have regional and interregional cost and benefits. It was through RECB that MISO developed the Phase I (50-50 interconnection costs) filing and where the discussions for Phase II were underway. RECB used four principles to guide the analysis--

- Eliminate/Minimize Free Riders: The transmission cost allocation methodology should allocate the costs of lumpy transmission upgrades to all present and future beneficiaries from those upgrades.
- Ensure the “Right” Loads Pay: The cost of transmission upgrades should be borne by the loads benefiting from those investments even if they are remote from the transmission investment and/or affected generation.
- Reflect Changing System Usage Over Time: The cost allocation should be able to change over time to reflect changes over time in those who benefit from the investments.
- Balance Attributes of System Use: The cost allocation should strike a balance among alternative methods for assigning costs:
    - The direct causer of a transmission project vs. all beneficiaries.
    - Local vs. regional beneficiaries of the transmission project.
    - Transmission to meet reliability needs vs. to reduce the cost of energy or to meet environmental goals.

Cost Allocation and Regional Planning (CARP)
Given the crucial role that the states have in transmission planning and cost recovery, the Organization of MISO States (OMS) felt that the states could provide leadership and help resolve the logjam around cost allocation among MISO stakeholders, without bias toward or against any other stakeholder. Accordingly, in October 2008, spurred by the governors UMTDI creation the month before, the OMS Board decided to take a proactive role and launch its own parallel cost allocation initiative dubbed *Cost Allocation and Regional Planning* (CARP). OMS did not mean for CARP to supplant the work of RECB. In fact, CARP and the RECB Task Force also developed a symbiotic relationship. The two groups had common leadership during CARP’s existence and ideas were shared freely between the two groups.

Led by Wisconsin Commissioner and OMS president Lauren Azar, between January 2009 and June 2010, CARP became the forum to educate state regulators, to debate options for cost allocation, to formulate concepts, and to discuss proposals that could be injected back into RECB and other MISO stakeholder processes. CARP held 20 two-day meetings of commissioners, commission staff and OMS staff. Each state was represented by a state commissioner, typically the state's OMS Board member, and by state staff. These in-person meetings were held at various locations around the MISO region, with stakeholders permitted to observe either in person or telephonically.

CARP began its journey by bringing the participants to a common level of understanding on the current state of transmission planning and cost allocation. CARP participants studied topics like modeling, forecasting, future scenarios, and model inputs through readings and tutorials provided by MISO staff, FERC, Regulatory Assistance Project (RAP), Department of Energy (DOE), commissioners from outside the MISO region, academics, and consultants. MISO explained how its tariff allocated costs for different types of projects and how money flowed in their application. State representatives shared their views on the outcomes of cost allocation, as well as their state's policy and economic visions. CARP's goal was for its membership to become conversant in the practices of planning and modeling to support their discussion of cost allocation, not to become engineers themselves. CARP members were also briefed on filing rights, discussed whether states or OMS should pursue filing rights, and other legal issues related to filing a new cost allocation methodology. Commissioners came away from these rigorous meetings with a deeper understanding of the topics addressed, preparing them for the cost allocation debate but also making them better informed decision makers on these issues at home. As with UMTDI, CARP created a forum where these priorities could be articulated and compared.

Once the July 2010 filing deadline was set, CARP focused its attention directly on crafting an acceptable cost allocation methodology.

Cost Allocation Options

CARP and the RECB Task Force each considered several cost allocation methodologies:

1. The *"Injection-Withdrawal"* method, where the transmission builder would recover the investment in new transmission from the generators who "inject" power onto the grid, as well as from load who "withdraw" power from the grid.
2. The *"Tehachapi"* cost allocation model used by the California ISO, which allows developers to recover construction costs up front for transmission lines that are deemed to have system benefits. Going forward, generators using the line would pay a pro rata share of the facility's cost.
3. The *"SPP Balanced Portfolio Approach,"* an effort to develop a group of economic transmission upgrades that benefit the entire SPP region and to allocate those project costs regionally.

4. The *"SPP Highway-Byway*" methodology used in the Southwest Power Pool (SPP), which allocates costs for future transmission facilities based on the voltage level of the specific facility:
    a. For high voltage transmission 300 kV and above--100% of their costs allocated to electric utilities' load across SPP's entire system based on their historic use of the region's transmission system;
    b. For transmission projects above 100 kV and below 300 kV--one-third (1/3) of their costs allocated across the entire SPP region and 2/3 allocated to the utilities in the local zone the project is in; and
    c. For transmission projects 100 kV and below--100% of their costs allocated to utilities in local zone the project is located in.
5. The *"Postage Stamp*" cost allocation method where eligible costs are shared across the footprint.

