ELECTRICITY TRANMISSION AND THE STATE UTILITY COMMISSION APPROCAL PROCESS – WHAT'S TAKING SO LONG?

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Abstract

Electricity transmission lines connecting widely dispersed renewable energy resources and other electricity generators to load centers are a vital piece of the electric grid of the future. Building transmission infrastructure faces a number of obstacles, not the least of which is receiving approval from state utility commissions. This paper tracks the progress of fifteen transmission projects approved in Midcontinent Independent System Operator Transmission Expansion Planning 2011, as they move through the commission approval process in an attempt to identify any delays and their causes. These projects were selected due to their status as Multi value Projects in the hopes they would represent the best case scenario for projects seeking approval. The projects cover eight states: Iowa, Illinois, Michigan, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin. While projects in Iowa and Minnesota were found to take significantly longer than projects in other states, the delays were determined to be due primarily to developer actions, rather than a cumbersome approval process.

Keywords: electricity transmission, high voltage transmission lines, utility commission, certificate of need, certificate of public convenience and necessity

Contents

Introduction

Electricity transmission construction is a complex process with an enormous number of factors affecting what, when, and where transmission lines can be built. In addition to frequent opposition from communities through which the lines will pass, transmission developers must satisfy a variety of federal, state, and local requirements for the siting of their projects. Further complicating matters, the process for getting project approval at the state level varies from state to state. This potentially makes some of the most important projects, high-voltage multi-state projects, even more difficult to build than single state projects.

Increased public awareness around climate change and the explosion of renewable energy technologies such as wind and solar has prompted considerable research into the policies and issues surrounding electricity generation and consumer electricity demand. This has spurred a depth of discussion, both technical and political, about the future of electricity system in a carbon-constrained world. Much of the discussion has focused at the two ends of the problem, that is, electricity generation and consumer demand. On the generation side of the equation, there has been debate over the role of coal,[1] the value and cost effectiveness of carbon capture and storage technologies.[2] Considerable time has been spend arguing the role of nuclear power[3] and the amount of renewable energy resources that can be reliably integrated into the grid.[4] In addition to excitement surrounding the role of batteries in smoothing renewable resource output.[5] On the consumer side of the equation, research into patterns and drivers of demand, as well as strategies for reducing consumer load and shifting it into off-peak hours have been

[1] Christian Azar et al., "Carbon Capture and Storage From Fossil Fuels and Biomass – Costs and Potential Role in Stabilizing the Atmosphere," *Climatic Change* 74, no. 1–3 (January 1, 2006): 47–79, https://doi.org/10.1007/s10584-005-3484-7.
[2] Edward S. Rubin, Chao Chen, and Anand B. Rao, "Cost and Performance of Fossil Fuel Power Plants with CO2 Capture and Storage," *Energy Policy* 35, no. 9 (September 1, 2007): 4444–54, https://doi.org/10.1016/j.enpol.2007.03.009.
[3] Kathleen Vaillancourt et al., "The Role of Nuclear Energy in Long-Term Climate Scenarios: An Analysis with the World-TIMES Model," *Energy Policy* 36, no. 7 (July 1, 2008): 2296–2307, https://doi.org/10.1016/j.enpol.2008.01.015.
[4] Godfrey Boyle, *Renewable Electricity and the Grid: The Challenge of Variability* (Earthscan, 2012).
[5] Nirmal-Kumar C. Nair and Niraj Garimella, "Battery Energy Storage Systems: Assessment for Small-Scale Renewable Energy Integration," *Energy and Buildings* 42, no. 11 (November 1, 2010): 2124–30, https://doi.org/10.1016/j.enbuild.2010.07.002.

common.[6][7] Supplementing the technical arguments about these two ends of the energy system, has been researching into the social issue of jobs; which types of energy resources result in the highest number of good paying jobs and the role of energy efficiency technologies in creating jobs[8] being of primary interest.

Connecting these two ends of the energy equation, however, is the grid, a web of more than 5.7 million miles of electricity transmission and distribution lines.[9] The explosion of residential rooftop solar has, in recent years, led to concern about the ability of this aging network of lines to handle the increased two-way power flows associated with distributed generation and increased demand in load centers. It has motivated research into ways to optimize the deployment of smart grid technologies[10] and other distribution upgrades. Facing a similar but distinct challenge are wind power plants. Since some of the best wind resources are located in remote locations far from load centers, high voltage transmission lines are needed to connect these resources to the grid.

Research has shown transmission's value in reducing the variability of renewable resources,[11] the retail price reductions resulting from a competitive electricity market enabled by adequate transmission,[12] and improvements to power plant efficiency resulting from increased competition.[13] It has also identified some of the major challenges to transmission construction, including the mismatch between federal and

[6] M. H. Albadi and E. F. El-Saadany, "A Summary of Demand Response in Electricity Markets," *Electric Power Systems Research* 78, no. 11 (November 1, 2008): 1989–96, https://doi.org/10.1016/j.epsr.2008.04.002.
[7] Hunt Allcott and Sendhil Mullainathan, "Behavior and Energy Policy," *Science* 327, no. 5970 (March 5, 2010): 1204–5, https://doi.org/10.1126/science.1180775.
[8] Max Wei, Shana Patadia, and Daniel M. Kammen, "Putting Renewables and Energy Efficiency to Work: How Many Jobs Can the Clean Energy Industry Generate in the US?," *Energy Policy* 38, no. 2 (February 1, 2010): 919–31, https://doi.org/10.1016/j.enpol.2009.10.044.
[9] Jennifer Weeks Climate The Daily, "U.S. Electrical Grid Undergoes Massive Transition to Connect to Renewables," Scientific American, accessed March 26, 2018, https://www.scientificamerican.com/article/what-is-the-smart-grid/.
[10] S. C. Chan et al., "Load/Price Forecasting and Managing Demand Response for Smart Grids: Methodologies and Challenges," *IEEE Signal Processing Magazine* 29, no. 5 (September 2012): 68–85, https://doi.org/10.1109/MSP.2012.2186531.
[11] "Integrating Renewable Electricty on the Grid: A Report by the APS Panel on Public Affairs" (American Physical Society, 2016), https://www.aps.org/policy/reports/popa-reports/upload/integratingelec.pdf.
[12] Adam Swadley and Mine Yücel, "Did Residential Electricity Rates Fall after Retail Competition? A Dynamic Panel Analysis," *Energy Policy*, Clean Cooking Fuels and Technologies in Developing Economies, 39, no. 12 (December 1, 2011): 7702–11, https://doi.org/10.1016/j.enpol.2011.09.014.
[13] J. Dean Craig and Scott J. Savage, "Market Restructuring, Competition and the Efficiency of Electricity Generation: Plant-Level Evidence from the United States 1996 to 2006," *The Energy Journal* 34, no. 1 (2013): 1–31.

state jurisdiction[14] and resistance to transmission projects by local communities. While research has been done to attempt to quantity transmission siting difficulty generally,[15] this paper specifically examines the state level approval process under the jurisdiction of the state public utility commission or equivalent. It attempts to identify correlations between longer project timelines and various factors impacting the approval process, identify the causes of those longer timelines, and discover what effect, if any, intervention by the regional transmission operator in this process had on it. It does this by analyzing the progress of the 2011 Multi Value Project (MVP) Portfolio as they satisfied state utility commission requirements to receive approval, with the ultimate goal of suggesting improvements to streamlining or standardizing the process.

In December of 2011, the Midcontinent Independent System Operator (MISO), approved transmission projects representing 6.5 billion dollars of transmission investment through 2021 in MISO's 2011 Transmission Expansion Planning report with 5.1 billion of that composed of 17 Multi Value Projects.[16] As the name suggests, the MVP Portfolio represents projects that provide multiple benefits to the MISO region. These projects were selected to enhance the reliability of the existing system, enable the transport of renewable energy to meet renewable energy mandates set by state legislatures, and provide "multiple types of economic value,"[17] with the included projects expected to have a benefit-to-cost ratio of 2.2 - 3.4 as of the 2017 MTEP report.[18]

[14] Alexandra B. Klass and Elizabeth J. Wilson, "Interstate Transmission Challenges for Renewable Energy: A Federalism Mismatch Symposium," *Vanderbilt Law Review* 65 (2012): 1801–74.
[15] Shalini P. Vajjhala and Paul S. Fischbeck, "Quantifying Siting Difficulty: A Case Study of US Transmission Line Siting," *Energy Policy* 35, no. 1 (January 1, 2007): 650–71, https://doi.org/10.1016/j.enpol.2005.12.026.
[16] "MISO Transmission Planning Studies and Reports: MTEP11," accessed April 3, 2018, https://www.misoenergy.org/planning/transmission-studies-and-reports#nt=%2Freport-study-analysistype%3AMTEP%2Fmtepdoctype%3AMTEP%20Report%2Fmtepreportyear%3APrevious%20MTEP%20Reports&t=10&p=0&s=FileName&sd=desc.
[17] "Candidate MVP Portfolio Analysis: June 2011 Interim Report" (Midcontinent ISO, June 2011), https://puc.sd.gov/commission/dockets/electric/2014/EL14-090/DR2/DR2-4/Attachment1.pdf.
[18] "MISO Transmission Planning Studies and Reports: MTEP17," accessed April 3, 2018, https://www.misoenergy.org/planning/transmission-studies-and-reports#nt=%2Freport-study-analysistype%3AMTEP%2Fmtepdoctype%3AMTEP%20Report%2Fmtepreportyear%3AMTEP17&t=10&p=0&s=&sd=.

Methodology

For this study seventeen transmission projects were identified for study from the MISO Transmission Expansion Planning 2011 report (MTEP11). These projects were selected due to their status as Multi Value Projects (MVP) in the report. The motivation for selecting these projects stems from their inclusion in the MVP Portfolio.

Three criteria must be met in order for a project to be considered a MVP.[19]

- The project must be the most economical way to reliably deliver energy in support of state, federal, or other regulatory energy policy mandates or laws which govern the minimum or maximum amount of energy produced by a specific type of generation.
- The project must provide multiple types of economic value across multiple pricing zones with a benefit to cost ratio greater than 1.
- The project must address at least one projected National Electricity Reliability Council (NERC) or other regional standard violation and one economic based transmission issue that provides value across multiple pricing zones.

Their status as MVPs indicates that they are widely beneficial projects and should therefore experience the least resistance from state regulators. Based on this assumption, the project timelines recorded here can be said to represent the best-case scenarios for transmission projects in the host states.

Data on a project's progress through each state's approval process was gathered primarily from the Docket or Case listed on the Public Utility Commission/Public Service Commission/Utilities Board/etc website. Additional information about each project is also taken from project websites hosted by the developer, specifically to share information about the projects. Specific information about each source is provided in the footnotes.

[19] "MISO Transmission Planning Studies and Reports: MTEP11."

Where exact dates were unavailable, dates provided in the timelines are as of receipt by the relevant governmental body (Public Utility Commission, Public Service Commission, Utilities Board, etc). For example, where the affidavit of publication is unavailable for Notices of Informational meetings, the dates listed are the dates those notices are added to the docket by the relevant body. The "Start" date is the date the first required document is filed with the public service commission except where public notice is a prerequisite of that filing. In these cases, the earliest date where notice was given is used as the start date. The Final Order dates are the dates the needed certificate is issued. While in some cases this is the same date as the Final Order by the commission, in others, there is a delay due to conditions put on the order.

To examine the effect of MISO participation in the process, MISO intervention in a docket/case is noted. Where MISO Intervention is noted, in all cases the motion to intervene was granted and MISO's participation is limited to submission of testimony, cross-examination at hearing, and the filing of a post-hearing brief.

One of the factors considered in this analysis is the number of steps in the regulatory process. In this analysis, anything required by the commission that moves the process forward are considered steps. Steps can include actions taken by the developer or the commission. The steps considered in this analysis include any event that moves the process forward, as described by documents filed on the docket. These include things like publication of Notice of Hearing in local media, the holding of public hearings, and the assignment of the docket to an Administrative Law Judge.

Iowa, in particular bears some additional explanation, since the same regulatory process must be satisfied in each county a project passes through. Since a Petition for Franchise is required in each county, the process is governed by the Iowa Utilities Board, and is identical for each county it is executed in, the number of steps in the process is generally higher than other states. The number of steps in the regulatory process is the total number of steps required in order to receive all the needed permits. Since an Electric Franchise is required in each county in Iowa, the number of steps in its regulatory process is directly related to the number of counties through which a project is built.

In some cases, both in Iowa and elsewhere, it is possible to consolidate cases/dockets to avoid some of the repetitions due to needing multiple permits (as in Minnesota) and the same permit in multiple counties (as in Iowa). For each project, before consolidation occurs, each step is counted independently, however consolidation is considered a single step, and after the dockets are consolidated, the steps completed for multiple counties/permits are considered together as single steps, as long as they can be completed once to satisfy all county/permit requirements. Even after consolidation, some steps must be performed individually for each permit/county. In Iowa for example, regardless whether dockets are consolidated, public input meetings must be held in each county and notice of hearings must be published in each county. Since these actions must be repeated in each county, each are considered their own step in the Iowa process.

In most states, both public input hearings and more formal evidentiary hearings before an administrative law judge are required. The public input hearing and evidentiary hearing are considered two separate steps, but total number of days spent in both are considered together. In most cases, multiple days of hearings are held. Regardless of how many days are devoted to each type of hearing, each type of meeting is counted as a single step in the process, except where the meetings must be repeated in each count. For example, a project in Iowa passing through three counties, would be required to hold one public input meeting in each county. Since a meeting is specifically required for each county, this would be recorded as three steps. In many cases, where an evidentiary hearing is held, a pre-hearing is also held. Since these pre-hearings are integral to the evidentiary hearing step, they are not considered a separate step in the process. Since they do, however, contribute to the total number of days spent in hearing, they are added to the days of hearings factor in this analysis.

In all cases where an evidentiary hearing is held, all parties file testimony in advance of the hearing and post hearing briefs after the hearing. Since these steps are directly related to the hearing and occur in all cases, they are not explicitly mentioned in the data or analysis sections, but are considered together with the evidentiary hearing as one step in the process.

With regards to the EIS, note that it is only considered a "step" in this analysis if it is filed with the commission separately from the initial application. EIS's or other permits required by federal processes are not considered here. The EIS is considered the same as every other step in the process, except where it is the commission or other state agency completing the EIS. The motivation behind this is that this analysis is specifically targeted at the commission approval processes. While an EIS may be required by the commission, by submitting it concurrently with the initial application, the time it takes to complete the EIS is not visible in this analysis. Where the EIS is completed by another state agency, mention is made of it in discussion of the results of this analysis.

An important note about the number of steps required for a projects is that the number for one project in a given state may not be the same for other projects. For example, in Iowa, an evidentiary hearing is only required for projects where eminent domain is requested by a developer, or objections to the project are raised. Number of steps examines the number of steps a developer must comply with for a given project, not the number of steps in an idealized standard process.

Each project is analyzed in two ways. First, at the MISO project level (i.e. MVP classification), then at the sub-project level (i.e. State level identification of projects. For the MISO project level analysis, all factors in all sub-projects comprising the MISO project, are summed over all states involved. For example, if state number one has 10 steps in its regulatory process and state two has 5 steps, the "Number of steps" factor in this analysis would be 15. Likewise, if the MISO Multi Value Project is comprised of two sub projects, each of which must comply with the regulatory process, their steps would be summed, except where dockets are consolidated as mentioned earlier.

