In Minnesota, transmission vision becomes reality (SNL)

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By Richard Martin

The CapX2020 lines will bring wind power from the Dakotas and western Minnesota to the cities of the Great Lakes.
Source: CapX2020

When the last line of the CapX2020 group of transmission projects went online on Sept. 8, it marked the culmination of a 13-year process that was remarkable not only for being completed on time and under budget but for being completed at all.

The final leg, a 345-kV transmission line called Big Stone South to Brookings County in South Dakota, owned by Xcel Energy Inc. and Otter Tail Corp., was the last piece to be completed of the $2 billion CapX2020 initiative, undertaken by 11 utilities across Minnesota, North Dakota, South Dakota and Wisconsin to upgrade and expand the grid in theMidcontinent ISO region.

Encompassing five projects totaling about 800 miles of high-voltage transmission lines, CapX2020 was designed to bring electricity from renewable sources, particularly wind farms in the Dakotas and western Minnesota, and to enhance the stability and reliability of the regional grid.

"The CapX2020 initiative was launched in 2004 at a time when [regional transmission operator] MISO's planning process was not yet mature, and tariffs to address cost allocation and recovery were not in place," Will Kaul, a retired executive at Great River Energy who helped spearhead the CapX2020 initiative, said in an email. "Investment in high-voltage transmission was essentially frozen because of the business risk related to uncertainty about cost recovery and regulatory lag, not to mention concern about landowner controversy." Nevertheless, utility executives, regulators and legislators persisted, managing to plan, develop and shepherd to completion the first major upgrade to the power grid in the Upper Midwest since the 1970s. Along with Xcel Energy, Great River and Otter Tail, participating utilities are the Central Minnesota Municipal Power Agency, Dairyland Power Cooperative, ALLETE Inc. subsidiary Minnesota Power Inc., Minnkota Power Cooperative Inc., Missouri River Energy Services, Rochester (Minn.) Public Utilities, the Southern Minnesota Municipal Power Agency and WPPI Energy.

From least desirable to most
The CapX2020 projects "are delivering what we had hoped and anticipated, fundamentally strengthening the backbone transmission grid of the Upper Midwest," said Teresa Mogensen, a senior vice president at Xcel Energy who helped oversee the projects, in a phone interview. The utilities now have "a lot better ability to connect to a lot of new wind, and to deal with some of these changes and new implications on the system." The backers accomplished this through a combination of a unique collaborative structure; a lot of public outreach; supportive regulators; and a cooperative, though not to say compliant, legislature. The five transmission-owning utilities originally behind the effort released an interim report in December 2004 stating that the "current transmission network will be unable to accommodate the required new generation and increased customer demand without significant upgrades and new facilities." Several months later, in 2005, the Minnesota state legislature passed a bill that allowed utilities to recoup the cost of investment from ratepayers during construction, rather than once the lines are operational — a change that reduced business risk and shifted transmission projects "from a least-desirable investment for utilities to a most-desirable," said Stephen Rose, a research scientist at the University of Minnesota's Humphrey School of Public Affairs who co-authored a 2016 report that examined the origins and benefits of CapX2020.

The project had the added impetus of the federal Energy Policy Act of 2005, which intended, among other goals, to kick-start a long overdue transformation of the U.S. electrical grid.

CapX2020 would help fulfill that goal. Still, the projects' backers faced the challenge of meeting the needs of 11 separate power suppliers, a group that included investor-owned utilities, municipal utilities and electric cooperatives. "The thought was that we're all regulated by the same states, our customers are all part of the same region," said Mogensen. "Maybe together we can figure out some infrastructure solutions that will be more effective for all of us working together than each one working on our own on individual solutions."

CapX2020 transmission projects

Line name	SNL project name	Owners
Bemidji-Grand Rapids	Wilton-Cass Lake-Boswell	ALLETE (Minnesota Power), Great River Energy, Northern States Power Co.-MN, Otter Tail Power Co., Minnkota Power Cooperative Inc.
Big Stone South-Brookings	Big Stone South-Brookings Transmission (MVP-1)	Northern States Power Co.-MN, Otter Tail Power Co.
Brookings County-Hampton	Brookings County-Hampton 345-kV (MVP-2)	Central Minnesota Municipal Power Agency, Great River Energy, Missouri River Energy Services, Northern States Power Co.-MN, Otter Tail Power Co.
Fargo-St. Cloud	Fargo-St.Cloud (Alexandria-Bison) 345-kV (Fargo-Phase III)	ALLETE (Minnesota Power), Great River Energy, Missouri River Energy Services, Northern States Power Co.-MN, Otter Tail Power Co.
	Fargo-St.Cloud (Quarry-Alexandria) 345-kV (Fargo-Phase II)	ALLETE (Minnesota Power), Great River Energy, Missouri River Energy Services, Northern States Power Co.-MN, Otter Tail Power Co.
Hampton-Rochester-La Crosse	Hampton-Rochester-La Crosse 345-kV (Twin Cities-La Crosse)	Dairyland Power Cooperative, Rochester Public Utilities, Southern Minnesota Municipal Power Agency, WPPI Energy, Northern States Power Co.-MN, Northern States Power Co.-WI
Monticello-St. Cloud	Monticello to St. Cloud (Monticello-Quarry) 345-kV (Fargo-Phase I)	ALLETE (Minnesota Power), Great River Energy, Missouri River Energy Services, Northern States Power Co.-MN, Otter Tail Power Co.
North Rochester-Chester	North Rochester to Northern Hills 161-kV	Dairyland Power Cooperative, Rochester Public Utilities, Southern Minnesota Municipal Power Agency, WPPI Energy, Northern States Power Co.-MN, Northern States Power Co.-WI
	North Rochester to Northern Hills 161-kV (Hampton-La Crosse)	Dairyland Power Cooperative, Rochester Public Utilities, Southern Minnesota Municipal Power Agency, WPPI Energy, Northern States Power Co.-MN, Northern States Power Co.-WI