The Courts Weigh in on Sharing of Transmission Costs
The CARP/MISO/RECB effort was not happening in a vacuum. On August 6, 2009, the Seventh Circuit issued their opinion in *Illinois Commerce Commission v. FERC.* In that case, Illinois challenged the FERC-approved method of allocating new transmission costs in PJM. In its opinion the 7th Circuit famously stated

> *We do not suggest that the Commission has to calculate benefits to the last penny, or for that matter to the last million or ten million or perhaps hundred million dollars….If it cannot quantify the benefits to the midwestern utilities from new 500 kV lines in the East, even though it does so for 345 kV lines, but it has an articulable and plausible reason to believe that the benefits are at least roughly commensurate with those utilities' share of total electricity sales in PJM's region, then fine; the Commission can approve PJM's proposed pricing scheme on that basis. For that matter it can presume that new transmission lines benefit the entire network by reducing the likelihood or severity of outages*.

Hence the mandate that benefits and costs be "roughly commensurate" became a clear and necessary element of any proposed new cost allocation methodology.

From Studying to Decisions.
There were difficult decisions with competing interests, so there was considerable disagreement among the members of both CARP and the RECB Task Force. These differences could have bogged down the CARP effort, but CARP decided to take many "advisory" votes on various topics to see where members' positions stood. If votes were clearly one way or another then they set the path accordingly. This advisory voting approach prevented issues with little support from slowing or distracting the group from moving forward. Issues voted on included possible levels of charges to generation vs. load, regional vs. sub-regional charges, through and out charges,

project eligibility for cost sharing, market implications of methodologies, the benefits/implications of cost allocation models on generator interconnection, and DC lines.

The question of allocating costs between generators and load and how much to each was very divisive. The RECB Task Force was nearly evenly divided, with some favoring the injection-withdrawal model and others the highway-byway model. Given the even split RECB decided to send the question of how MISO stakeholders should go forward to the MISO's Advisory Committee (AC). On a vote of 16.5-5.5, the AC recommended that MISO fully analyze both models. The issue was not as divisive in CARP. In early 2010, most CARP states favored the injection-withdrawal method because they felt that generators should (a) bear some of the cost of a transmission system build out and (b) needed a price signal for more optimal siting of their generating resources. CARP asked MISO to begin developing a draft tariff based on that model. The RECB Task Force was heading in the same direction, and it became the MISO Advisory Committee "Hot Topic" discussion on "Cost Allocation – Wind Integration" held on February 17, 2010.

March-April 2010--Competing Options

During March-April 2010, there were at least four cost allocation variations being discussed. One was the injection-withdrawal methodology straw proposal that CARP expressed interest in. This approach was presented to the RECB Task Force at the March 22-23, 2010, meeting. Another was also a proposal called "Injection/Withdrawal Lite," which included using injection/withdrawal for the regional Extra-High Voltage (EHV) transmission system (345kV and up), while refining the RECB I and RECB II methods for the non-regional EHV system and creating a new generation interconnection formula. A third variation was a newer/revised CARP proposal where both generators and load pay for new transmission. This method was not favored by all states, but a strong majority voted to approve that methodology. Fourth, a group of Transmission Owners (TO) developed and presented their own proposal to the RECB Task Force at the March 22-23, 2010, meeting. This TO Proposal recommended a method to recover qualifying project costs by charging 0% to generators and 100% to load on a postage stamp basis for the cost of "Unique Purpose Projects" (UPPs), with generation interconnection costs allocated 100% to generators.

On April 21, 2010, CARP voted to adopt yet another cost allocation methodology based on the TO Proposal, but with some modifications that added charges to generators. The New CARP proposal recommended charging 80% of interconnection costs to load on a postage stamp basis and 20% of costs to generators. Costs to generators included new and existing generators. Generator interconnections would be "higher of" as specified in the MISO straw injection-withdrawal proposal. RECB I Baseline Reliability Projects would continue to be paid for as is. This proposal was supported by 10 of the 13 states.

In late April 2010, the RECB Task Force considered all proposals. Each methodology was described, and members had the opportunity to propose amendments to each. All methodologies and amendments that were moved and seconded by Task Force members and were subjected to a vote, which was tallied by MISO.