A second analysis is then done at the sub-project level, with each state's portion of the project being treated as its own project. While in most cases, the MVP is one project, in a few cases, most notably in Iowa, MISO MVPs are comprised of several smaller transmission projects. For example, MVP 4 is comprised of four connected transmission lines, being built by both ITC Transmission and MidAmerican Energy Company. Where a given project crosses state lines, that project's timeline in each state is

analyzed in each state as its own sub-project. For example, MVP 15 is built between Wisconsin and Illinois. In this portion of the analysis, the portion built in Wisconsin will be considered independently of the portion in Illinois. This strategy is expected to give the most precise picture of difficulty in building a given transmission project by reducing the duplication of steps counted in the higher level analysis due to the need for filings in multiple counties or for multiple sub-projects. Even with this method, some duplication of steps will remain in analysis of Iowa due to the requirement to file separately in every county. While this will limit the author's ability to analyze the regulatory process at the most basic level (i.e. the bare bones requirements for building a single county transmission line), it will give a better picture of the process for building the longer distance lines more important to regional goals.

In several cases, multiple Multi Value Projects are handled by the commission as a single project. For example, the Illinois Rivers Project, comprised of MVP 9, 10, 11, and 17, was only required to file one application for a Certificate of Convenience and Necessity that covered the entire Illinois portion of the project. Though MISO considered this four individual projects, the states of Illinois and Missouri treated it as a single project. Since all four MVPs proceeded along an identical timeline, all will be considered as if they were a single MVP for the first, MVP level analysis. However, since a portion of this project entered Missouri, the second analysis will examine the project's time spent in each state's process separately. Likewise, MVPs 7 and 8, the Mark Twain Transmission line, are treated the same.

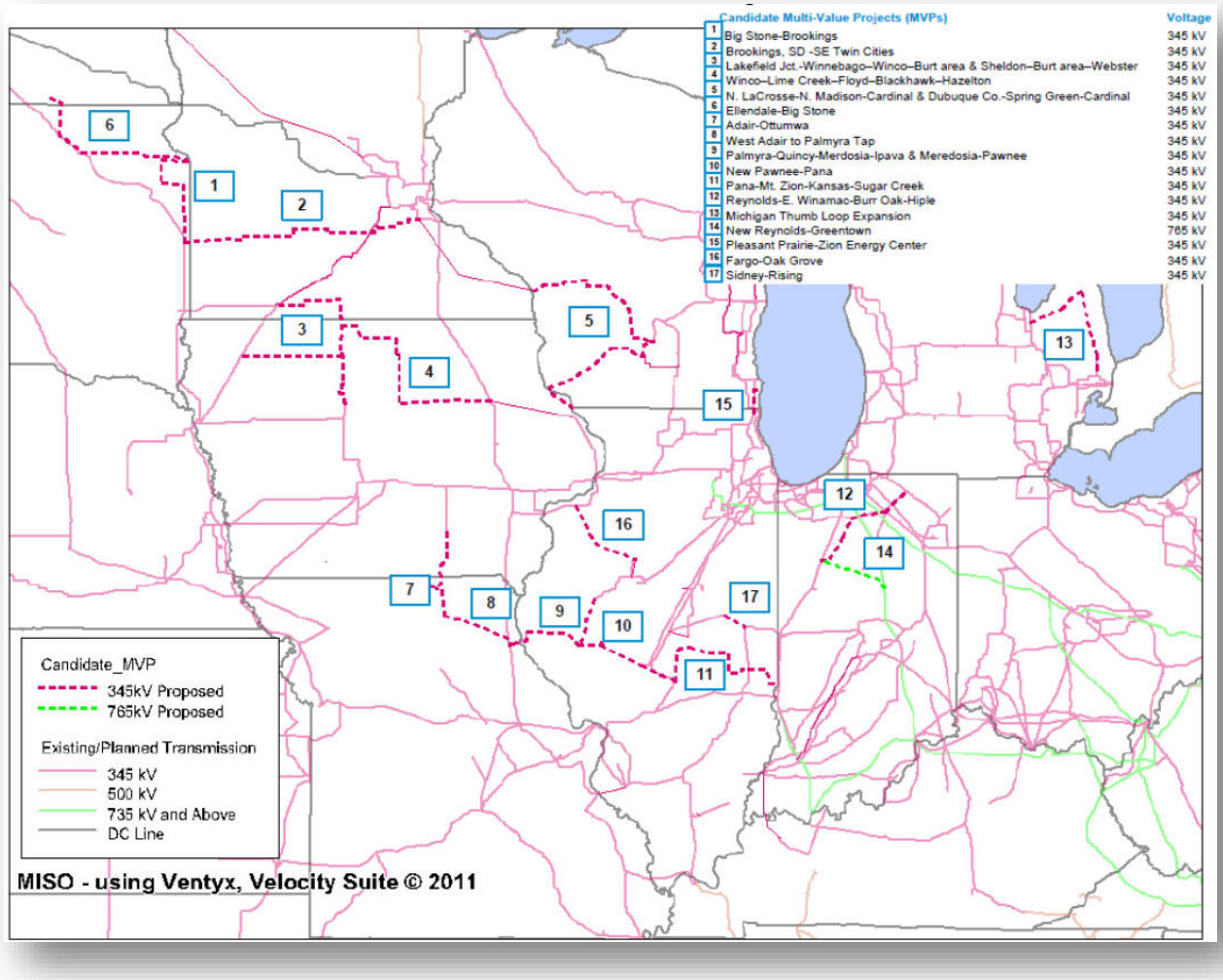
Regarding the dates of Final Orders used in this analysis, several of the initially issued Final Orders in this portfolio of projects were challenged with requests for rehearing and appeals to the courts. Since this project is an analysis of the state approval process and not the judicial system, time spent in the courts is not examined or counted in project approval times.

Short descriptions of each MVP are provided in the data section that follows, with detailed project timelines provided in Appendix 1.

Analysis is done by identifying correlations between factors collected in this review. Relationships

between factors are identified using the CORREL function in Microsoft Excel along with R-squared values from trend lines on scatterplots. This is first done at the MVP level, then projects are separated into two groups by length of time to approval: those which obtained approvals within two years and those which needed greater than two years. The sub projects comprising each MVP are then examined to find out which of the longer projects are Multi-state projects and if so, if the longer timeline is the result of delays in one state, or both. This will allow the author to find out which states are the most time intensive for getting approvals. An effort is then made to identify the underlying factors that may be contributing to the longer and shorter project timelines in an attempt to find lessons that can be applied to shortening project timelines.

Data



MVP – 1 – Big Stone to Brookings, South Dakota[20] [21] [22]

Description: The southern portion of a 345 KV transmission line from Big Stone to Brookings, South Dakota. The Northern part of this line (33 miles) was originally approved in Docket EL06-002 on January 16, 2007 and recertified 4/9/2013 as part of the MVP 1 project. The approximately 43 mile southern portion was an extension of the originally permitted line and passes through two counties, Grant and

[20] "Docket EL06-002," South Dakota Public Utilities Commission - Commission Dockets, accessed April 3, 2018, https://puc.sd.gov/Dockets/Electric/2006/EL06-002.aspx.
[21] "Docket EL13-020," South Dakota Public Utilities Commission - Commission Dockets, accessed April 3, 2018, http://puc.sd.gov/Dockets/Electric/2013/el13-020.aspx.
[22] "Big Stone South-Brookings County 345 KV Project," CapX2020 - Delivering reliable electricity, accessed April 22, 2018, http://www.capx2020.com/bss/index.html.

Deuel South Dakota. Only this southern portion is considered in this analysis.

MVP – 2 – Brookings, South Dakota to SE Twin Cities, Minnesota[23]

Description: An approximately 200 mile 345 kV transmission line from Brookings, SD to Hampton, MN as well as a 25 mile segment between Marshal and Granite Falls. This project was one of the CAPEX 2020 projects developed by Great River Energy, Northern States Power Company (a wholly owned subsidiary of Xcel Energy), and others to support wind energy production and projected electricity demand in 2020. The Certificate of Need dockets for three connected transmission lines were consolidated into a single docket to address the full CAPEX 2020 plan for Minnesota in one docket (06-115). A separate, standalone Route Permit was filed for the Brookings-Hampton 345 kV line (08-1474). A Facility Permit was filed for the approximately 11 mile portion of the line from Brookings, SD to the Minnesota border (EL10-016).

MVP – 3

Description: Approximately 220 miles of new 345 kV transmission lines in Minnesota (75 miles) and Iowa (145 miles) built and owned by ITC Midwest and MidAmerican Energy Company. The Minnesota portion of the project was developed by ITC Midwest, passes through 3 counties, and the initial application for a Certificate of Need was filed in March of 2013 (Docket 12-1053). The Iowa segment of the project passes through six counties, with portions being developed by both ITC Midwest (1 county) and MidAmerican Energy Company (5 counties). The initial applications for the Iowa portion of the project were filed January of 2013, with ITC Midwest's docket being consolidated with its MVP 4 dockets.

MVP – 4:

Description: Project comprised of four electricity transmission lines, built and owned by ITC Midwest

[23] "Brookings County-Hampton 345 KV Project," CapX2020 - Delivering reliable electricity, accessed April 22, 2018, http://www.capx2020.com/brookings/index.html.

and MidAmerican Energy Company. The Iowa Utilities Board (IUB), the body vested with authority to grant an Electric Franchise to Build, Maintain and Operate Electricity Transmission lines in Iowa, refers to the MVP – 4 project by the four transmission lines that make up the MISO project.

Black Hawk-to-Hazelton Line[24] – MVP4 part 1 - Approximately 12 miles of 345 kV line, constructed and owned by ITC Midwest, through Buchanan and Black Hawk Counties.

Killdeer-to-Black Hawk Line[25] – MVP4 Part 2 – Approximately 100 miles of 345 kV line constructed and owned by MidAmerican Energy Company and ITC Midwest through Franklin, Cerro Gordo, Butler, and Black Hawk Counties

Colby-to-Killdeer Line[26] – MVP4 Part 3 – An approximately 12 mile rebuild of existing 161 KV into double circuit 345 KV and extending it .06 mile in Cerro Gordo County

Ledyard-to-Colby Line[27] – MVP4 Part 4 – Approximately 55 miles of 345 kV line through Kossoth, Winnebago, and Worth Counties constructed and owned by ITC Midwest. Though Docket E-22116 was ultimately consolidated with these dockets, it is considered separately as part of the MVP 3 project.

MVP – 5 – The Badger-Coulee Project[28] [29]

Description: An approximately 180 mile 345 kV transmission line, built and operated jointly by American Transmission Company and Northern States Power Company – Wisconsin an Xcel company, connecting the North Madison substation (Town of Vienna, WI) to the Cardinal Substation (Town of Middleton, WI) in the south. It also connects the Briggs road substation (north of La Crosse, WI) in the west to the other two substations. The proposed routes involved 9 counties representing 77 municipalities and townships. The Iowa portion of this route has not yet begun seeking regulatory approval with the Iowa Utilities Board.

[24] "Black Hawk-Hazelton 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, https://www.itc-holdings.com/docs/default-source/project-documents/black-hawk---hazleton-345-kv-line-build/black_hawk_hazleton_project_profile.pdf?sfvrsn=ff7df1f6_4.
[25] "Killdeer-Hampton Tap 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, http://itctransco-itc-prod.barkleylabs.com/images/documents/1433516935ITCMW_Profile_Killdeer-Hampton_rev0615.pdf.
[26] "Colby-Killdeer 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, https://www.itc-holdings.com/docs/default-source/project-documents/colby-killdeer-345-kv-line-build/1433516511itcmw_profile_colby-killdeer_rev0615.pdf?sfvrsn=2336f1f6_4.
[27] "Ledyard-Colby 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, http://itctransco-itc-prod.barkleylabs.com/images/documents/1433516994ITCMW_Profile_Ledyard-Colby_rev0615.pdf.
[28] "Docket 5-CE-142," PSC - Case Management System (Docket Detail), accessed March 15, 2018, http://apps.psc.wi.gov/vs2010/dockets/content/detail.aspx?dockt_id=5-CE-142.
[29] "Badger Coulee Transmission Line Project," American Transmission Co. projects, accessed April 22, 2018, http://www.atc-projects.com/projects/badger-coulee/.

MVP 6 – Big Stone South to Ellendale[30]

Description: Approximately 163 miles of 345 kV transmission line between Big Stone South Dakota and Ellendale North Dakota. Approximately 10 miles in Dickey County North Dakota with the remaining 153 miles in Brown, Day, and Grant counties South Dakota.

MVP – 7, 8 – Mark Twain Transmission Project[31]

Description: Approximately 100 miles of primarily 345 kV transmission line from the Palmyra, Missouri substation through a new substation in Kirksville, to the Iowa border. After initially being conditionally approved by the Missouri Public Service Commission (PSC), The Mark Twain Transmission project's Certificate of Convenience and Necessity was nullified by an appeals court decision against the PSC.

MVP – 9, 10, 11, 17 - Illinois Rivers Project[32]

Description: An approximately 375 mile transmission line running from Palmyra, Missouri across Illinois to the Indiana boarder built to support public policy goals (renewable portfolio standards in particular), enhance reliability, and provide economic benefits by enabling low cost wind energy to be efficiently transported.

Missouri portion[33]

Description: Approximately 7 miles of 345 kV transmission line between a new substation to be constructed near Palmyra, Missouri through Marion County across the Mississippi river to Quincy, IL to connect with the Illinois portion of the Illinois Rivers Project.

[30] "Big Stone South to Ellendale (BSSE) Transmission Line," accessed April 22, 2018, http://bssetransmissionline.com/.
[31] "Mark Twain Transmission Project | Ameren Transmission," Ameren Corporation, accessed April 22, 2018, https://www.ameren.com/mark-twain.
[32] "Ameren Transmission Company's Illinois Rivers Project," Illinois Commerce Commission, accessed April 22, 2018, https://www.icc.illinois.gov/AmerenILRiversProject/.
[33] "Case No. EA-2015-0145," Missouri Public Service Commission - Electronic Filing Information System, accessed March 8, 2018, https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.

MVP – 12, 14 – Reynolds to Topeka,[34] Indiana and Greentown to Reynolds,[35] Indiana Electric System Improvement Projects

Description: Approximately 170 miles of transmission line connecting Reynolds to Greentown (70 miles of 765 kV) and Reynolds to Burr Oak to Topeka (100 miles of 345 kV), Indiana. The projects are being built jointly by the Northern Indiana Public Service Co and Pioneer Transmission and will be operated by MISO.[36]

The Indiana Utility Regulatory Commission (IURC) does not require a Certificate of Public Convenience and Necessity, or any other state level approval, for electricity transmission projects.[37] While changes to rates and Transmission Distribution System Improvement Charges (TDSIC) must be approved by the IURC,[38] all projects in the MVP portfolio are eligible for 100% cost sharing within MISO. Due to the 100% cost sharing, the developers did not need to petition the IURC for recovery of costs through rate adjustments or riders. Due to these facts, there is no state level permitting process for this project in Indiana.