As of Sept. 27, 2017.
NA = not available
Source: SNL Energy, an offering of S&P Global Market Intelligence

Playing poker

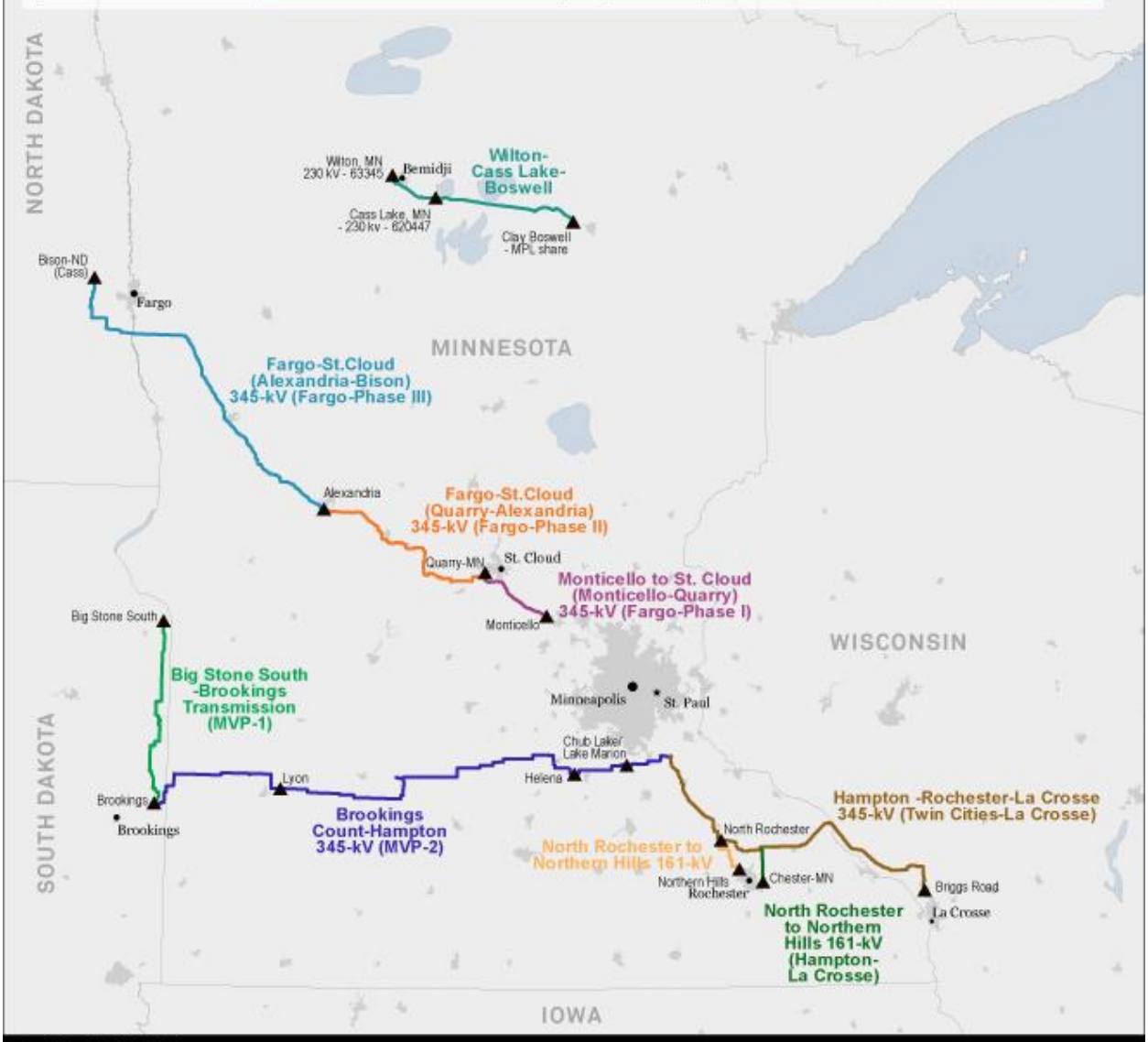
The utility officials looked for areas where renewable generation was likely to expand in the coming decades, said Beth Soholt, executive director of Wind on the Wires, an industry group that promotes the development of wind power in the Upper Midwest. "MISO and CapX2020 did a good job of locating transmission where there is really good wind."