At its May 19, 2010, meeting, the MISO Advisory Committee (AC) considered and took action on three motions relating to alternative RECB cost allocation methodologies that had previously been discussed:

> *In the first motion, the AC considered a MISO developed proposal, key elements of which included: (i) MVPs with 20% of the cost of the MVPs allocated to Generators through a demand-based charge and 80% allocated to Load through an Energy-based charge; and (ii) the continuation of the existing generator interconnection cost allocation approved by the Commission in the October 23 Order.*
>
> *In the second motion, the AC considered a proposed methodology supported by CARP, key elements of which included: (i) an allocation of the cost of "Unique Purpose Projects" ("UPPs") 20% to Generators through a demand-based charge and 80% to Load recovered through an Energy-based charge; and (ii) a "higher of" allocation of Generation interconnection charges.*
>
> *Neither of these motions was adopted.*
>
> *Finally, the AC considered a third proposal that was supported by a group of transmission owners (the "Supporting Transmission Owners), key elements of which included: (i) an allocation of the cost of the UPPs 100% to Load through a demand-based charge; and (ii) the modification of the existing generator interconnection cost allocation approved by the Commission in the October 23 Order to expand the regional cost sharing of facilities at voltages of 345 kV or higher to 20%.*
>
> *This motion was adopted.*

Based on the results of the voting and on qualitative feedback, at the June 10, 2010, RECB meeting, MISO offered yet another methodology. The new MISO proposal combined components from the CARP model and the TO proposal. MISO's updated straw version proposed to recover qualifying new transmission costs through a system-wide usage rate applied to load and an access rate applied to generators. Under this methodology, 80% of MVP transmission facility costs would be recovered from load and exports and 20% would be recovered from generators and imports. In addition, 10% of GIP Network Upgrade costs for projects 345 kV or above would be allocated and recovered systemwide. The remaining costs would be paid for by the interconnecting generator.

By this time, MISO had concluded that a postage stamp cost allocation methodology would not only be administratively simpler than the alternatives being discussed but could also work to everyone's benefit if a package of lines could be put forward to provide benefit roughly commensurate with costs (consistent with the Seventh Circuit opinion in *Illinois Commerce Commission v. FERC).* It was in this straw proposal that the term "multi-value project" was used (arguably as a better alternative to the TO's "Unique Purpose Projects" (UPPs)).

On June 22, 2010, after listening to the stakeholders, considering many often-competing options, and considering the pros and cons of multiple alternatives MISO presented its final cost allocation proposal. This MISO final proposal contained many elements of the other proposals. However, a notable difference was MISO's final MVP proposal allocated all project costs to load while CARP proposed allocating 20% of project costs to generators. MISO allocated 100% of MVP transmission costs to load and exports based on its evaluation of potential market efficiency impacts, related seams issues, stakeholder comments, and an external consultant's evaluation of the initial version of the MVP approach. On July 15, 2010, MISO filed this version of the MVP tariff with FERC, and on December 16, 2010, FERC conditionally accepted the proposed tariff (*See* ER10-1791-000).

V. The Rest of the Story… July 2010 to December 2011 and Beyond

On December 8, 2011, guided by their planning principles, the criteria in the approved MVP tariff, and a solid business case, the MISO Board of Directors approved a package of 17 MVP projects[5] with an estimated investment cost of over $5B. Ten years later, 16 of the 17 projects are in service while the final project continues to pursue state permits.

Like everything else with this story, getting from the tariff filing on July 15, 2010, to the MISO Board of Directors' approval on Dec. 8, 2011, and from there to the construction and energization of the lines had its own twists and turns. The complexity of the tariff meant that many details needed to be worked out for individual projects. This included questions on how to implement the tariff and given the compromises that were made and differences of opinions there were several legal and regulatory challenges as described below.

First, there was the issue of making sure the proposed transmission projects could meet MISO's guiding principles and the criteria in the MVP tariff, which states:

> 1. A Multi-Value Project must be evaluated as part of a Portfolio of projects, as designated in the transmission expansion planning process, whose benefits are spread broadly across the footprint.
>
> 2. A Multi-Value Project must meet one of the three criteria outlined below:

[5] MISO's most recent summary of the MVP projects, their construction costs, and initial costs reported by the developers may be found in Appendix B.

a. Criterion 1. A Multi-Value Project must be developed through the transmission expansion planning process for the purpose of enabling the Transmission System to reliably and economically deliver energy in support of documented energy policy mandates or laws that have been enacted or adopted through state or federal legislation or regulatory requirement that directly or indirectly govern the minimum or maximum amount of energy that can be generated by specific types of generation. The MVP must be shown to enable the transmission system to deliver such energy in a manner that is more reliable and/or more economic than it otherwise would be without the transmission upgrade.

b. Criterion 2. A Multi-Value Project must provide multiple types of economic value across multiple pricing zones with a Total MVP Benefit-to Cost ratio of 1.0 or higher where the Total MVP Benefit -to-Cost ratio is described in Section II.C.7 of this Attachment FF. The reduction of production costs and the associated reduction of LMPs resulting from a transmission congestion relief project are not additive and are considered a single type of economic value.

c. Criterion 3. A Multi-Value Project must address at least one Transmission Issue associated with a projected violation of a NERC or Regional Entity standard and at least one economic-based Transmission Issue that provides economic value across multiple pricing zones. The project must generate total financially quantifiable benefits, including quantifiable reliability benefits, in excess of the total project costs based on the definition of financial benefits and Project Costs provided in Section II.C.7 of Attachment FF.