MVP – 13 – Michigan Thumb Loop Expansion Transmission Project[39] [40]

Description: The Thumb Loop Expansion Transmission Project is a 140 mile, double circuit 345 kV transmission line passing through four counties in the Michigan Thumb region: Tuscola, Huron, Sanilac, and St. Clair. The Project, which included four new substations, serves as the "backbone" of the transmission system in this region and facilitates development of the maximum wind potential of the

[34] "The Reynolds to Topeka Electric System Improvement Project," accessed April 22, 2018, http://www.reynoldstopeka.com/.
[35] "Greentown-Reynolds Electrical System Improvement Project," accessed March 8, 2018, http://www.greentownreynolds.com/abouttheproject.html.
[36] "Greentown-Reynolds Electrical System Improvement Project."
[37] "2014 Annual Report" (Indiana Utility Regulatory Commission), accessed March 15, 2018, https://www.in.gov/iurc/files/Indiana_Utility_Regulatory_Commission_2014_Annual_Report_FINAL(3).pdf.
[38] "OUCC: NIPSCO Electric Infrastructure Plan," Indiana Office of Utility Consumer Counselor, November 6, 2017, http://www.in.gov/oucc/2747.htm.
[39] "Case: U-16200," Michigan Public Service Commission E-Dockets Community, accessed March 15, 2018, https://mi-psc.force.com/s/case/500t0000008efTdAAI/in-the-matter-of-the-application-of-international-transmission-company-dba-itc-transmission-for-an-expedited-siting-certificate-for-a-transmission-line-pursuant-to-2008-pa-295-part-4-for-region-no-4-thumb-region-as-designated-by-the-michigan-wi.
[40] "Michigan Thumb Loop Transmission Line," Center for Rural Affairs, June 9, 2011, http://www.cfra.org/michigan-thumb-loop.

region as identified by the Michigan Wind Energy Resource Zone Board.[41]

MVP-15 – Pleasant Prairie to Zion Energy Center[42]

Description: An approximately 6 mile 345 kV transmission line between Pleasant Prairie, Wisconsin (Kenosha County) to Zion Energy Center, Illinois (Lake County). The new line was intended to relieve congestion by adding an additional high voltage link between Wisconsin and Illinois. The Wisconsin portion of the line is 3.5 miles, with the remainder in Iowa.

MVP 16

Description: An approximately 77 mile 345 kV transmission line built and owned by Ameren Transmission company of Illinois (44 miles) (ATXI) and MidAmerican Energy Company (32.5 miles) (MidAmerican). The ATXI portion of the line runs from the Sandburg substation in Knox County to the Fargo substation in Peoria County with the MidAmerican portion running from Fargo substation to Oak Grove in Rock Island County. In all the project passes through five Illinois counties: Peoria, Knox, Rock Island, Mercer, and Henry. Motion by Ameren specifically requests consideration of the evidence in both dockets together as the testimony regarding MVP 16's regional value is dependent on both portions of the project going forward.

[41] ITC, "Project Profile: Thumb Loop 345kV Transmission Line," ITC Holdings Corp, accessed March 15, 2018, http://itctransco-itc-prod.barkleylabs.com/operating-entities/itc-michigan/projects/itctransmission.html.
[42] "American Transmission Co. Projects– Pleasant Prairie-Zion Energy Center," accessed April 22, 2018, http://www.atc-projects.com/projects/pleasant-prairie-zion-energy-center-project/.

Tables and Variables

Table 1 – MVP Project Variables.								
MISO Project	**State**	**Miles of Line**	**Counties**	**MISO Participation**	**Number of Permits**	**Number of Steps**	**Days of hearings**	**Time to Approval (months)**
MVP 01	SD	43	2	No	1	5	1	8.40
MVP 02	SD/MN	225	10	Yes	3	23	48	59.27
MVP 03	MN/IA	227	8	Yes	9	43	11	56.40
MVP 04	IA	179	10	No	10	66	12	53.30
MVP 05	WI	180	9	Yes	1	11	10	18.27
MVP 06	SD/ND	163	4	No	3	20	5	10.70
MVP 07/08	MO	100	5	Yes	1	9	8	16.83
MVP 09/10/11/17	MO/IL	382	22	Yes	2	52	50	37.60
MVP 13	MI	140	4	No	1	10	2	5.97
MVP 15	WI/IL	6	2	No	2	18	6	18.60
MVP 16	IL	77	5	No	2	16	12	17.57

Table 2 – MVP Sub-Project Variables.								
MISO Project	**State**	**Sub-Project**	**Miles of Line**	**Counties**	**Number of Permits**	**Number of Steps**	**Days of hearings**	**Time to Approval (months)**
MVP 01	SD	MVP01 - SD	43	2	1	5	1	8.40
MVP 02	MN	MVP2 - MN	214	9	2	18	47	56.00
MVP 02	SD	MVP2 - SD	11	1	1	5	1	6.90
MVP 03	IA	MVP3 - IA Part 1	31	1	1	8	3	47.60
MVP 03	MN	MVP3 - MN	75	2	2	11	4	26.27
MVP 03	IA	MVP3 - IA Part 2	121	6	6	29	4	22.10
MVP 04	IA	MVP4 - IA Part 4	55	3	3	18	4	44.10
MVP 04	IA	MVP4 - IA Part 2	100	4	5	34	6	33.37
MVP 04	IA	MVP4 - IA Part 3	12	1	1	9	1	19.60
MVP 04	IA	MVP4 - IA Part 1	12	2	2	9	1	17.93
MVP 05	WI	MVP05 - WI	180	9	1	11	10	18.27
MVP 06	SD	MVP06 - SD	153	3	1	13	4	12.13
MVP 06	ND	MVP06 - ND	10	1	2	7	1	8.83
MVP 07/08	MO	MVP07,8 - MO	100	5	1	9	8	16.83
MVP 09/10/11/17	IL	MVP9,10,11,17 - IL	375	21	1	48	50	15.90
MVP 09/10/11/17	MO	MVP9,10,11,17 - MO	7	1	1	4	0	5.83
MVP 13	MI	MVP13 - MI	140	4	1	10	2	5.97
MVP 15	WI	MVP15 -WI	3.5	1	1	11	2	18.60
MVP 15	IL	MVP15 - IL	2.5	1	1	7	4	11.83
MVP 16	IL	MVP16 - IL Part 1	44	2	1	12	12	17.57
MVP 16	IL	MVP16 - IL Part 2	32.5	4	1	10	5	13.60

Table 3 – MISO Intervention in MVP Portfolio						
MISO Project	**State**	**Miles of Line**	**Counties**	**MISO Participation**	**Number of Permits**	**Number of Steps**
MVP 09/10/11/17	MO/IL	382	22	Yes	2	52
MVP 03	MN/IA	227	8	Yes	9	43
MVP 02	SD/MN	225	10	Yes	3	23
MVP 05	WI	180	9	Yes	1	11
MVP 04	IA	179	10	No	10	66
MVP 06	SD/ND	163	4	No	3	20
MVP 13	MI	140	4	No	1	10
MVP 07/08	MO	100	5	Yes	1	9
MVP 16	IL	77	5	No	2	16
MVP 01	SD	43	2	No	1	5
MVP 15	WI/IL	6	2	No	2	18

Table 4 –MISO Intervention in MVP Sub-Projects							
MISO Project	**State**	**Sub-Project**	**Miles of Line**	**Counties**	**MISO Participation**	**Number of Permits**	**Number of Steps**
MVP 09/10/11/17	IL	MVP9,10,11,17 - IL	375	21	Yes	1	48
MVP 02	MN	MVP2 - MN	214	9	Yes	2	18
MVP 05	WI	MVP05 - WI	180	9	Yes	1	11
MVP 06	SD	MVP06 - SD	153	3	No	1	13
MVP 13	MI	MVP13 - MI	140	4	No	1	10
MVP 03	IA	MVP3 - IA Part 2	121	6	No	6	29
MVP 04	IA	MVP4 - IA Part 2	100	4	No	5	34
MVP 07/08	MO	MVP07,8 - MO	100	5	Yes	1	9
MVP 03	MN	MVP3 - MN	75	2	Yes	2	11
MVP 04	IA	MVP4 - IA Part 4	55	3	No	3	18
MVP 16	IL	MVP16 - IL Part 1	44	2	No	1	12
MVP 01	SD	MVP01 - SD	43	2	No	1	5
MVP 16	IL	MVP16 - IL Part 2	32.5	4	No	1	10
MVP 03	IA	MVP3 - IA Part 1	31	1	No	1	8
MVP 04	IA	MVP4 - IA Part 3	12	1	No	1	9
MVP 04	IA	MVP4 - IA Part 1	12	2	No	2	9
MVP 02	SD	MVP2 - SD	11	1	No	1	5
MVP 06	ND	MVP06 - ND	10	1	No	2	7
MVP 09/10/11/17	MO	MVP9,10,11,17 - MO	7	1	Yes	1	4
MVP 15	WI	MVP15 -WI	3.5	1	No	1	11
MVP 15	IL	MVP15 - IL	2.5	1	No	1	7

Analysis and Results

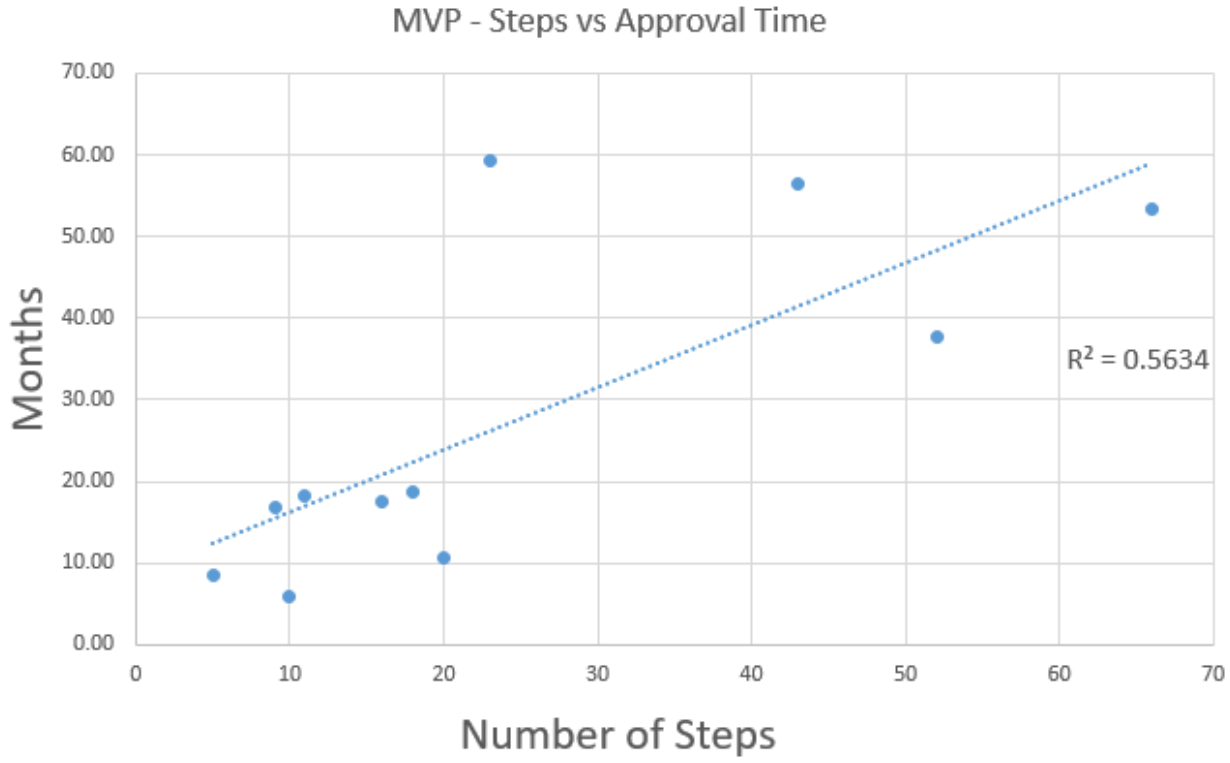


Figure 1 – Relationship between the total number of steps a project must comply with in all states it passes through and the time, in months, that it takes to be awarded the needed permit(s). R^2 = .56

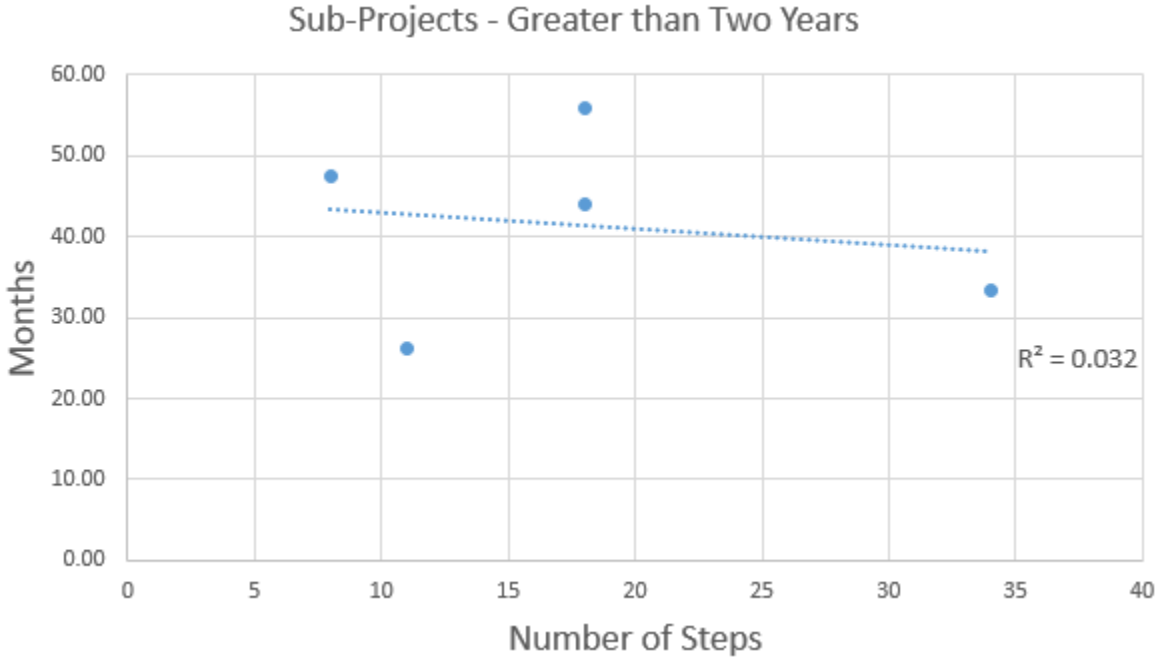


Figure 2 – Relationship between Number of Steps in the regulatory process and Months needed to receive approval for the five sub-projects which needed greater than two years. R^2 = .03

Figure 3 – Relationship between Number of Steps in the regulatory process and Months needed to receive approval for the 16 sub-projects which needed less than two years. $R^2 = .17$

