Bayfield Second Circuit Transmission Project Frequently Asked Questions

Updated September 2018

Answers have been updated for Questions 5, 6, 7, 9, 10, 11, 23, and 24.

1) Q: Why is this project needed?
A: The project is needed to improve electric reliability and to provide voltage support to communities on the Bayfield peninsula. Currently electricity is provided to communities on the east side of the Bayfield Peninsula via a single existing 34.5 kilovolt transmission line that was built between 1957 and 1971 (46 to 60 years old). The existing 34.5 kV line runs between Gingles Substation south of Ashland and Bayfield Electric's Salmo Substation west of Bayfield (Figure 1.1). The line was originally designed to be a closed loop, connecting to the west side of the peninsula through Cornucopia, Herbster and Iron River. However, due to the electric load demands at Bayfield and Washburn, and the overall length of the loop, it is no longer possible to serve power to all customers on the peninsula from either end of the loop. To avoid voltage collapse, a switch near Cornucopia must be kept open, which in effect separates the loop into two load serving radial lines. Any failure on the line south of Bayfield or Washburn results in power outages to those communities as there is not a back-up line in the area. Additionally, the existing system experiences low voltages during peak usage days.

The proposed Bayfield Second Circuit Project will increase reliability and solve voltage concerns by providing an additional source of electricity to the area. This second source of power helps ensure that power remains on should the existing line be damaged or require maintenance. The project will also add capacity to the transmission system which could enable energy from new resources in the future, including from renewable sources. Delaying the project would impact our ability to perform system maintenance, and affect system reliability and the ability to bring energy resources to load. In addition, this project will strengthen the overall system in the area and allow Xcel Energy to rebuild the remainder of the 34.5 kV system on the Bayfield peninsula with minimal outages to customers.

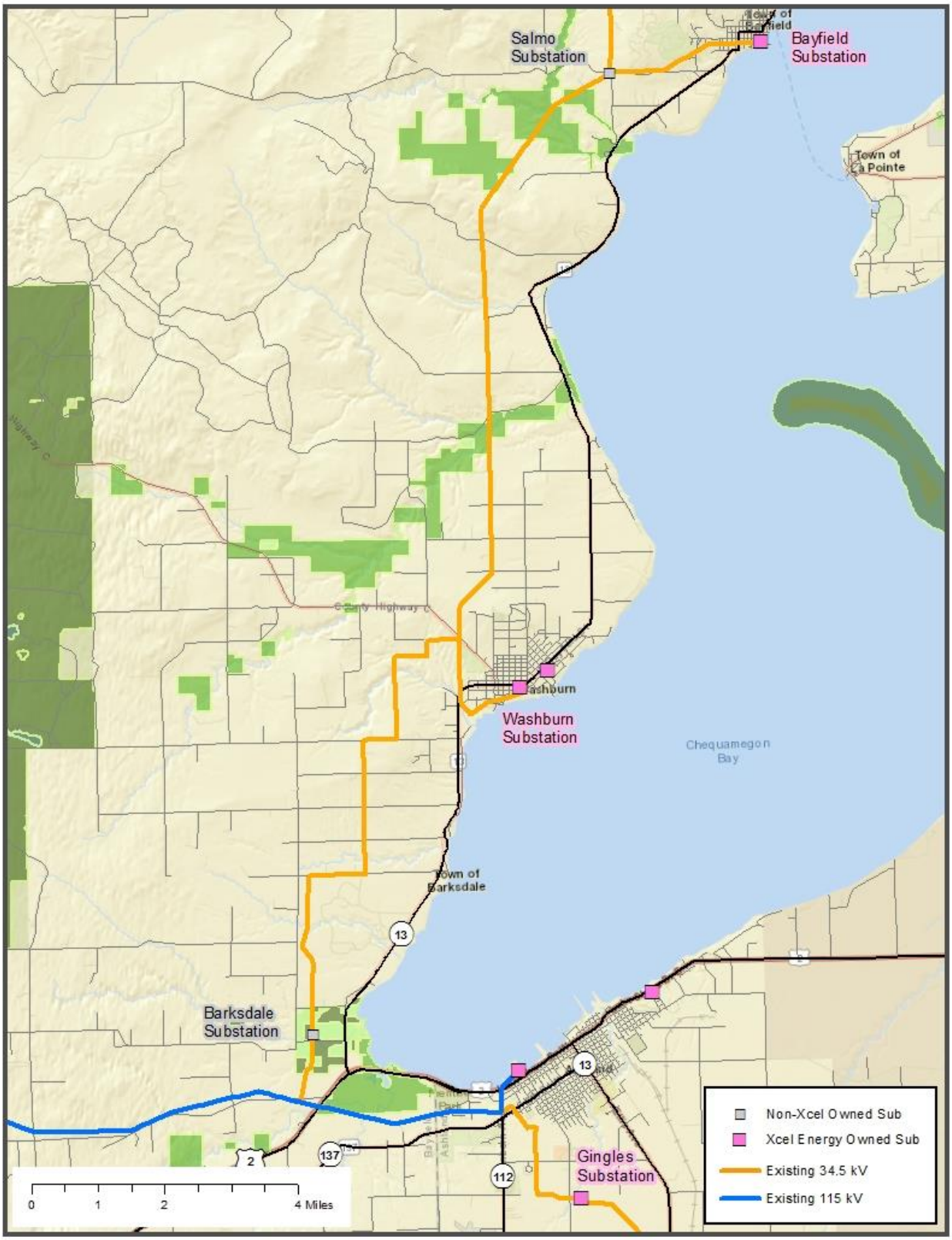


Figure 1. Existing Transmission System on East Side of Bayfield Peninsula

2) Q: How does this project differ from the Bayfield Loop Project that Xcel Energy proposed in 2013?