Then the projects also had to meet MISO's planning principles:

- A robust business case for the plan.
- Increased consensus around regional energy policies.
- A regional tariff matching who benefits with who pays over time.
- Cost recovery mechanisms to reduce financial risk.

THE BUSINESS CASE—
A sound business case for each MVP project was needed:

1) For MISO approval,
2) For the transmission owners to gain the internal approvals from their boards,
3) To secure state regulatory approvals, and,
4) To the attract capital required to finance the projects.

When developing the positive business case for the proposed MVP portfolio projects, MISO considered a number of future policy and economic variables. The most critical variables considered were future energy policies as espoused by the state renewable energy goals as well as demand and energy growth assumptions. MISO also considered potential national policies, such as a legislated cost of carbon (like a carbon tax) or national renewable energy mandate, as well as variations in natural gas prices and wind turbine costs. Consistent with MISO's traditional planning analysis, ranges of options were developed for each of these variables and sensitivities were run to those most significant and most important to determine the "no regrets" outcomes, where the benefits of the portfolio would not depend upon the implementation of any individual future energy policy to exceed the portfolio costs.

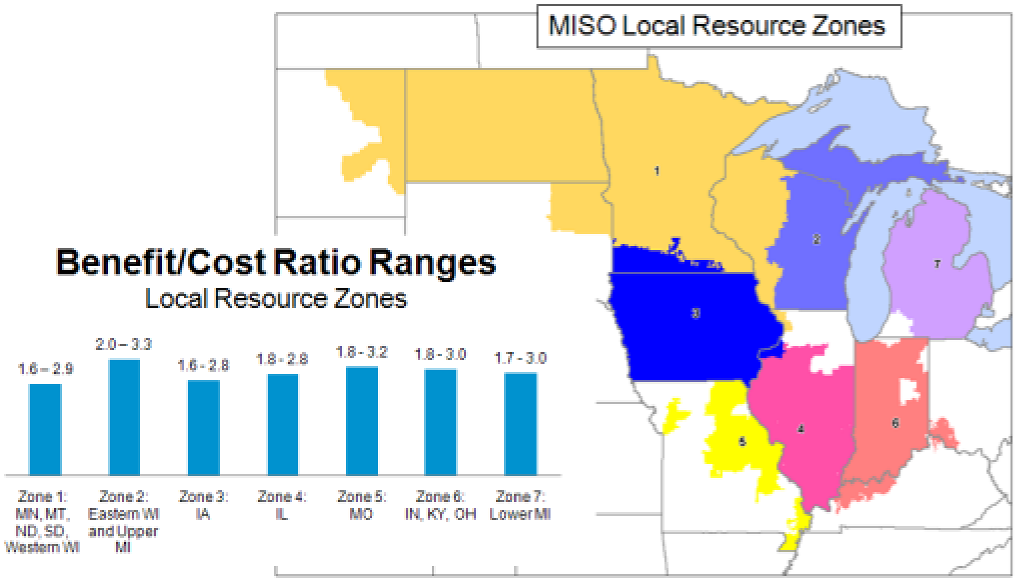
The MISO 2012 analysis of the MVP portfolio concluded that the economic benefits of proposed portfolio will provide an average annual value of $1,279 million over the first 40 years of service, at an average annual revenue requirement of $624 million providing a benefit to cost ratio ranging from 1.8 to 3.0, under all scenarios studied. Increasing regional reliability as well as resolving reliability violations and enabling 41 million MWh of wind energy per year helping states meet their renewable energy mandates and goals. (See MISO's *Multi-Value Project Portfolio Results and Analyses*, January 10, 2012).

The MVP business case was re-affirmed in 2014 when MISO concluded the MVP Portfolio:

- Provide[d] benefits in excess of its costs, with its benefit-to-cost ratio ranging from 2.6 to 3.9; an increase from the 1.8 to 3.0 range calculated in MTEP11
- Create[d] $13.1 to $49.6 billion in net benefits over the next 20 to 40 years, an increase of approximately 50 percent from MTEP11
- Enable[d] 43 million MWh of wind energy to meet renewable energy mandates and goals through year 2028, an additional 2 million MWh from the MTEP11 year 2026 forecast

(see *MTEP14 MVP Triennial Review A 2014 review of the public policy, economic, and qualitative benefits of the Multi-Value Project Portfolio* September 2014).

On a zonal basis, the benefit to cost ratio was projected to be 1.6 or greater across the footprint, consistent with FERC's expectation that benefits be roughly commensurate with costs, as illustrated below:



The benefits of the MVP portfolio are restudied regularly, as required by the MISO tariff. The 2019 "MTEP19 Limited Review" study showed the benefit/cost ratio of the MVP portfolio to be 1.8-3.1, firmly within the range projected in 2011.