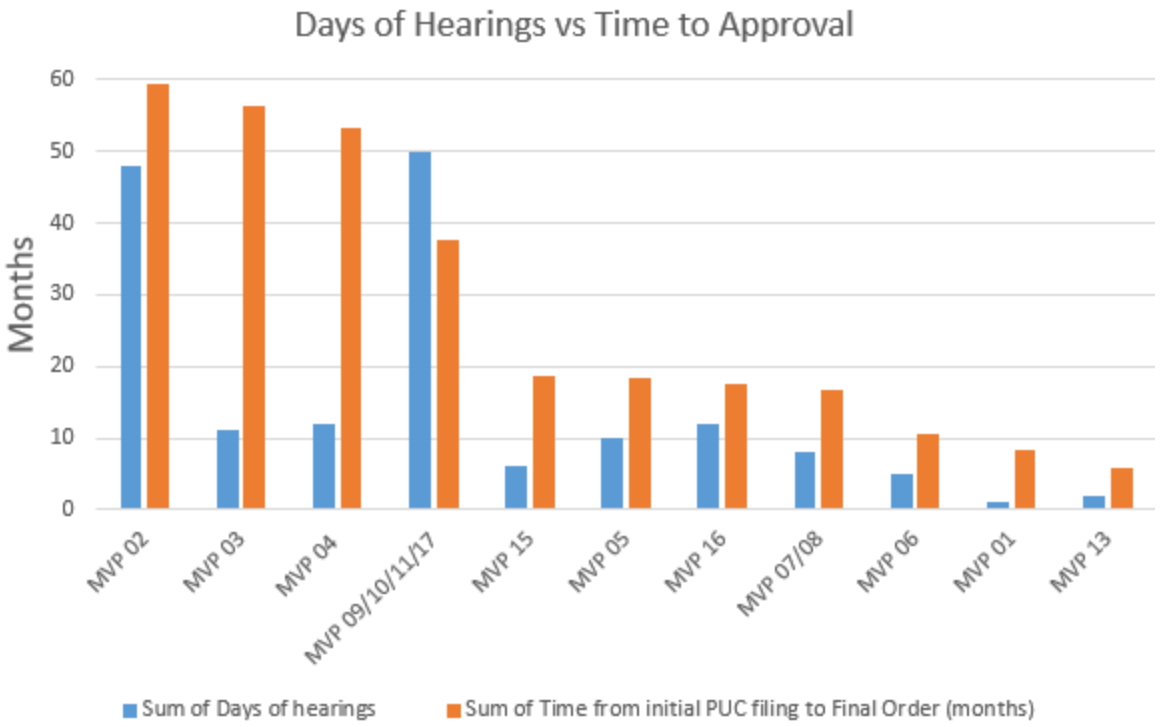


Figure 4 - Relationship between the number of days spent in hearings, number of counties a project passes through, and the time to approval. $R^2 = .38$

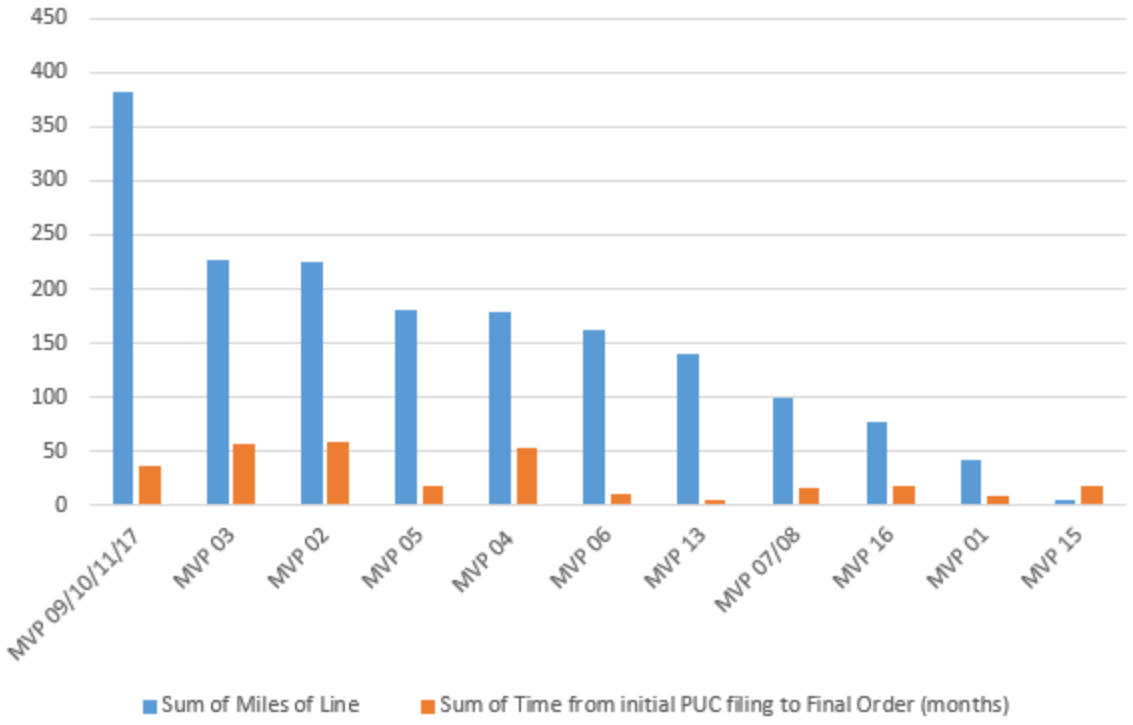


Figure 5 - Relationship between miles of line and the time it takes to receive project approval at the MVP level. $R^2 = .33$

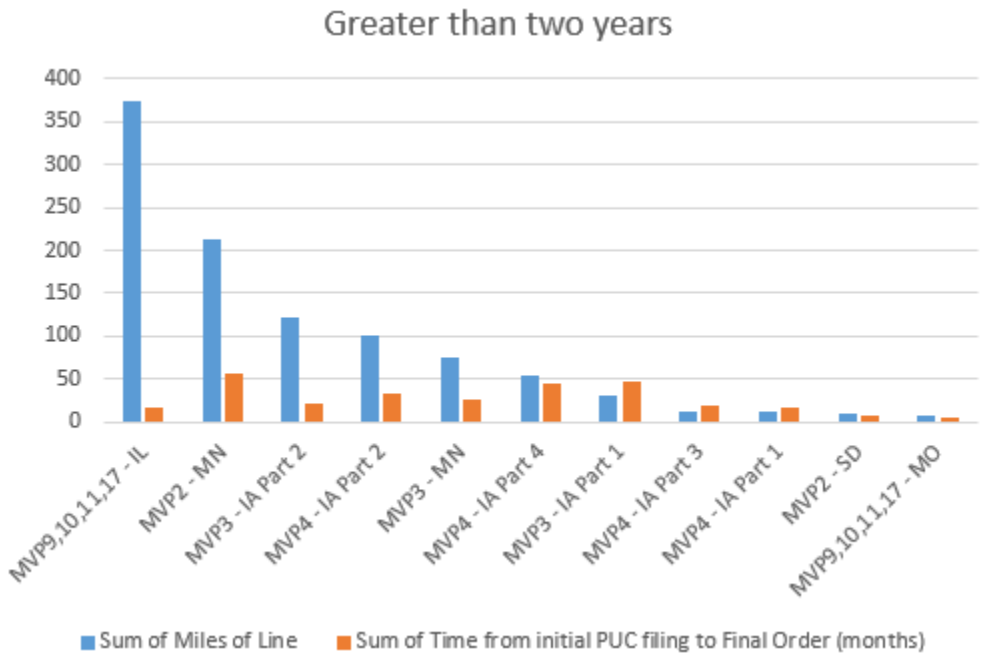


Figure 6 - Relationship between total miles of transmission line and time to receive approval for the Multi Value Projects in the "Greater than Two Years" group. $R^2 = 0$

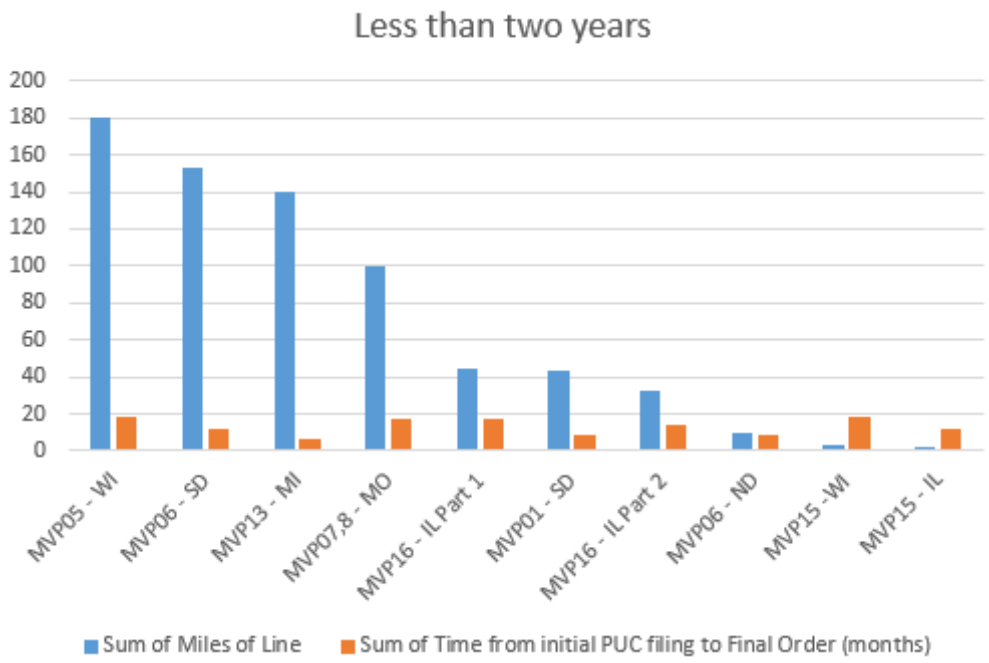


Figure 7 - Relationship between total miles of transmission line and time to receive approval for projects in the "Less than Two Years" group. $R^2 = 0$

Beginning first with the MVP level analysis, Figure 1 shows that there is a clear correlation between the number of regulatory steps a project must comply with, and the time it takes to comply with the regulatory processes. With a few notable exceptions, the more steps there are, the longer the process takes. This result, while unsurprising, lends confidence to the methods used in this analysis. The correlation is not perfect, however, and in some cases, while there are a similar number of steps in the process, the amount of time spent satisfying those requirements differs widely. The figures show that the majority of MVPs received approval within two years, with the average approval time of these sub-two year projects being approximately 14 months and a median approval time of approximately 17 months. For those MVPs which took longer than 2 years, the average length was approximately 52 months with a median of about 55 months. The sharp difference between the sub-two year and above 2 year approval times suggests that there are factors not visible at the MVP level that created delays in the longer lifetime projects.

At the MVP level, there is a correlation between number of hearings and time to approval (R^2 = .38). While this correlation disappears for the Less than Two Years group of sub-projects, it remains

when examining the Greater than Two Years group.

Unexpectedly, the length of the line has a much weaker correlation (R^2 = .33) with the amount of time needed to obtain the necessary approvals. This correlation weakens to significantly when we break the MVPs into their component sub-projects and completely disappears (R^2 = 0) once the groups are separated into the Greater than and Less than Two Years groups.

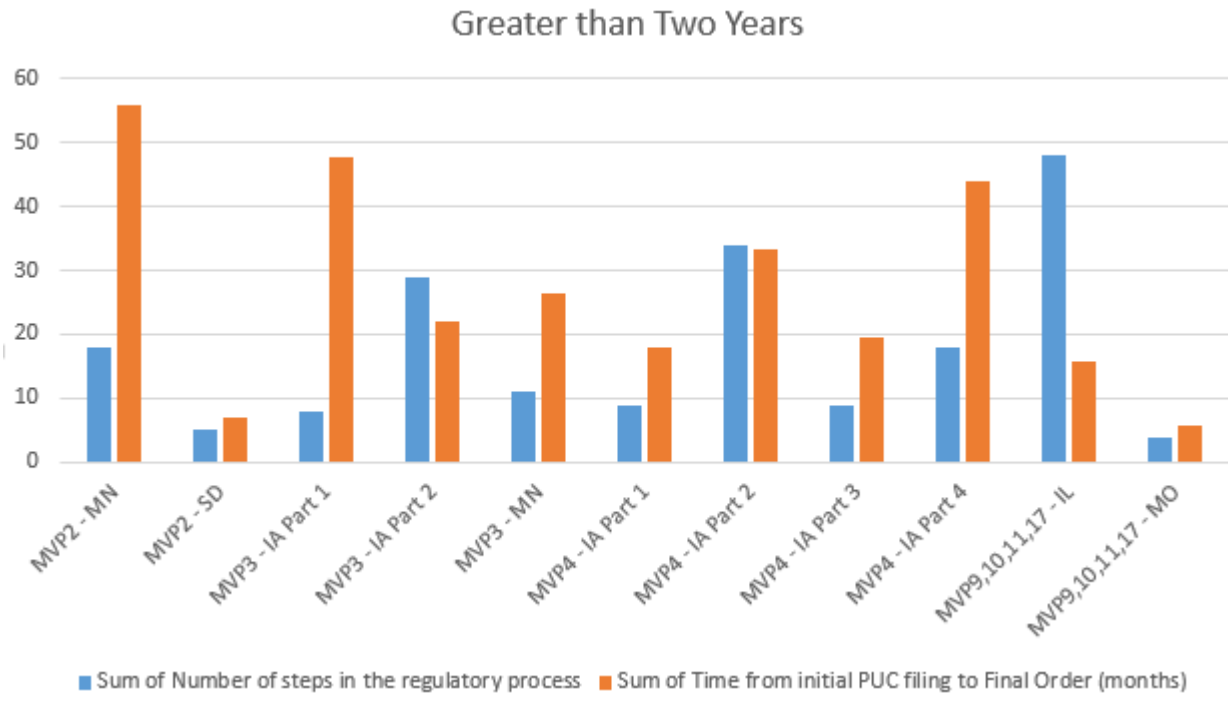


Figure 8 - Relationships between the number of steps in each state's regulatory process and the time it takes a given project to pass through each state's process. R^2 = 0

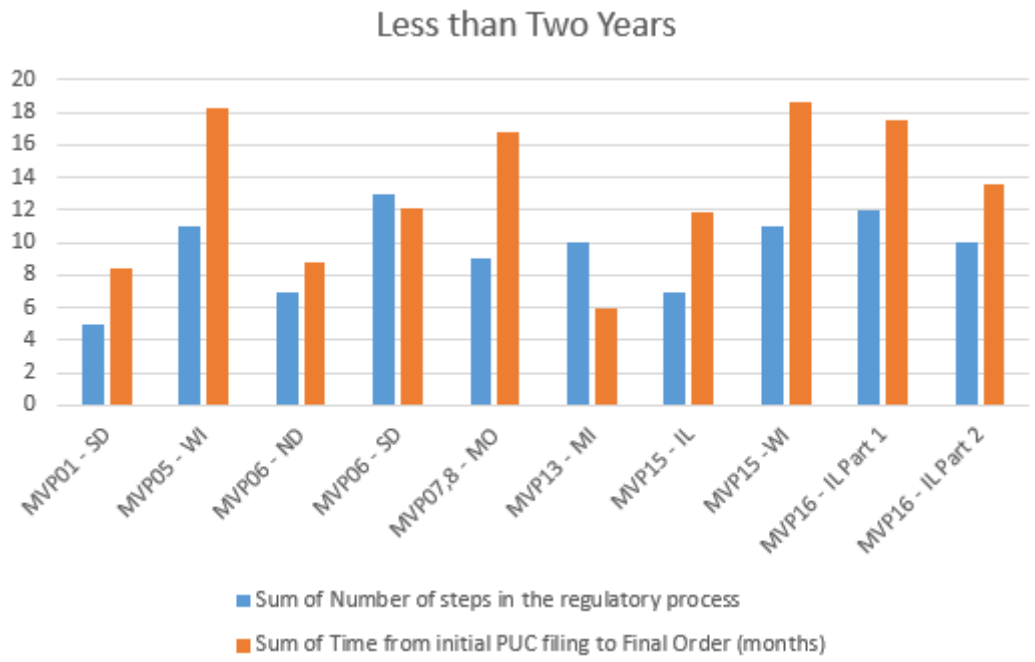


Figure 9 - Relationship between the number of steps in the regulatory process and Time. R^2 = .36

Figure 8 shows that there is a great deal of variability in the longer project timelines, both in number regulatory steps and length of time. However, with an R^2 value of zero, there is no correlation between the number of steps in the regulatory process and the time to receive approval in the greater than two year's group. In contrast, for the less than two years group, the correlation between number of steps and time to approval is much stronger, with an R^2 value of .36.