The harder question was: Who would pay for it all? To solve that puzzle, representatives from each of the CapX2020 utilities sat around a poker table. Each company was allotted a certain number of chips proportional to its share of the peak load across the system; for each of the five high-level projects — each project can include multiple lines or segments — the players anted up a number of chips that represented their willingness to contribute to that project.

"The way it turned out, we basically got in the projects at the levels we wanted to," Missouri River Energy Services Director of Power Supply & Operations Ray Wahle said in the Humphrey School report. "And when everyone else laid their chips down, it turned out that we all ended up where we needed to be."

CapX2020 transmission projects

Line name	SNL project name	Construction period	Voltage (kV)	Length (miles)	Project costs ($M)
Bemidji-Grand Rapids	Wilton-Cass Lake-Boswell	2011-2012	230	70	114
Big Stone South-Brookings	Big Stone South-Brookings Transmission (MVP-1)	2015-2017	345	70	140
Brookings County-Hampton	Brookings County-Hampton 345-kV (MVP-2)	2012-2015	345	250	655
Fargo-St. Cloud	Fargo-St.Cloud (Alexandria-Bison) 345-kV (Fargo-Phase III)	2012-2015	345	134	NA
	Fargo-St.Cloud (Quarry-Alexandria) 345-kV (Fargo-Phase II)	2011-2014	345	78	NA
Hampton-Rochester-La Crosse	Hampton-Rochester-La Crosse 345-kV (Twin Cities-La Crosse)	2013-2016	345	128	485
Monticello-St. Cloud	Monticello to St. Cloud (Monticello-Quarry) 345-kV (Fargo-Phase I)	2010-2011	345	28	NA
North Rochester-Chester	North Rochester to Northern Hills 161-kV	2013-2014	161	16	NA
	North Rochester to Northern Hills 161-kV (Hampton-La Crosse)	2015-2016	161	12	16



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NA = no available
Source: SNL, an offering of S&P Global Market Intelligence
Map credit: Elizabeth Thomas

MVPs

Now with the lines completed, challenges remain. Demand growth, points out Carol Overland, a Red Wing, Minn.-based attorney and longtime utility gadfly, has been nowhere near the projections made in the mid-2000s on which the initiative was based. Xcel Energy's peak demand, as documented in the company's 2016 10-K filing, has not yet recovered to the level reached in 2006, before the financial crash and the resulting downturn in electricity use.

"We just don't need what we thought we would need," Overland asserted in a phone interview. "The fact is that Xcel makes a lot more money building stuff than selling electricity."

Nevertheless, in 2011 two of the CapX2020 lines, Brookings County-Hampton and Big Stone South-Brookings County, were designated "Multi-Value Projects" by MISO, meaning that they deliver benefits across the MISO territory that exceed their price tag. As such, the costs of the MVPs are shared across the full MISO footprint, not just within the territory they serve.

Disunity

Today, with renewables supplanting coal-fired generation at a rapid clip across much of the United States, the question becomes, could such a project be undertaken again? Are there other ambitious regionwide CapX2020s waiting to be developed and built to meet the needs of a rapidly transforming electrical system?

Certain market and public policy factors have changed in favor of big transmission. MISO, for instance, has formalized the transmission planning process across its 15-state region, with specified tariffs in place for cost recovery. FERC has put incentives in place to make transmission an even more desirable investment for utilities. The problem is that understanding the future of power generation and delivery is far more complex and uncertain than it was in the early 2000s.

"What's stymieing MISO now is getting on the same page for what's going to happen over the next 10 to 15 or 20 years," said Soholt. "It's a little more difficult to see how energy markets are going to develop."

The rub, as ever, is money. In the PJM Interconnection region, for instance, a prolonged debate continues over how to split the cost of a $280 million, 230-kV line in an area known as Artificial Island in southern New Jersey. In June, PJM came out with two alternative approaches to allocating those costs among the ratepayers of Exelon Corp. subsidiary Delmarva Power & Light Co., Public Service Enterprise Group Inc. subsidiary Public Service Electric and Gas Co. and other utilities in the region.

In a special meeting of the PJM Transmission Expansion Advisory Committee on June 9, PJM Vice President of Planning Steven Herling said PJM "is not advocating for any of these three approaches we have presented here. We recognize that there are any number of other approaches."

In practice, "any number of approaches" often adds up to "no viable approach." Ultimately, the division of costs for Artificial Island, as for other big transmission projects under development in other territories, will be up to the transmission owners. They'd better bring their poker chips.