Although the proposed MVP portfolio was primarily evaluated on its ability to reliably deliver energy required by the state renewable energy mandates, the portfolio was also projected to provide value under a variety of different generation policies, as the location of the energy zones would support multiple generation fuel types. Carbon emissions were projected to be reduced with the MVP portfolio due the anticipated shifts in generation technologies and facilitated bulk transfer of wind generated electricity across the MISO footprint. Further, the MVP portfolio would lead to increased system robustness allowing the transmission system to reduce the likelihood of, and more quickly recover from, a blackout or similar event. The proposed MVP portfolio creates a more robust regional transmission system, which decreases the likelihood of future blackouts by strengthening the overall transmission system by decreasing the impacts of transmission outages, increasing access to additional generation under contingent events, and enabling additional transfers of energy across the system during severe conditions.

State permits are required for construction of energy facilities. The nature of the permits, the body granting permits, the process of securing permits, and the time required varies from state to state. A showing of need that assures the public that the cost of a transmission project is in the public interest is common. Proceedings examining the route of a transmission project are also common. The elements of the business case briefly summarized above are important components of state permit applications. Hurdles to permitting can include disagreements about a project's support of state statute or policy, differences about cost effective achievement of policy, and statutes or rules that limit the state review to impacts within its borders when the regionally beneficial transmission described here is of broad importance.

FERC's mandate that the cost of transmission be roughly commensurate with benefits has also been a source of consternation. Some states would have preferred that MVP lines be evaluated individually rather than as a portfolio when assessing compliance with the FERC directive. This contention was adjudicated and FERC's approval of the MVP package of lines was upheld in federal court as described next.

Regulatory & Legal Challenges

Multiple parties submitted timely requests for rehearing and clarification of FERC's MVP Order. In their October 21, 2011, order, FERC denied in part and granted in part the requests for rehearing and clarification and conditionally accepted MISO's compliance filing, subject to a further compliance filing.

On June 7, 2013, the U.S. Court of Appeals for the Seventh Circuit upheld the MISO's MVP cost allocation for new transmission projects in *Illinois Commerce Commission v. FERC*, Case Nos. 11-3421 *et al*. Writing for the court, Judge Richard Posner rejected challenges to FERC's orders accepting the MISO-wide allocation of MVP costs to load, including arguments that MVP charges were not distributed commensurate with expected benefits and arguments that generators should bear a share of the costs. In reaching this decision, the court questioned the constitutionality of state renewable portfolio standards that treat in-state and out-of-state renewable generation differently. On one issue, the court disagreed with FERC. The court vacated and remanded FERC's disapproval of MISO's proposal to allocate a share of MVP costs to power exported to PJM.

VI. Ingredients of MVP Success

The MVP process successfully married public policy with regional transmission planning through a complex, intertwined, and iterative process of collaboration and compromise among MISO, governors, state utility regulators, the MISO Transmission Owners and stakeholders. In hindsight, the MVP Transmission story has a sense of inevitability about it. Yet, at the time there was great uncertainty of its success and at its beginning no one really knew what success would look like. It is a complicated story with many ingredients mixing into a successful outcome. Here are the ones we feel were most important:

Key Ingredient #1. Have a problem that everyone recognizes needs solving. Transmission constraints were a growing problem starting in the early 2000's but it didn't become "completely obvious to everyone" until the mid- to late-2000's when it got gubernatorial attention. Thus, the issue moved forward once it turned from "do we need more transmission" to "how do we get more transmission?"

Key Ingredient #2. Have governors engage. A bipartisan set of midwestern governors (Governors Hoven (ND-R), Rounds (SD-R), Granholm (MI-D) and Pawlenty (MN-R) in particular) played an essential and catalytic role in the MVP Story. They helped identify the problems, added urgency to efforts, gave political cover (and pressure) to overcome objections, and they not only directed but empowered their regulators to act.

Key Ingredient # 3. Have a deadline. FERC-set a deadline of July 15, 2010, for MISO to file a tariff for a new category of cost sharing for transmission projects driven primarily by public policies. Everything worked backwards from there. Everyone knew MISO had to file something to meet the FERC deadline. That kept the pressure on and created time constraints forcing the participants to avoid getting bogged down and adopt mechanisms (like CARP's advisory votes) to clear away little supported ideas.