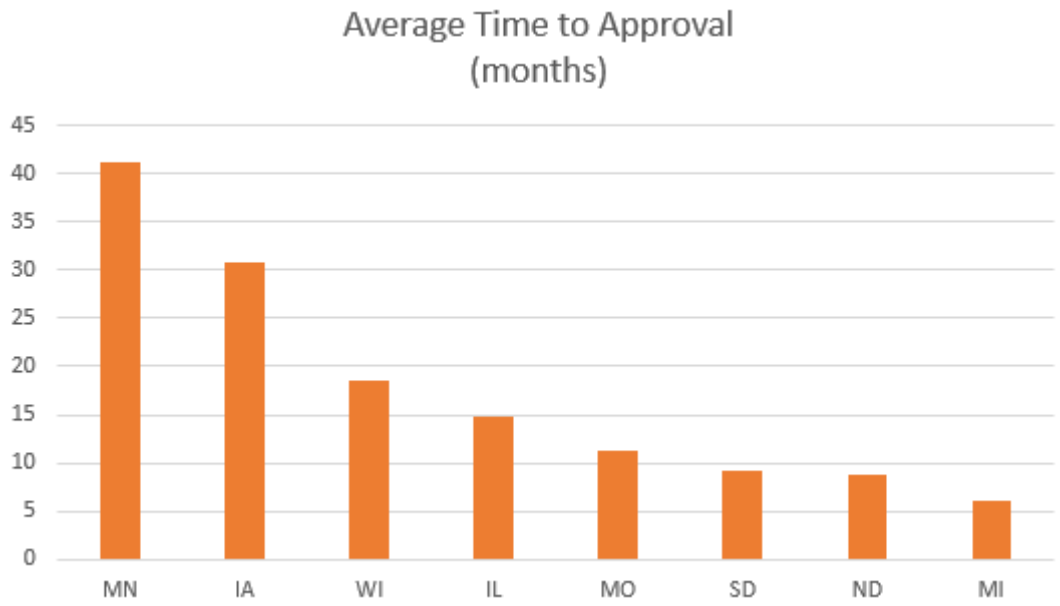


Figure 10 - Average time to approval for all sub-projects, grouped by state.

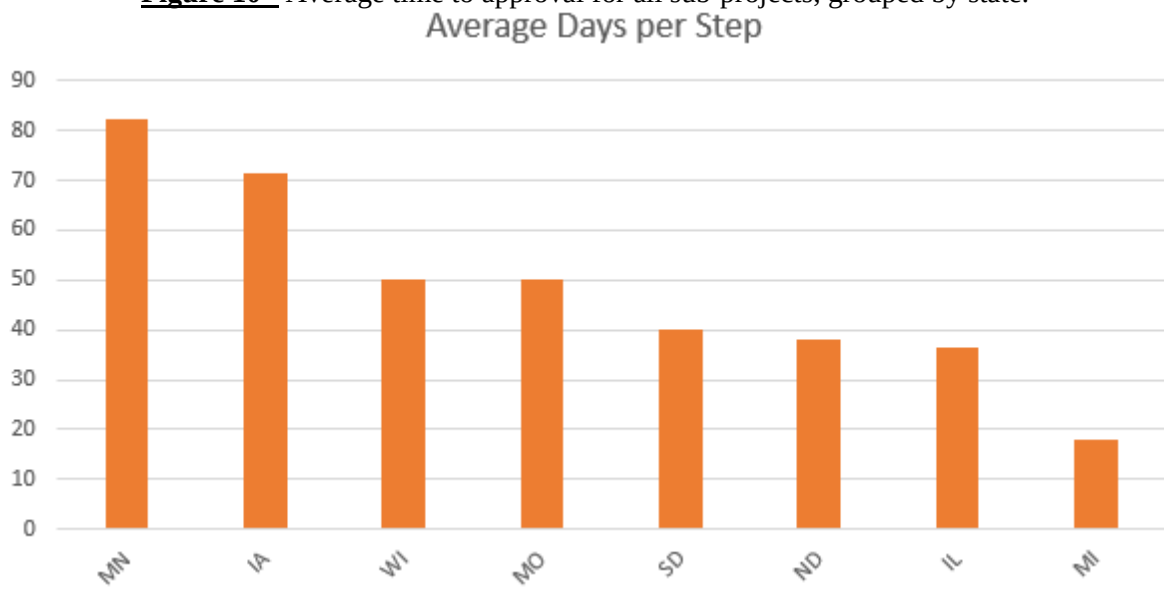


Figure 11 - The number of days spent seeking regulatory approval divided by the total number of steps in the process.

Looking at the average time to receive approval in Figure 10, we see that projects in Minnesota and Iowa, on average, take significantly longer than projects in other states. Looking back at Figure 8 we can also see that for projects that take longer than two years to receive approval, it is the projects in Minnesota and Iowa that have the longest times and makeup eight of the eleven sub-projects comprising the MVPs in this group. Figure 10 likewise shows that for the projects in this analysis, projects in

Minnesota and Iowa spend approximately 20 and 30 more days respectively on each step of the process than projects in the next most time-consuming states.

Discussion

First and foremost it is vital to remember that fifteen projects is an extremely small subset of all the transmission lines being built in the United States and this sample is not intended to be representative of all transmission projects. While this paper makes use of some statistical techniques, such as averaging, it should be noted that this small subset of projects is not representative of transmission projects nationally. In MISO alone, there were 354 new transmission projects approved in MISO's Transmission Expansion Planning 2017 report.[43] Some states in this analysis, such as Michigan and North Dakota, have only one project. Others, such as Minnesota, Missouri and Wisconsin, have only two. This paper does not attempt to draw statistical conclusions from the analysis, but rather uses statistical techniques to identify interesting correlations to suggest projects that warrant a case by case review.

Most surprising is the relatively poor correlation between length of transmission line and the time it took to move through the process. Intuitively, it was expected that the farther a project needed to go, the more communities it would disturb and the more approvals it would need. It is possible the correlation would be stronger if this analysis examined transmission project timelines more holistically, rather than focusing on the Utility Commission portion of the process specifically.

Figure 8 and Figure 10 are the most illuminating of those included in this analysis. Contrary to expectations, a project being built across state lines does not necessarily mean that the project will take longer than another single state project. It very much depends which two states a project is built in. The Illinois Rivers Project (MVP 9, 10, 11, 17), bears special mention in this regard. While the total project took more than two years to receive the needed regulatory approval from start to finish in both states it was built in, the actual time spent before the commissions was only approximately 22 months (15.9 in

[43] "MISO Transmission Planning Studies and Reports: MTEP17."

Illinois and 5.8 in Missouri). Due to this analysis's method of calculating the total time spent in regulatory approval and the fact that the Missouri portion of the project did not begin seeing approval until more than a year after the Illinois portion *received* its approval, total project time is greater than the sum of the individual project times.

Of the four MVP projects whose approval by the commission required more than two years, three of them were two state projects, and the fourth was built entirely in Iowa. As mentioned above, the sub-projects comprising the Illinois Rivers project (MVP 9, 10, 11, 17), both individually took less than two years. The remaining three MVPs were comprised of nine sub-projects, six in Iowa, two in Minnesota, and one in South Dakota. Of these nine projects, only five needed longer than two years to receive regulatory approval (Figure 2). While the higher level analysis showed the total MVP time to approval for these projects at an average of 55 months, the five longest sub-projects had an average approval time of 41.5 months. This shows immediately that at least some of the delay is due to developers not filing for all the needed certificates at the same time. If the process was started for each project at the same time, more than a year could be shaved off of these longer project approval times. This is especially evident in the case of the Illinois Rivers project. Because the Missouri portion of the project did not begin seeking approval until after the Illinois portion of the project had received its approval, the MVP approval time is the fourth highest of all the projects considered, at 37.6 months. However, the Illinois portion needed only 15.9 months and the Missouri portion needed only 5.8 months. If both portions of the project had begun seeking approval concurrently, the project may have received both approvals within 16 months, less than half the time it actually took. Excluding the Illinois Rivers Projects, we are left with five sub-projects that needed well above the two years the other projects needed, to receive approval. Of these five projects, three are in Iowa and two in Minnesota.

There are a couple of factors that drove up the time needed for approval of projects in Minnesota. Minnesota requires two permits for transmission facilities, a Certificate of Need and a Route Permit. In seeking approval for the Minnesota portion of the MVP2 project, there is an approximately 9 month delay

between the Minnesota Public Utility Commission (PUC) approving the developer's notice to affected cities, counties, and land owners and their application for a Certificate of Need. In addition to this unexplained delay, two other major factors slowed down MVP2 approval. The first is that the developer did not file for both applications at the same time. The Minnesota PUC allows developers to file their Certificate of Need and Route permit jointly. This option was taken advantage of by the Minnesota portion of MVP3 resulting in this project receiving its approvals for both applications in approximately half the time it took for MVP2. While MVP3 is a shorter transmission line, previous analysis has already shown the correlation between length of line and approval time, for projects with greater than two year approval times, is poor. The second reason for the longer time, is the inclusion of the Environmental Impact Analysis in the Minnesota PUC process. Of the states included in this analysis, only Minnesota and Wisconsin require an environmental impact statement (EIS) to be prepared by a state agency after a Certificate application is submitted, and the one project in Wisconsin was so small an EIS was not required. While other states, such as South Dakota do require an EIS, in most cases the EIS is prepared by the developer in advance and submitted as part of the application. Due to this analysis only examining the time from the first Utility Commission filing to the issuance of the needed certificate, the time needed to conduct the EIS is not accounted for in the other projects. Subtracting the time spent waiting for the completion of the EIS's for MVP2 and MVP3 results in approval times of approximately 41 months and 14 months respectively. This decrease puts the MVP3 project comfortably within the Less than two years group and slightly strengthens the correlation between regulatory steps and time to approval. MVP2 on the other hand, appears to have been a contentious project, with a total of twenty-five evidentiary hearings held over two months and post hearing briefs being accepted for another four months after hearings were concluded. The relatively strong correlation between days of hearings and approval times suggests that part of the longer times may be due these projects being unpopular and being contested wherever legally possible. It would be interesting to see how the number of parties to a docket affects project time since large numbers of individuals and organizations requesting party status on the docket, allows them to lodge objections and offer testimony at hearing, potentially resulting in more days of hearings.

Turning next to the projects in Iowa, while there is a weak correlation between the number of steps and the time to approval in the three projects of the Less than Two Years group ($R^2 = .17$), the correlation disappears for the Greater than Two Years group ($R^2 = 0$). This suggests there were factors outside the normal approval process affecting approval times for these projects. Looking back at the project timelines and re-examining the documents filed on the docket during large breaks in updates, is illuminating. It showed that each of the projects in Iowa spent over a year responding to deficiencies in their applications, identified by the Iowa Utilities Board. Similarly, while not in the top five longest projects, the MidAmerican portion of MVP3 (Sub Project MVP3 IA Part 2) provides an interesting analog. This project, through six Iowa counties, spent fourteen months responding to deficiencies before the six dockets were consolidated. Once those deficiencies were addressed and the dockets consolidated however, the remainder of the process was completed in five months.

In both Minnesota and Iowa, one of the things that drove project times up was not filing for all the needed Permits (in Minnesota) or Petitions for Franchise (in Iowa) at the same time. In Minnesota, MVP2 filed for their Certificate of Need in August of 2007, but did not filed for their Route Permit until December of 2008, a sixteen month delay. In addition to the time lost directly by not filing at the same time, this delay required the Certificate of Need and Route Permits to proceed through the regulatory process independent of each other. That meant separate environmental impact analysis had to be performed for each project and hearings had to be planned and held separately. This type of delay also occurred in Iowa. In Iowa, this often occurred since two companies (ITC Transmission and MidAmerican Energy Co) were each building a portion of a single, larger transmission project. Due to the Iowa requirement that transmission projects provide local electrical value in each county they pass through, certain projects could not continue through the approval process until other projects, being built in other counties and/or by another developer, reached the appropriate stage in their process.

Finally, in several cases, there are gaps in docket filings that cannot be explained as it is beyond the scope of this analysis. The MVP4 Part 4 project, one of the top five longest, had several of these

breaks. After holding its public meetings in August 2013, ITC did not file their Petitions for Franchise until the last day of March 2014, a seven-month delay. This project also had another eight-month delay, from October 2014 to June 2015, during which the only action on the dockets was the filing of a single objection. While it possible that the developer was doing something to move the project forward during these gaps, it is not clear whether those actions were required for the state process, a federal requirement, negotiation with landowners, or community outreach and so can only be mentioned in this analysis as unexplained delays.

MISO's role in the process also appears to be a fairly limited one. While many of the projects stated their status as MVPs in their application to the state utility commission, demonstrating the value MISO's advanced studies provided to projects, its only active participation in the approval process was to offer testimony at hearing. Even this happened in only a relatively small subset of projects. It is interesting to note that of the four MVP projects with the longest approval times, MISO intervened in three of them. However, at both the MVP and Sub-Project level, length of line appears to be the most robust indicator of MISO intervention. At the MVP level, MISO intervened in four of the five longest projects and only once outside of those. At the sub-project level, MISO intervention is observed in five of the top ten longest lines, and only once in the remaining eleven shorter lines. Number of Hearings is also a good indicator of MISO participation at the sub-project level, with the five of the ten sub-projects with the most hearings also receiving MISO intervention. While interesting to note, it is unclear how MISO's intervention affected the project timelines. The correlation between MISO intervention, line length, and number of hearings suggests that MISO intervention is in anticipation of, or response to, complicated or contentious projects. Unfortunately, without a larger sample of projects, it is impossible to say whether its intervention had any significant effect on the time it takes to receive approval.

Conclusion

In conclusion, it is clear that there is a correlation between the number of regulatory steps a

developer must comply with and the time it takes to receive approval for the needed permits. Longer project times however, are not the result of an overly burdensome state regulatory process, but rather developer decisions about when to file the needed applications, the quality of those applications, and other delays not directly related to the state approval process. Developers seeking to shorten the time it takes to receive regulatory approval in their state, should focus on submitting high quality applications when initially filing for a Certificate of Need or other permits, and submitting applications for all needed permits simultaneously to avoid the repetition of steps required when filing separately.

References

"2014 Annual Report." Indiana Utility Regulatory Commission. Accessed March 15, 2018. https://www.in.gov/iurc/files/Indiana_Utility_Regulatory_Commission_2014_Annual_Report_FINAL(3).pdf.

Albadi, M. H., and E. F. El-Saadany. "A Summary of Demand Response in Electricity Markets." *Electric Power Systems Research* 78, no. 11 (November 1, 2008): 1989–96. https://doi.org/10.1016/j.epsr.2008.04.002.