Key Ingredient #4. Develop momentum and keep moving forward. While the governors created front-end urgency and FERC set a backend deadline, transmission planning still takes time. Time for the need to become obvious, time to develop a planning process, and time to go through the process and inclusively sort through the solution options, and then time to implement those solutions (including going through each states' regulatory approval processes). Speeding through or rushing the process, short-cutting or ignoring steps was unlikely to result in success. So, the key was not speed, rather it was momentum; the UMTDI/RGOS and the RECB/CARP processes kept moving forward. In the MVP context this momentum was aided by the gubernatorial directive but also the iterative process pursued by the MVP participants; from the CapX2020 utilities coming together to start transmission development work, to determining the top wind areas, to narrowing and grouping of those areas into zones of the RGOS, to UMTDI's role in weeding those zones to the best ones for respective states and helping identify the transmission lines to connect those zones to the current grid, and then CARP and RECB developing a plan for paying for those lines all leading to MISO's filing of the MVP tariff…the effort could have stalled at any of these spots (and countless other spots) but the momentum that started in 2005 and took shape in 2008 never stalled through the filing on July 15, 2010 and MISO Board approval in December 2011.

Key Ingredient #5. State Regulators: Deciders & Decisions. Although there were many stakeholders and participants in the MVP Transmission process, and certainly MISO was the final decisionmaker in filing of the MVP cost allocation tariff with FERC, primary decision-makers along the way were the utility regulators. In both the UMTDI and CARP settings it was state regulators that assumed leadership, gathered input, and made decisions. The state utility regulators as individuals and collectively were directed by their governors to "solve the problem." And they effectively and efficiently assumed the mantle. They worked with MISO, sought input, both formally and informally from stakeholders but they were the only ones in the room when the final decisions were made. Decisions were made unanimously as they sought to find the highest common denominators that served not only their respective state and its stakeholders but also the region as a whole.

Key Ingredient #6. A Flexible & Inclusive Process. The MVP Process gathered diverse perspectives but there were tough decisions to be made requiring delicate balancing of competing interests. So, while the process was inclusive of ideas and perspectives it was intolerant to objections: any participant could put any idea on the table for consideration, but no one could take an idea off the table until it had been evaluated, analyzed, assessed, and discussed by the group. This approach assured openness and transparency.

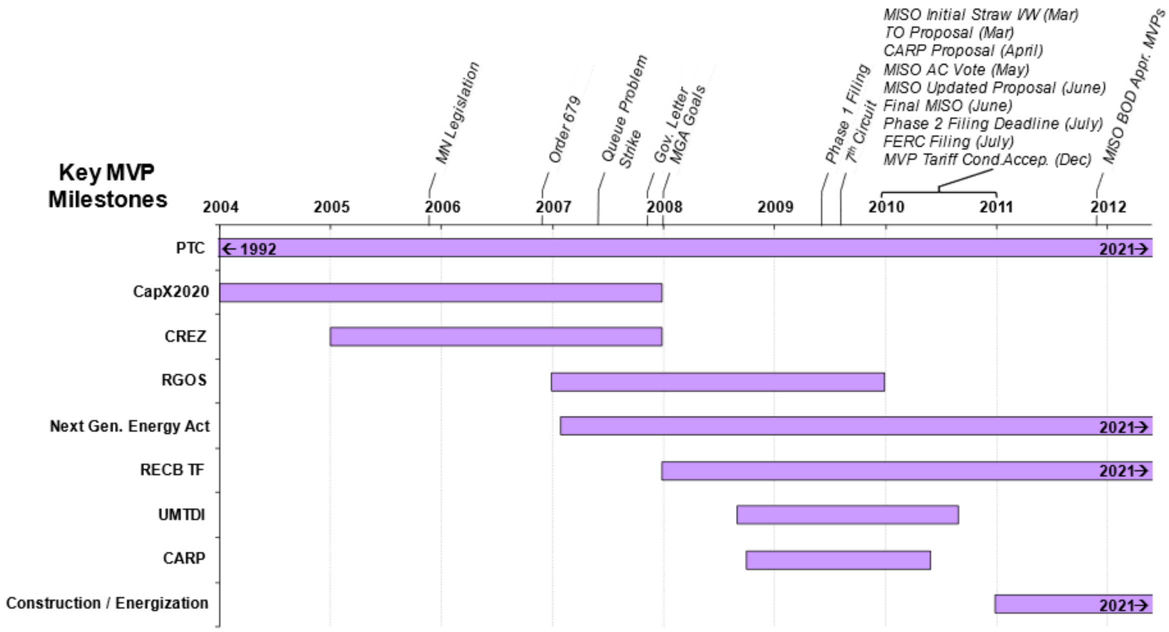
Key Ingredient #7…It's Not About the Money; It's About the Money. Who pays for what is clearly a centering question that came into play in the MVP transmission story in two ways. First, and most obviously in the cost allocation debates. But the second was just as important: the use of the "lowest cost of delivered energy" analytical touchstone. The MVP conversation did not focus on the cheapest or lowest cost transmission project or even set of projects, rather the discussion was on which set of energy zones and transmission projects produced the lowest cost of electricity delivered throughout the states (or MISO footprint). Thus, the MVP projects were recognized not only for their individual cost-benefit economics but for how they worked together as a portfolio to lower the total costs in aggregate. This was critical to the final business case analysis, facilitated the cost allocation decisions and soothed potential political opposition to the estimated $5+ billion price tag that the portfolio of transmission carried.