Allcott, Hunt, and Sendhil Mullainathan. "Behavior and Energy Policy." *Science* 327, no. 5970 (March 5, 2010): 1204–5. https://doi.org/10.1126/science.1180775.

"Ameren Transmission Company's Illinois Rivers Project." Illinois Commerce Commission. Accessed April 22, 2018. https://www.icc.illinois.gov/AmerenILRiversProject/.

"American Transmission Co. Projects– Pleasant Prairie-Zion Energy Center." Accessed April 22, 2018. http://www.atc-projects.com/projects/pleasant-prairie-zion-energy-center-project/.

Azar, Christian, Kristian Lindgren, Eric Larson, and Kenneth Möllersten. "Carbon Capture and Storage From Fossil Fuels and Biomass – Costs and Potential Role in Stabilizing the Atmosphere." *Climatic Change* 74, no. 1–3 (January 1, 2006): 47–79. https://doi.org/10.1007/s10584-005-3484-7.

"Badger Coulee Transmission Line Project." American Transmission Co. projects. Accessed April 22, 2018. http://www.atc-projects.com/projects/badger-coulee/.

"Big Stone South to Ellendale (BSSE) Transmission Line." Accessed April 22, 2018. http://bssetransmissionline.com/.

"Big Stone South-Brookings County 345 KV Project." CapX2020 - Delivering reliable electricity. Accessed April 22, 2018. http://www.capx2020.com/bss/index.html.

"Black Hawk-Hazelton 345 KV Electric Transmission Project." ITC Project Profile. Accessed April 22, 2018. https://www.itc-holdings.com/docs/default-source/project-documents/black-hawk---hazleton-345-kv-line-build/black_hawk_hazleton_project_profile.pdf?sfvrsn=ff7df1f6_4.

Boyle, Godfrey. *Renewable Electricity and the Grid: The Challenge of Variability*. Earthscan, 2012.

"Brookings County-Hampton 345 KV Project." CapX2020 - Delivering reliable electricity. Accessed April 22, 2018. http://www.capx2020.com/brookings/index.html.

"Candidate MVP Portfolio Analysis: June 2011 Interim Report." Midcontinent ISO, June 2011. https://puc.sd.gov/commission/dockets/electric/2014/EL14-090/DR2/DR2-4/Attachment1.pdf.

"Case No. EA-2015-0145." Missouri Public Service Commission - Electronic Filing Information System. Accessed March 8, 2018. https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.

"Case No. EA-2015-0146." Missouri Public Service Commission - Electronic Filing Information System. Accessed March 8, 2018. https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.
"Case No. EA-2015-0146." Missouri Public Service Commission - Electronic Filing Information System. Accessed March 8, 2018. https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.
"Case PU-13-840." Public Service Commission, North Dakota. Accessed March 7, 2018. https://psc.nd.gov/database/company_case_list.php.
"Case: U-16200." Michigan Public Service Commission E-Dockets Community. Accessed March 15, 2018. https://mi-psc.force.com/s/case/500t0000008efTdAAI/in-the-matter-of-the-application-of-international-transmission-company-dba-itc-transmission-for-an-expedited-siting-certificate-for-a-transmission-line-pursuant-to-2008-pa-295-part-4-for-region-no-4-thumb-region-as-designated-by-the-michigan-wi.
Chan, S. C., K. M. Tsui, H. C. Wu, Y. Hou, Y. C. Wu, and F. F. Wu. "Load/Price Forecasting and Managing Demand Response for Smart Grids: Methodologies and Challenges." *IEEE Signal Processing Magazine* 29, no. 5 (September 2012): 68–85. https://doi.org/10.1109/MSP.2012.2186531.
Climate, Jennifer Weeks, The Daily, and Jennifer Weeks Climate The Daily. "U.S. Electrical Grid Undergoes Massive Transition to Connect to Renewables." Scientific American. Accessed March 26, 2018. https://www.scientificamerican.com/article/what-is-the-smart-grid/.
"Colby-Killdeer 345 KV Electric Transmission Project." ITC Project Profile. Accessed April 22, 2018. https://www.itc-holdings.com/docs/default-source/project-documents/colby-killdeer-345-kv-line-build/1433516511itcmw_profile_colby-killdeer_rev0615.pdf?sfvrsn=2336f1f6_4.
Craig, J. Dean, and Scott J. Savage. "Market Restructuring, Competition and the Efficiency of Electricity Generation: Plant-Level Evidence from the United States 1996 to 2006." *The Energy Journal* 34, no. 1 (2013): 1–31.
"Docket 5-CE-142." PSC - Case Management System (Docket Detail). Accessed March 15, 2018. http://apps.psc.wi.gov/vs2010/dockets/content/detail.aspx?dockt_id=5-CE-142.
"Docket 06-1115." MN Commerce Department - eDockets Home. Accessed April 3, 2018. https://www.edockets.state.mn.us/EFiling/search.jsp.
"Docket 08-1474." MN Commerce Department - eDockets Home. Accessed April 4, 2018. https://www.edockets.state.mn.us/EFiling/search.jsp.
"Docket 12-1053." MN Commerce Department - eDockets Home. Accessed April 3, 2018. https://www.edockets.state.mn.us/EFiling/search.jsp.
"Docket 12-1337." MN Commerce Department - eDockets Home. Accessed April 3, 2018. https://www.edockets.state.mn.us/EFiling/search.jsp.
"Docket 137-CE-161." PSC - Case Management System (Docket Detail). Accessed March 20, 2018. http://apps.psc.wi.gov/vs2010/dockets/content/detail.aspx?dockt_id=137-CE-161.
"Docket: E-21894 Amendment No. 2 and No. 3." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Docket E-22116." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Docket EL06-002." South Dakota Public Utilities Commission - Commission Dockets. Accessed April 3, 2018. https://puc.sd.gov/Dockets/Electric/2006/EL06-002.aspx.
"Docket EL10-016." South Dakota Public Utilities Commission - Commission Dockets. Accessed April 3, 2018. https://puc.sd.gov/Dockets/Electric/2010/el10-016.aspx.
"Docket EL13-020." South Dakota Public Utilities Commission - Commission Dockets. Accessed April 3, 2018. http://puc.sd.gov/Dockets/Electric/2013/el13-020.aspx.
"Docket EL13-028." South Dakota Public Utilities Commission - Commission Dockets. Accessed April 3, 2018. https://puc.sd.gov/Dockets/Electric/2013/EL13-028.aspx.
"Dockets E-22011, E-22034." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Dockets E-22097, E-22098, E-22099." Iowa Utilities Board Electronic Filing System. Accessed April 4,

2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Dockets E-22097, E-22098, E-22099 Amendment 1, E-22152, E-22153." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Dockets E-22103, E-22104, E-22105, E-22106, E-22107, E-22108." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Dockets E-22140, E-22141, E-22142." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"Dockets E-22152, E-22153." Iowa Utilities Board Electronic Filing System. Accessed April 4, 2018. https://efs.iowa.gov/efs/ShowDocketSearch.do.
"EDocket: 11-0661." Illinois Commerce Commission - eDocket Documents. Accessed March 20, 2018. https://www.icc.illinois.gov/docket/Documents.aspx?no=11-0661.
"EDocket: 12-0598." Illinois Commerce Commission - eDocket Documents. Accessed April 7, 2018. https://www.icc.illinois.gov/docket/Documents.aspx?no=12-0598.
"EDocket: 14-0494." Illinois Commerce Commission - eDocket Documents. Accessed April 9, 2018. https://www.icc.illinois.gov/docket/Documents.aspx?no=14-0494.
"EDocket: 14-0514." Illinois Commerce Commission - eDocket Documents. Accessed April 9, 2018. https://www.icc.illinois.gov/docket/Documents.aspx?no=14-0514.
"Greentown-Reynolds Electrical System Improvement Project." Accessed March 8, 2018. http://www.greentownreynolds.com/abouttheproject.html.
"Integrating Renewable Electricty on the Grid: A Report by the APS Panel on Public Affairs." American Physical Society, 2016. https://www.aps.org/policy/reports/popa-reports/upload/integratingelec.pdf.
ITC. "Project Profile: Thumb Loop 345kV Transmission Line." ITC Holdings Corp. Accessed March 15, 2018. http://itctransco-itc-prod.barkleylabs.com/operating-entities/itc-michigan/projects/itctransmission.html.
"Killdeer-Hampton Tap 345 KV Electric Transmission Project." ITC Project Profile. Accessed April 22, 2018. http://itctransco-itc-prod.barkleylabs.com/images/documents/1433516935ITCMW_Profile_Killdeer-Hampton_rev0615.pdf.
Klass, Alexandra B., and Elizabeth J. Wilson. "Interstate Transmission Challenges for Renewable Energy: A Federalism Mismatch Symposium." *Vanderbilt Law Review* 65 (2012): 1801–74.
"Ledyard-Colby 345 KV Electric Transmission Project." ITC Project Profile. Accessed April 22, 2018. http://itctransco-itc-prod.barkleylabs.com/images/documents/1433516994ITCMW_Profile_Ledyard-Colby_rev0615.pdf.
"Mark Twain Transmission Project | Ameren Transmission." Ameren Corporation. Accessed April 22, 2018. https://www.ameren.com/mark-twain.
"Michigan Thumb Loop Transmission Line." Center for Rural Affairs, June 9, 2011. http://www.cfra.org/michigan-thumb-loop.
"MISO Transmission Planning Studies and Reports: MTEP11." Accessed April 3, 2018. https://www.misoenergy.org/planning/transmission-studies-and-reports#nt=%2Freport-study-analysistype%3AMTEP%2Fmtepdoctype%3AMTEP%20Report%2Fmtepreportyear%3APrevious%20MTEP%20Reports&t=10&p=0&s=FileName&sd=desc.
"MISO Transmission Planning Studies and Reports: MTEP17." Accessed April 3, 2018. https://www.misoenergy.org/planning/transmission-studies-and-reports#nt=%2Freport-study-analysistype%3AMTEP%2Fmtepdoctype%3AMTEP%20Report%2Fmtepreportyear%3AMTEP17&t=10&p=0&s=&sd=.
Nair, Nirmal-Kumar C., and Niraj Garimella. "Battery Energy Storage Systems: Assessment for Small-Scale Renewable Energy Integration." *Energy and Buildings* 42, no. 11 (November 1, 2010): 2124–30. https://doi.org/10.1016/j.enbuild.2010.07.002.

"OUCC: NIPSCO Electric Infrastructure Plan." Indiana Office of Utility Consumer Counselor, November 6, 2017. http://www.in.gov/oucc/2747.htm.
Rubin, Edward S., Chao Chen, and Anand B. Rao. "Cost and Performance of Fossil Fuel Power Plants with CO2 Capture and Storage." *Energy Policy* 35, no. 9 (September 1, 2007): 4444–54. https://doi.org/10.1016/j.enpol.2007.03.009.
"Spoon River Transmission Project | Ameren Transmission." Accessed April 22, 2018. https://www.ameren.com/spoon-river.
Swadley, Adam, and Mine Yücel. "Did Residential Electricity Rates Fall after Retail Competition? A Dynamic Panel Analysis." *Energy Policy*, Clean Cooking Fuels and Technologies in Developing Economies, 39, no. 12 (December 1, 2011): 7702–11. https://doi.org/10.1016/j.enpol.2011.09.014.
"The Reynolds to Topeka Electric System Improvement Project." Accessed April 22, 2018. http://www.reynoldstopeka.com/.
Vaillancourt, Kathleen, Maryse Labriet, Richard Loulou, and Jean-Philippe Waaub. "The Role of Nuclear Energy in Long-Term Climate Scenarios: An Analysis with the World-TIMES Model." *Energy Policy* 36, no. 7 (July 1, 2008): 2296–2307. https://doi.org/10.1016/j.enpol.2008.01.015.
Vajjhala, Shalini P., and Paul S. Fischbeck. "Quantifying Siting Difficulty: A Case Study of US Transmission Line Siting." *Energy Policy* 35, no. 1 (January 1, 2007): 650–71. https://doi.org/10.1016/j.enpol.2005.12.026.
Wei, Max, Shana Patadia, and Daniel M. Kammen. "Putting Renewables and Energy Efficiency to Work: How Many Jobs Can the Clean Energy Industry Generate in the US?" *Energy Policy* 38, no. 2 (February 1, 2010): 919–31. https://doi.org/10.1016/j.enpol.2009.10.044.

Appendix 1

MVP – 1 – Big Stone to Brookings, South Dakota[44] [45] [46]

- 6/3/2013 – Application for a Facility Permit jointly filed by Xcel Energy and Otter Tail Power Company with the South Dakota Public Utilities Commission.
- 6/24/2013 – Notice of public hearing published in local newspapers of counties through which the project would pass.
- 7/31/2013 – One public input hearing held in Brookings, SD.
- 8/5/2013 – Evidence of publication and notice to landowners provided to PUC.
- 2/20/2014 – PUC issued its order granting a Permit to Construct Facilities.

MVP – 2 – Brookings, South Dakota to SE Twin Cities, Minnesota[47]

South Dakota Facility Permit[48]

[44] "Docket EL06-002," South Dakota Public Utilities Commission - Commission Dockets, accessed April 3, 2018, https://puc.sd.gov/Dockets/Electric/2006/EL06-002.aspx.
[45] "Docket EL13-020," South Dakota Public Utilities Commission - Commission Dockets, accessed April 3, 2018, http://puc.sd.gov/Dockets/Electric/2013/el13-020.aspx.
[46] "Big Stone South-Brookings County 345 KV Project," CapX2020 - Delivering reliable electricity, accessed April 22, 2018, http://www.capx2020.com/bss/index.html.
[47] "Brookings County-Hampton 345 KV Project," CapX2020 - Delivering reliable electricity, accessed April 22, 2018, http://www.capx2020.com/brookings/index.html.
[48] "Docket EL10-016," South Dakota Public Utilities Commission - Commission Dockets, accessed April 3, 2018,

- 11/22/2010 – CapEX2020 partners filed a Facility Permit application with the SD PUC.
- 12/10/2010 - Notice of the meeting was published in a local newspaper.
- 1/6/2011 – Public input meeting held.
- 1/20/2011 – Evidence of publication and notice to landowners provided to PUC.
- 6/17/2011 – PUC issued its order granting a Permit to Construct Facilities.

Minnesota Certificate of Need[49]

- 8/4/2006 – Notice given to MN PUC of intention to file for a Certificate of Need.
- 11/3/2006 – MN PUC approved the companies' plans for giving notice to affected cities, counties, and landowners.
- 8/16/2007 – Xcel Energy and Great River Energy filed a Certificate of Need.
- 3/31/2008 – Environmental Report completed by the Minnesota Office of Energy Security Energy Facility Permitting Unit.
- 4/11/2008 – MISO petitions to become a party to the proceeding at the request of the Minnesota Office of Energy Security and was granted party status 4/22/2008.
- 5/28/2008 – 19 Public hearings in 13 locations, over 10 days, were began 6/17/2008, with advanced notice of the hearings published in local or state newspapers from 5/31-6/5 2008 and notice mailed directly to landowners affected by the project by the developers.
- 7/14 through 9/18/2008 – 25 days of evidentiary hearings were held, with post hearing briefs filed by a number of parties through January 23.
- 2/27/2009 – The Minnesota Office of Administrative Hearings, for the Minnesota PUC, through the Administrative Law Judge, issued an Order makings its "findings of fact, conclusions, and recommendations" on the application for a Certificate of Need. The order approved Certificates of Need for upsized versions of the projects (double circuited lines with only one side being used until needed).
- 3/16/2009 – A number of parties submitted exceptions to the administrative law judge's findings in the Order and a request to reopen the case.
- 4/9/2009 – Commission staff recommended granting Certificates of Need for the upsized versions of the projects and deny the request to reopen.
- 5/22/2009 – The MN PUC granted Certificates of Need for the upsized versions of the projects with conditions outlined in the order.
- 6/11/2009 – A number of parties, including the applicants, submitted petitions for reconsideration, taking issue with some of the conditions in the order.
- 8/10/2009 – All but the applicant's petition for reconsideration were denied and the PUC issued a new Final Order amending certain portions of its 5/22/2009 order.

Minnesota Route Permit[50]

- 12/29/2008 – A Route Permit was submitted for the Brookings, SD to Hampton, MN project (MVP-2).
- 2/5/2009 – After finding the application "substantially complete" on January 29, the PUC issued its Notice and Order of Hearing and referred the matter to the Office of Administrative Hearings to hold public hearings.

https://puc.sd.gov/Dockets/Electric/2010/el10-016.aspx.

[49] "Docket 06-1115," MN Commerce Department - eDockets Home, accessed April 3, 2018, https://www.edockets.state.mn.us/EFiling/search.jsp.

[50] "Docket 08-1474," MN Commerce Department - eDockets Home, accessed April 4, 2018, https://www.edockets.state.mn.us/EFiling/search.jsp.

- 6/30/2009 – Notice of EIS Scoping Decision published.
- 10/20/2009 – Notice of Draft EIS and public information meetings (hearings).
- 11/30/2009 – Public and Evidentiary hearings begin. 17 public hearings were held in 8 cities over 9 days concluding December 11, with evidentiary hearings between 12/11 and 12/28.
- 4/22/2010 – The Administrative Law Judge assigned to the case issued his "findings of fact, conclusions, and recommendations."
- 6/15/2010 – The Office of Energy Security received notice from the US Fish and Wildlife Service indicating that the proposed route crossing of the Minnesota River was not viable.
- 7/27/2010 – The case was remanded to the Office of Administrative Hearings to select an alternate route for crossing the Minnesota River (segment 4).
- 9/14/2010 – A Route Permit for five of the six proposed segments is approved (1,2,3,5,6).
- 10/4/2010 – Petition for Reconsideration was submitted by objecting parties, but was denied 10/29/2010.
- 12/22/2010 – The Administrative Law Judge issued his "Findings of Fact, Conclusions of Law, and Recommendations" for the remanded portion of the route.
- 3/1/2011 – The PUC granted a route permit for the remanded portion of the route.

MVP – 3

Minnesota Certificate of Need[51] and Route Permit[52]

- 9/28/2012 – ITC Midwest filed its Notice Plan Petition (plan for notifying parties affected by the project) with the Minnesota PUC.
- 12/31/2012 – Notice Plan is approved by the MN PUC.
- 3/22/2013 – ITC Midwest files its application for a Certificate of Need.
- 3/28/2013 – ITC Midwest filed its Route Permit Application and requested that the Certificate of Need and Route Permit proceedings be combined.
- 6/24/2013 – Notice of Public Information and EIS Scoping meetings.
- 6/27/2013 – PUC referred the Certificate of Need application to the Minnesota Office of Administrative hearings for a contested case proceeding. The contested case proceeding was to be held jointly with the contested case review of ITC Midwest's site/route permit application (Docket 12-1337)
- 3/21/2014 – Draft EIS.
- 4/10/2014 – MISO admitted as a party to the proceeding.
- 5/13-14/2014 – One public input hearing held in each county (two in Martin County), for a total of four over two days.
- 5/19-20/2014 – Evidentiary Hearing held.
- 7/11/2014 – Final EIS submitted.
- 9/8/2014 – The ALJ filed his "Findings of Fact, Conclusions of Law, and Recommendations" on the Certificate of Need and Route Permit proceedings.
- 9/23/2014 – Several parties filed exceptions to the ALJ's report.
- 11/25/2014 – The PUC granted ITC Midwest a Certificate of Need and Route Permit.
- Based on a prior decision of the Iowa PUC, ITCM determined it would need to combine the Iowa Portion of MVP3 with the Ledyard to Colby portion of MVP4 into one application (Kossuth

[51] "Docket 12-1053," MN Commerce Department - eDockets Home, accessed April 3, 2018, https://www.edockets.state.mn.us/EFiling/search.jsp.
[52] "Docket 12-1337," MN Commerce Department - eDockets Home, accessed April 3, 2018, https://www.edockets.state.mn.us/EFiling/search.jsp.

County). Consolidation was requested 6/15/2015, and approved 9 months later. Public hearings held March 23, 2016.

Iowa proceedings

ITC Midwest Docket[53] - MVP3 – IA Part 1

- 3/11/2013 – ITC Midwest filed its newspaper notice of the proposed project with the IUB in Kossuth County.
- 4/17/2013 – Informational meeting held in Kossuth County.
- 10/25/2013 – Petition for Franchise submitted to the IUB.
- 6/15/2015 – ITC Midwest requested the consolidation of this docket with its Dockets for the MVP 4 project (E-22140, E-22141, E-22142) because this project by itself provided no independent value without consideration of the MVP 4 dockets.
- 3/23/2016 – The requested Dockets were consolidated.
- 6/24/2016 - Official Notice of Petition and hearings from the IUB published in local newspaper by ITC Midwest.
- 7/12-13/2016 – A public hearing for the presentation of evidence and cross examination of witnesses was held.
- 12/22/2016 – The IUB issued an order granting the petition for electric franchise conditional on ITC Midwest making minor revisions to its petition.
- 2/6/2017 – Franchise issued.

MidAmerican Energy Company[54] - MVP3 – IA part 2

- 10/25/2012 – MidAmerican Energy filed its newspaper notice (notice of the scheduled informational meeting) in the 6 counties through which the project would pass.
- 12/4-6/2012 – MidAmerican held informational meetings in each county.
- 1/18/2013 – MidAmerican filed its Petitions for Franchise with the IUB in each county.
- 3/13/2014 – The IUB issued an order consolidating the six MidAmerican dockets and assigning them to an Administrative Law Judge for a hearing (eminent domain was being requested in four of the six counties).
- 6/10/2014 – Notice of the hearing had been published twice in each county between May 13 and June 10.
- 6/24/2014 – The hearing was held for the six consolidated MidAmerican Dockets.
- 7/24/2014 – A proposed decision and order granting franchises was issued for all six dockets.
- 8/19/2014 – All six MidAmerican franchises were issued.

Iowa – MVP – 4:

Black Hawk-to-Hazelton Line[55] – MVP4 part 1

[53] "Docket E-22116," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.

[54] "Dockets E-22103, E-22104, E-22105, E-22106, E-22107, E-22108," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.

[55] "Black Hawk-Hazelton 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, https://www.itc-holdings.com/docs/default-source/project-documents/black-hawk---hazleton-345-kv-line-build/black_hawk_hazleton_project_profile.pdf?sfvrsn=ff7df1f6_4.

ITC Midwest[56]

- 12/26/2012 – ITC Midwest filed its newspaper notice of the proposed project with the IUB in Buchanan and Black Hawk Counties.
- 1/8/2013 – Informational meetings held in both counties.
- 4/30/2013 – Petition for Franchise (Amendment to Existing Franchise) submitted to IUB for both counties.
- 10/16/2013 – Official Notice of Petition published by ITC Midwest in local newspapers in Buchanan County (Docket E-22011).
- 3/3/2014 - Official notice Official Notice of Petition published by ITC Midwest in local newspapers in Black Hawk County (Docket E-22034).
- 6/17/2014 – Petition for Franchise granted when legal questions raised in MidAmerican Dockets E-22097, E-22098, E-22099 were resolved.

Killdeer-to-Black Hawk Line[57] **– MVP4 Part 2**

MidAmerican Energy Company[58]

- 9/21/2012 – Notice of Informational Meeting published in Franklin, Butler, and Black Hawk County newspapers.
- 11/8-9/2012 – Informational meetings held in all three counties. (Black Hawk meeting held 11/9/2012).
- 12/19/2012 – MidAmerican submitted Petitions for Franchise in all three counties. Corrections and revisions demanded by the IUB would continue for approximately one year.
- 11/1/2013 – Dockets assigned to an ALJ for a hearing since eminent domain was requested.
- 11/21/2013 – Proposed Eminent Domain Notice was submitted to the IUB.
- 11/26/2013 – Eminent domain notice approved by the IUB.
- 12/27/2013 – Official Notice from the IUB of the evidentiary hearing was published in local newspapers.
- 1/21/2014 – Evidentiary hearing held for all three dockets.
- 2/25/2014 – The ALJ issued proposed decisions and orders granting franchises for all three dockets.
- 3/6/2014 – The IUB issued an order taking the ALJ's decision for review on its own motion to address a number of legal questions raised by the three dockets. "The issues concerned the legal implications of issuing a franchise for three sections of an overall transmission line that would connect at each end with another section of the line that is planned, but not yet franchised."[59]
- 6/13/2014 – IUB issued orders approving the franchise for part of E-22099 (and requiring a revised petition for the remaining part, E-22099 Amendment 1). Dockets E22097, E-22098, and E-22099 Amendment 1 were remanded to the ALJ for a hearing due to consolidation with ITC Midwest Dockets E-22152, E-22153.

[56] "Dockets E-22011, E-22034," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.
[57] "Killdeer-Hampton Tap 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, http://itctransco-itc-prod.barkleylabs.com/images/documents/1433516935ITCMW_Profile_Killdeer-Hampton_rev0615.pdf.
[58] "Dockets E-22097, E-22098, E-22099," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.
[59] https://efs.iowa.gov/cs/groups/external/documents/docket/mdaw/mjmz/~edisp/233087.pdf

ITC Midwest[60]

- 9/13/2013 – Notice of Informational Meeting published in Franklin and Cerro Gordo County
- 10/18/2013 – Informational meetings held in both counties.
- 2/28/2014 – Petitions for Franchise submitted in both counties.
- 6/13/2014 – Both dockets are consolidated with MidAmerican Dockets E-22097, E-22098, E-22099 Amendment 1 and assigned to an ALJ due to requests for eminent domain and landowner objections.
- 10/15/2014 – Proposed Eminent domain notice submitted.
- 10/22/2014 – Eminent domain notices approved pending minor changes.

Consolidated Dockets[61]

- 12/15/2014 - 1/5/2015 – Official Notice from the IUB of the evidentiary hearing was published in local newspapers in each county.
- 2/3-4/2015 – Evidentiary hearing held for all three MidAmerican and both ITC Midwest dockets.
- 5/7/2015 – The ALJ issued a proposed decision and order granting the franchises conditional on minor modifications.
- 6/1/2015 – Franchises issued for Dockets E22097, E-22098, and E-22099 Amendment 1
- 6/19/2015 – Franchises issued for Dockets E-22152 and E-22153.

Colby-to-Killdeer Line[62] **– MVP4 Part 3**

ITC Midwest[63]

- 4/1/2013 – Notice of informational meetings published in Cerro Gordo county newspaper.
- 5/13/2013 – Informational meeting held.
- 9/16/2013 – Petition for Amendment to Franchise submitted to IUB.
- 2/27/2014 – Official Notice of Petition from the IUB published in local newspaper by ITC Midwest.
- 3/31/2014 – Petition for Amendment No. 3 submitted to extend the line .06 miles further than initially requested. No record of an informational meeting being held.
- 4/11/14 – ITC Midwest submitted a request for expedited proceedings.
- 5/1/14 – Request for expedited proceedings granted and a franchise for Docket E-21894 Amendment No. 2 was granted.
- 9/29/2014 - Official Notice from the IUB of the petition was published in a local newspaper in the county.
- 11/10/2014 – Franchise for Docket E-21894 Amendment No. 3 granted.

Ledyard-to-Colby Line[64] **– MVP4 Part 4**

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[60] "Dockets E-22152, E-22153," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.
[61] "Dockets E-22097, E-22098, E-22099 Amendment 1, E-22152, E-22153," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.
[62] "Colby-Killdeer 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, https://www.itc-holdings.com/docs/default-source/project-documents/colby-killdeer-345-kv-line-build/1433516511itcmw_profile_colby-killdeer_rev0615.pdf?sfvrsn=2336f1f6_4.
[63] "Docket: E-21894 Amendment No. 2 and No. 3," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.
[64] "Ledyard-Colby 345 KV Electric Transmission Project," ITC Project Profile, accessed April 22, 2018, http://itctransco-itc-prod.barkleylabs.com/images/documents/1433516994ITCMW_Profile_Ledyard-Colby_rev0615.pdf.

ITC Midwest[65]

- 6/24/2013 – Notice of informational meetings published in Kossoth, Worth, and Winnebago counties.
- 8/1-2/2013 – Informational meetings held in each county.
- 3/31/2014 – Petitions for Franchise submitted in each county. Eminent domain was not requested.
- 6/15/2015 – ITC Midwest submitted a request to consolidate Dockets E-22116, E-22140, E-22141, and E-22142.
- 6/30/2015 – Eminent domain initially requested in all three counties (i.e. on all dockets).
- 3/23/2016 – IUB issued an order consolidating the four dockets.
- 5/3/2016 – Proposed Eminent domain notice submitted to IUB.
- 5/31/2016 – Notice of eminent domain approved.
- 6/24 -7/6/2016 - Official Notice of Petition from the IUB published in local newspaper by ITC Midwest in each county with the date of the evidentiary hearing.
- 7/12-13/2016 – A public hearing for the presentation of evidence and cross examination of witnesses was held.
- 12/22/2016 – The IUB issued an order granting the petitions for electric franchise conditional on ITC Midwest making minor revisions to its petitions.
- 2/6/2017 – Franchises issued.

MVP – 5 – The Badger-Coulee Project[66] [67]

- 10/22/2013 – Application for Certificate of Public Convenience and Necessity submitted.
- 11/18/2013 – MISO submits a motion to become a party in the case.
- 4/30/2014 – The PSC notified the Companies that their application was complete and required the company to mail copies of the completed application and Notice of Proceeding to each municipality and town through which the project would pass, as well as to public libraries in the project area.
- 5/7/2014 – Notice of Proceeding issued by the Wisconsin PSC along with list of entities to which the companies must mail it to.
- 5/21/2014 – Proof of mailing of the Notice of Proceeding provided to the PSC.
- 5/28/2014 – 6/13/2014 – Public EIS Scoping meetings held.
- 8/18/2014 – Draft EIS issued by the Wisconsin PUC.
- 10/31/2014 – Letter requesting publication of Notice of Hearing mailed to Community Newspapers along project route.
- 11/4/2014 – Final EIS issued by the PSC.
- 12/8/2014 - 12/15/2014 - Public Hearing sessions held in five cities along route.
- 1/6/2015 – 1/9/2015 – Party (evidentiary) Hearings held.
- 4/23/2015 – Final Decision issued, granting the CPCN.

[65] "Dockets E-22140, E-22141, E-22142," Iowa Utilities Board Electronic Filing System, accessed April 4, 2018, https://efs.iowa.gov/efs/ShowDocketSearch.do.
[66] "Docket 5-CE-142," PSC - Case Management System (Docket Detail), accessed March 15, 2018, http://apps.psc.wi.gov/vs2010/dockets/content/detail.aspx?dockt_id=5-CE-142.
[67] "Badger Coulee Transmission Line Project," American Transmission Co. projects, accessed April 22, 2018, http://www.atc-projects.com/projects/badger-coulee/.