Key Ingredient #8. Think Regionally. From the beginning the MVP transmission story was bigger than one transmission line, one electric company, one renewable energy developer or one state. It was seen as a regional issue that needed a regional solution. By thinking regionally, the MVP participants were expanding the options to make sure everyone benefits. While the desires of each state's policies required accommodations the goal was to accommodate them within the regional context. The most obvious example of this was that every state had energy zones and then lines that connected those zones to the grid. The ramifications of this "think big and regional" decision was significant. It led to the development of multiple lines in every state, which MISO analyzed to ultimately create the portfolio of transmission that enabled each state to benefit and made the footprint more resilient.

Key Ingredient #9 "No Regrets." Whatever the final transmission projects selected might be, they all needed to not only meet the individual and collective state goals, be economic and enhance reliability, they needed to meet the high- and low-variations of those goals and fit all scenarios, so there would be "no-regrets" as to which future would occur.

Key Ingredient #10…Support from MISO. Perhaps the most important ingredient to the success of the MVP Transmission story is the assistance, communication and honest-broker roles played by MISO. MISO provided extensive analytical support to UMTDI and CARP. It also provided logistical and administrative assistance by convening meetings and covering some expenses. And, when requested, MISO assisted and supported regulators when briefing governors and other in-state stakeholders.

APPENDIX A
Key Dates in the MVP Transmission Development Process



- **2003-2007**
  - Wind developer interconnection requests grew significantly
  - 2004 *CapX2020* utilities group formed
  - 2005 Minnesota adopts regional transmission legislation
  - States throughout the Midwest start adopting renewable energy goals, standards & requirements
    - March 9, 2006, then-Minnesota Governor Tim Pawlenty in his State of the State Address set a goal that 25% of Minnesota's electricity should come from renewable resources by 2025.
    - February 22, 2007, Gov. Pawlenty signed the first part of what was called the "Next Generation Energy Act," which included specific language mandating the implementation of the "25 by 25" standard.
  - November 5, 2007, the governors of Illinois, Minnesota, Ohio, Wisconsin, Iowa, North Dakota, and South Dakota sent then MISO CEO Graham Edwards a letter expressing their "growing concerns over the crisis wind energy developers face today as a result of current [MISO] policies governing the interconnection of wind resources to the transmission grid."

- Nov. 7, 2007, the Midwestern Governors Association (MGA), in its *Energy Security and Climate Stewardship Platform*, set measurable renewable goals for the region.
- Texas adopts and starts implementing its *Competitive Renewable Energy Zones* (CREZ) program.
- 2007 MISO initiates the *Regional Generation Outlet Study* (RGOS)

- **2008-2009**
  - September 18, 2008, the governors of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin collectively announced the Upper Midwest Transmission Development Initiative (UMTDI)**.**
    - October 28, 2008, UMTDI asks stakeholders for input
    - September 2010 UMTDI issues its final report
  - Energy Zones & transmission project options in RGOS I & II.
  - Oct. 2008 OMS creates the *Cost Allocation and Regional Planning (CARP)* work group.
  - July 9, 2009, MISO filing addressed the 50-50 interconnection costs issue
  - August 6, 2009, the Seventh Circuit issued their opinion in *Illinois Commerce Commission v. FERC,* (*576 F.3d 470 (7th Cir. 2009))* ruling that "transmission benefits and costs be roughly commensurate" became a clear and necessary element of any proposed new cost allocation methodology.
  - October 23, 2009, FERC sets July 15, 2010, as deadline for MISO to file a tariff for a new category of cost sharing transmission projects driven primarily by the need to integrate large quantities of remote generation resources.

- **2009-2010**
  - March-April 2010, there were at least four cost allocation variations being discussed by CARP, RECB, and stakeholders.
  - July 15, 2010, MISO files MVP cost allocation tariff with FERC.
  - December 16, 2010, FERC conditionally accepted the MVP tariff.

- **2011 to Present**
  - December 8, 2011, the MISO Board of Directors approved a package of 17 MVP projects with an estimated investment cost of over $5B as part of the 2011 MISO Transmission Expansion Plan (MTEP 11).
  - June 7, 2013, the U.S. Court of Appeals for the Seventh Circuit upheld MISO's MVP cost allocation for new transmission projects.
  - The 2019 "MTEP19 Limited Review" study showed the benefit/cost ratio of the MVP portfolio to be 1.8-3.1, firmly within the range projected in 2011.
  - October 2021, 16 of the MVP 17 projects are in service.[6]

[6] The last line is still going through the regulatory review process in Wisconsin.