MVP 6 – Big Stone South to Ellendale[68]

South Dakota portion – Docket EL13-028[69]

- 8/23/2013 – Companies file application for a Facility Permit.
- 10/11/2013 – Notice of Public Input Hearing published in local newspapers of Brown, Day, and Grant counties.
- 10/17/2013 – Two Public hearings held. One in Aberdeen and another in Milbank.
- 1/27/2014 – Companies amended their application with route changes and were required to hold an additional Public Input Hearing.
- 4/21/2014 – 5/16/2014 – Notice of additional Public Input Hearing and Evidentiary Hearings published in local newspapers of Brown, Day, and Grant counties.
- 5/20/2014 – Public Information meeting held.
- 6/10-6/11/2014 – Evidentiary hearings held.
- 7/18/2014 – Proposed order granting permit issued.
- 8/22/2014 – Final Order issued granting permit.

North Dakota portion – Docket PU-13-840[70]

- 10/18/2013 – Companies file application for a Corridor Certificate and Route permit with the North Dakota Public Service Commission (PSC). They also filed an application for a Waiver of Procedures and Time Schedules.
- 11/14/2013 – ALJ requested by PSC.
- 2/20/2014 – Notice of Filings and Notice of Hearing published in local newspaper.
- 2/18/2014 – Notice of Filings and Notice of Hearing mailed to affected landowners.
- 4/1/2014 – Public Input Hearing held.
- 6/11/2014 – Proposed order issued granting requests for a Waiver of Procedures and Time Schedules, a Corridor Certificate and Route permit.
- 7/10/2014 – Final Order issued granting the Corridor Certificate and Route permit.

MVP – 7, 8 – Mark Twain Transmission Project[71]

Docket EA-2015-0146[72]

- 12/9/2014 – Ameren submits notice of its intention to file an application for a Certificate of Convenience and Necessity (CCN).
- 5/29/2015 – Application for a Certificate of Convenience and Necessity is submitted to the Missouri Public Service Commission (PSC).
- 6/22/2015 – MISO applies to intervene in the case.
- 9/18/2015 – Public Hearings ordered in three counties. 10/19 (Shelby County), 10/26 (Schuyler County), and 10/27 (Adair County).
- 9/28/2015 – Notice of Public hearings served to Shelby, Schuyler, and Adair Counties.
- 10/6/2015 – Notice of Public Hearings served to Marion and Knox counties.

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[68] "Big Stone South to Ellendale (BSSE) Transmission Line," accessed April 22, 2018, http://bssetransmissionline.com/.
[69] "Docket EL13-028," South Dakota Public Utilities Commission - Commission Dockets, accessed April 3, 2018, https://puc.sd.gov/Dockets/Electric/2013/EL13-028.aspx.
[70] "Case PU-13-840," Public Service Commission, North Dakota, accessed March 7, 2018, https://psc.nd.gov/database/company_case_list.php.
[71] "Mark Twain Transmission Project | Ameren Transmission," Ameren Corporation, accessed April 22, 2018, https://www.ameren.com/mark-twain.
[72] "Case No. EA-2015-0146," Missouri Public Service Commission - Electronic Filing Information System, accessed March 8, 2018, https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.

- 10/27/2015 – Public Hearings held in Shelby (10/19), Schuyler (10/26), and Adair Counties (10/27).
- 1/29/2016 – Evidentiary Hearings held 1/25-1/29.
- 4/27/2016 – A Certificate of Convenience and Necessity is granted, conditional on ATXI getting approval from each county through which the project would pass.
- 5/26/2016 – ATXI and an objector to the project submit applications for Rehearing Motion for Reconsideration. ATXI objected to the requirement that they get approval from each county and the Objector, objected to the conditional granting of the CCN before approval is given by each county.
- 6/8/2016 – Applications for rehearing are denied.
- 7/15/2016 – The objector appealed to the Wester District Court of Appeals.
- 3/28/2017 – The Court issued its decision vacating the PSC's order, nullifying the CCN.

Docket EA-2017-0345[73]

- 6/20/2017 - ATXI submits notice of its intention to file an application for a Certificate of Convenience and Necessity (CCN).
- 9/15/2017 - Application for a Certificate of Convenience and Necessity is submitted to the Missouri Public Service Commission (PSC), with county commission orders giving assent from each county through which the project would pass: Lewis, Marion, Knox, Schuyler, and Adair. A Motion for Expedited Treatment, is also submitted concurrently.
- 9/18/2017 – PSC issues an Order to itself to mail notice to the five county commissions through which the project will pass and make the notice available to the media serving those counties.
- 9/27/2017 – MISO submits application to intervene.
- 10/25/2017 – Prehearing conference held.
- 1/5/2018 – All parties to the case, including ATXI, filed a Unanimous Stipulation and Agreement, agreeing that ATXI should be granted the CCN with conditions. Due to this agreement, no hearing is required.
- 1/10/2018 – PSC issues order approving the Unanimous Stipulation and Agreement, and issuing the CCN.

MVP – 9, 10, 11, 17 - Illinois Rivers Project[74]

Illinois portion[75]

- 4/30/2012 – Public meetings begin, with three public meetings being held in each county, through 10/11/2012. Notice of each meeting was published in a local newspaper once a week for three consecutive weeks in advance of each meeting. A total of 41 days of public meetings were held.
- 11/7/2012 – Ameren Transmission Company of Illinois (ATXI) filed a petition with the Illinois Commerce Commission seeking a CPCN and an order authorizing or directing the construction of the lines (Section 8-503 of the Act). Eminent domain authority was not sought (Section 8-509 of the Act).
- 11/8/2012 – MISO petitions to intervene.
- 12/3/2012 – Prehearing conference held before ALJ

[73] "Case No. EA-2015-0146," Missouri Public Service Commission - Electronic Filing Information System, accessed March 8, 2018, https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.
[74] "Ameren Transmission Company's Illinois Rivers Project," Illinois Commerce Commission, accessed April 22, 2018, https://www.icc.illinois.gov/AmerenILRiversProject/.
[75] "EDocket: 12-0598," Illinois Commerce Commission - eDocket Documents, accessed April 7, 2018, https://www.icc.illinois.gov/docket/Documents.aspx?no=12-0598.

- 12/11/2012 - Notice of the petition was published in a state newspaper in circulation in the affected counties and a number of objectors filed petitions to intervene.
- 1/17/2013 – Status Hearing held.
- 3/1/2013 – Second Status hearing held.
- 5/8/2013 – Motion hearing.
- 5/13-17/2013 – Evidentiary hearings held.
- 7/3/2013 – A proposed order was issued by the ALJs.
- 8/20/2013 – A Final Order was issued, but "the record of evidence" did not allow the commission to decide on the Line route from Pawnee to Pana, from Pana to Mt. Zion, or the new/expanded substations at Ipava, Pana, Mt. Zion, Kansas, Sidney, or Rising IL.
- 10/2/13 – Several Requests for Rehearing and Appeals were granted and ICC staff were instructed to identify alternate routes, with a rehearing scheduled for December 2013.
- 12/2013 – A number of evidentiary hearings were held in the rehearing.
- 12/31/2013 – First proposed order on rehearing issued by ALJ rejecting one party's modified route suggestion.
- 1/17/2014 – Second Proposed Order was issued recommending approval of the modified line route from Pawnee-Pana-Mt. Zion along with the needed substations.
- 2/20/2014 - Final order was issued approving the remaining portions of the route.
- March 2014 – Decision was appealed to the Appellate Court of Illinois (Fourth District) by a number of intervenors.
- 7/27/2015 - Between 7/18/2014 and 10/20/2014, all but four appeals were dismissed. The Court ultimately ruled in favor of the ICC on July 27, 2015.

Missouri portion[76]

- 12/9/2014 – Ameren gives notice that it intends to file for a Certificate of Convenience and Necessity (CCN) with the Missouri Public Service Commission (PSC) while stating that it believes the PSC does not have jurisdiction since ATXI is not a public utility under Missouri law.
- 2/20/2015 – ATXI submits a conditional application for a Certificate of Need (CCN), or an order from the PSC declining jurisdiction and dismissing the application because it does not have jurisdiction.
- 2/23/15 – Commission issued its Order and Notice to Marion County.
- 4/20/2015 – Missouri PSC staff issued their recommendation that the PSC does have jurisdiction, but also that the CCN should be issued with conditions.
- 6/2/2015 – Since no parties had objected to the staff's recommendation, no hearings were required and the Missouri PSC acted on the staff recommendation and issued a CCN.
- 6/11/2015 – ATXI, unsatisfied with the PSC explanation of its decision to assert jurisdiction, filed an application for Rehearing, resulting in a revised CCN being issued 7/22/2015 with the PSC again asserting jurisdiction. A third request for rehearing was denied and ATXI appealed to the Western District Missouri Court of Appeals in August 2015.
- 10/19/2016 - Line placed in service.

[76] "Case No. EA-2015-0145," Missouri Public Service Commission - Electronic Filing Information System, accessed March 8, 2018, https://www.efis.psc.mo.gov/mpsc/DocketSheet.html.

MVP – 12 and 14 – Reynolds to Topeka,[77] Indiana and Greentown to Reynolds,[78] Indiana Electric System Improvement Projects

- No state level process exists for these projects.

MVP – 13 – Michigan Thumb Loop Expansion Transmission Project[79] [80]

- 8/30/2010 – ITC filed an expedited siting application with the Michigan Public Service Commission (MPSC).
- 9/3/2010 - Notice of Public Input Hearing mailed to affected individuals, businesses, and municipalities.
- 9/5/2010 – Notice published in local Newspapers serving each county.
- 10/14/2010 – Motion hearing held.
- 10/18/2010 – Re-notice of hearing sent to parties of the case.
- 12/1/2010 – Evidentiary Hearing held.
- 2/25/2011 – MPSC approved route and issued a siting application to ITC.

MVP-15 – Pleasant Prairie to Zion Energy Center[81]

Wisconsin Portion[82]

- 10/27/2010 – Pre-application submitted by American Transmission Company (ATC) to the Wisconsin Public Service Commission (WPSC), beginning the public information phase. While this may have resulted in public input hearings, there is no record of them with the Wisconsin PSC and therefore they are not included in this analysis.
- 7/20/2011 – Detailed project plan is submitted and notice given of intent to seek a CPCN.
- 10/19/2011 – CPCN Application submitted (not available on PSC website, but the Final Decision issued 5/7/2012 indicates this was the submit date).
- 11/18/2011 – Application accepted as complete.
- 12/22/2011 – Notice of Proceeding and Prehearing Conference issued by the PSC.
- 1/31/2012 – Notice of the two scheduled hearings mailed to impacted parties and local news media.
- 2/23/2012 – First hearing, open to the public, held.
- 2/27/2012 – Environmental Assessment completed by the Wisconsin Department of Natural Resources, deciding an Environmental Impact Statement was not required.
- 3/1/2012 – Second hearing, limited to those party to the case, held.

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[77] "The Reynolds to Topeka Electric System Improvement Project," accessed April 22, 2018, http://www.reynoldstopeka.com/.
[78] "Greentown-Reynolds Electrical System Improvement Project," accessed March 8, 2018, http://www.greentownreynolds.com/abouttheproject.html.
[79] "Case: U-16200," Michigan Public Service Commission E-Dockets Community, accessed March 15, 2018, https://mi-psc.force.com/s/case/500t0000008efTdAAI/in-the-matter-of-the-application-of-international-transmission-company-dba-itc-transmission-for-an-expedited-siting-certificate-for-a-transmission-line-pursuant-to-2008-pa-295-part-4-for-region-no-4-thumb-region-as-designated-by-the-michigan-wi.
[80] "Michigan Thumb Loop Transmission Line," Center for Rural Affairs, June 9, 2011, http://www.cfra.org/michigan-thumb-loop.
[81] "American Transmission Co. Projects– Pleasant Prairie-Zion Energy Center," accessed April 22, 2018, http://www.atc-projects.com/projects/pleasant-prairie-zion-energy-center-project/.
[82] "Docket 137-CE-161," PSC - Case Management System (Docket Detail), accessed March 20, 2018, http://apps.psc.wi.gov/vs2010/dockets/content/detail.aspx?dockt_id=137-CE-161.

- 5/7/2012 – Final Decision issued granting CPCN.

Illinois Portion[83]

- 4/21/2011 – Notice of public meetings began being published in a local paper for three consecutive weeks in advance of each meeting.
- 5/17/2011 – Three public input meetings held, 5/10, 5/11, and5/17.
- 9/29/2011 – Application for CPCN filed.
- 10/4/2011 – ICC publishes notice of ATC application in local newspaper.
- 10/5/2011 – Notice of prehearing issued by commission.
- 10/20/2011 – Prehearing held.
- 1/5/2012 – Evidentiary hearing held.
- 3/8/2012 – Proposed Order issued.
- 4/10/2012 – Final Order issued granting CPCN.

MVP 16

Ameren portion – The Spoon River Transmission Project[84] [85]***– MVP16 Part 1***

- 4/7/2014 – Notice of public input meetings began being published in each county.
- 4/28/2014 – Public meetings held 4/28 - 5/1, 6/10 - 6/12.
- 8/21/2014 – Application for CPCN filed.
- 9/2/2014 – ICC issues Notice to affected landowners and Notice of pre-hearing conference.
- 9/12/14 – ICC publishes notice of Ameren's application in local newspapers and prehearing conference held jointly with docket 14-0494.
- 1/6/2015 – Status hearing held jointly with docket 14-0494.
- 4/29/2015 – Motion hearing held jointly with docket 14-0494.
- 5/12/15 – Evidentiary hearings begin and are held on 5/12 and 5/13 jointly with docket 14-0494.
- 7/20/15 – Proposed order is issued.
- 9/16/2015 – Final order issued granting CPCN, conditional on approval of the MidAmerican portion of the line.

MidAmerican portion[86]***– MVP16 Part 2***

- 8/4/2014 – Application submitted. No record of public input meetings. Possibly due to this being an uprate, rather than new construction.
- 8/29/2014 – Notice of prehearing sent to those party to the case, including each county's Board.
- 9/10 and 12/2014 – Prehearing conference held jointly with docket 14-0514.
- 1/6/2015 – Status hearing held jointly with docket 14-0514.
- 4/29/2015 – Motion hearing held jointly with docket 14-0514.
- 5/12-13/2015 – Evidentiary hearings held jointly with docket 14-0514.
- 6/24/2015 – Draft Order issued.
- 9/16/2015 – Final Order issued granting CPCN.

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[83] "EDocket: 11-0661," Illinois Commerce Commission - eDocket Documents, accessed March 20, 2018, https://www.icc.illinois.gov/docket/Documents.aspx?no=11-0661.
[84] "EDocket: 14-0514," Illinois Commerce Commission - eDocket Documents, accessed April 9, 2018, https://www.icc.illinois.gov/docket/Documents.aspx?no=14-0514.
[85] "Spoon River Transmission Project | Ameren Transmission," accessed April 22, 2018, https://www.ameren.com/spoon-river.
[86] "EDocket: 14-0494," Illinois Commerce Commission - eDocket Documents, accessed April 9, 2018, https://www.icc.illinois.gov/docket/Documents.aspx?no=14-0494.