APPENDIX B
MISO MVP Portfolio Summary

MISO

Regionally Cost Allocated Project Reporting Analysis

2011 MVP Portfolio Analysis Report

MVP Project Status October 2021

MVP No.	Project Name	State	Estimated in Service Date[1]		Status		Cost[2]			Explanation[6]
			MTEP Approved	October 2021	State Regulatory Status	Construction	MTEP Approved[3]	MTEP Approved Dollars Adjusted to Estimated ISD[4]	October 2021[5]	
1	Big Stone - Brookings	SD	2017	2017	●	Complete	$227	$263	$123	
2	Brookings, SD - SE Twin Cities	MN/SD	2011-2015	2013-2015	●	Complete	$738	$738*	$670	
3	Lakefield Jct - Winnebago - Winco - Burt area & Sheldon - Burt Area - Webster	MN/IA	2015-2016	2015-2018	●	Complete	$550	$654	$692	A - E
4	Winco - Lime Creek - Emery - Black Hawk-Hazleton	IA	2015	2015-2019	●	Complete	$469	$571	$564	B, C, D & E
5	N. LaCrosse - N. Madison - Cardinal (a/k/a Badger - Coulee Project)	WI	2018	2018	●	Complete	$798	$1,073	$1,034	A, F
	Cardinal - Hickory Creek	WI/IA	2020	2023	●[7]	Pending				A, D, F
6	Big Stone South - Ellendale	ND/SD	2019	2019	●	Complete	$331	$403	$247	
7	Ottumwa - Zachary	IA/MO	2017-2020	2019	●	Complete	$152	$186	$221	A,B,C,D
8	Zachary - Maywood	MO	2016-2018	2016-2019	●	Complete	$113	$137	$172	A, D, E
9	Maywood - Herleman - Meredosia - Ipava & Meredosia - Austin	MO/IL	2016-2017	2016-2017	●	Complete	$432	$501	$723	A, B
10	Austin - Pana	IL	2018	2016-2017	●	Complete	$99	$115	$135	A,B
11	Pana - Faraday - Kansas - Sugar Creek	IL/IN	2018-2019	2015-2020	●	Complete	$318	$388	$408	A,B
12	Reynolds - Burr Oak - Hiple	IN	2019	2018	●	Complete	$271	$322	$405	B,C
13	Michigan Thumb Loop Expansion	MI	2013-2015	2012-2015	●	Complete	$510	$563	$504	
14	Reynolds - Greentown	IN	2018	2013-2018	●	Complete	$245	$299	$348	B
15	Pleasant Prairie - Zion Energy Center	WI	2014	2013	●	Complete	$29	$30	$36	E, F
16	Fargo- Sandburg - Oak Grove	IL	2014-2019	2016-2018	●	Complete	$199	$237	$201	
17	Sidney - Rising	IL	2016	2016	●	Complete	$83	$94	$88	
						Total	**$5,564**	**$6,573**	**$6,570**	

Footnotes:

1 Estimated ISD provided by constructing Transmission Owners.

2 Costs stated in millions.

3 MTEP11 approved cost estimates provided by constructing Transmission Owners.

4 MTEP11 approved cost estimates escalated to the estimated in-service year dollars based on MISO's 2.50% annual inflation rate.

5 Current cost estimates provided by constructing Transmission Owners. This represents the estimated cost for ratebase purposes.

6 Explanation for cost variance beyond annual inflation escalation. See below for explanation.

7 Federal permits for river crossing still in progress

* MTEP11 approved cost estimate was provided in nominal (expected year of spend) dollars.

State Regulatory Status Indicator Scale	
○	Pending
◐	In regulatory process or partially complete
●	Regulatory process complete or no regulatory process Requirements

Explanations	Examples: Detailed information can be found in the MTEP Quarterly Status Update
A. Regulatory Requirements	Routing changes, timing delays, structure changes, and equipment modifications necessary to fulfill regulatory requirements.
B. Engineering & Design Standards	Modifications to foundations, structures, lines, and substations resulting from detail design, route selection and/or new NERC standards.
C. Material / Commodity Pricing	Price escalation variances above and beyond standard escalation assumption (including labor).
D. Schedule Delay	Increased cost due to changes in scheduling and, if applicable, the resulting higher AFUDC.
E. Costs associated with delayed ISD	Route changes due to legal or right-of-way issues, changes in material availability or costs, and new standards.
F. Other	Described in the MTEP Quarterly Status Update.

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