A: The Bayfield Loop Project that Xcel Energy presented to the public in 2013 involved a proposal to construct a new, larger voltage, 115 kV second circuit to Bayfield. Initial comments on the project included questions on whether a 115 kV line was needed to serve the load or if a lower voltage option would adequately serve the area. Based on those concerns, the Company conducted additional studies and were able to design a 34.5 kV solution, which is what Xcel Energy has now proposed. Decreasing the voltage of the new line to 34.5 kV requires the addition of the new line we refer to as the Washburn Tap, which was not in the 2013 project.

The 2013 project included rebuilding of the existing 17 miles of 34.5 kV line from near Bayfield to Xcel Energy's Cornucopia Substation and rebuilding 23 miles of existing 34.5 kV line between the Herbster and Iron River Substations. The proposed rebuild of the Bayfield-Cornucopia and Herbster-Iron River lines are still planned, but have been separated from the Bayfield Second Circuit Project. The segment between Bayfield and Cornucopia is planned to be rebuilt in 2018 and 2019. The segment between Cornucopia and Herbster will take place after the Bayfield Second Circuit Project is complete.

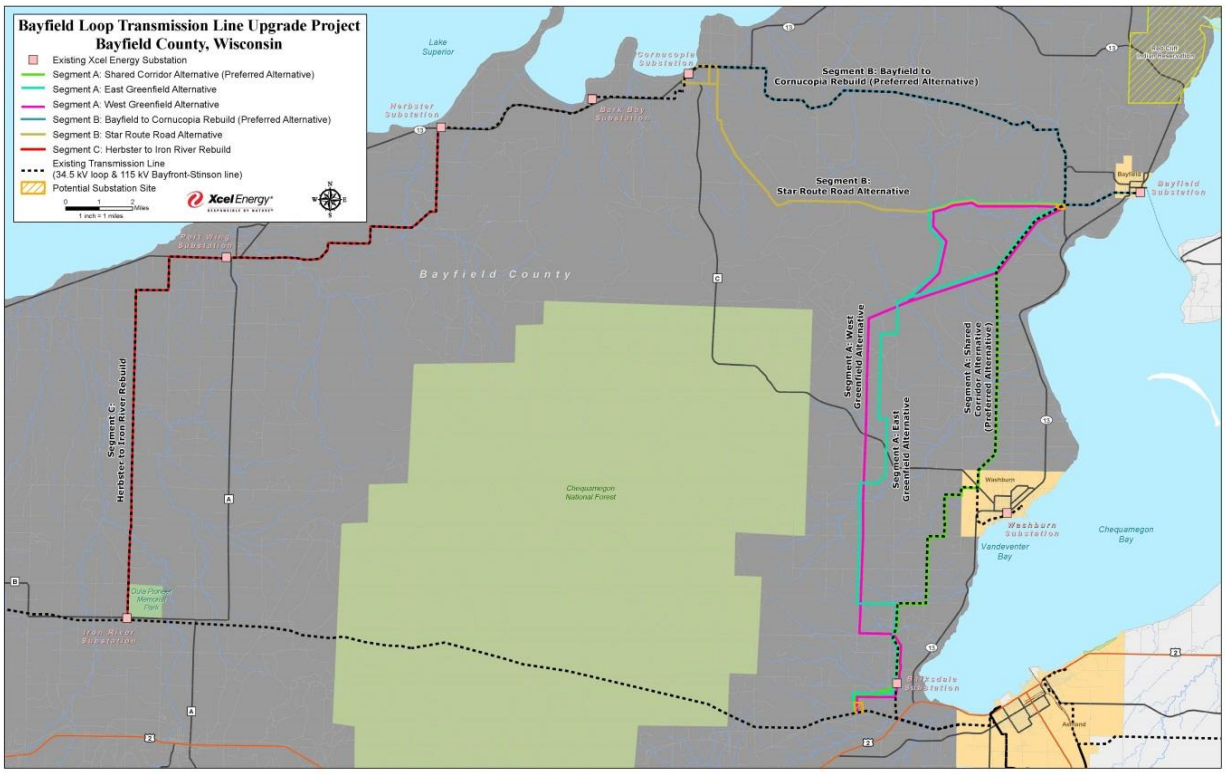


Figure 2. Map of 2013 Bayfield Loop Project Alternatives

3) Q: Chequemegon Bay (Cheq Bay) Renewables presented an alternative proposal that utilizes solar energy, does not require a new above ground transmission line and

appears to cost less than the Xcel Energy project. Is the company evaluating the Cheq Bay proposal?

A: Yes, Xcel Energy has received the alternative proposal from Cheq Bay Renewables. Our analysis of the proposal shows that it is focused on bringing solar energy to the area but does not address the electric reliability issues that are required on the Bayfield Peninsula. Some of our primary concerns with the Cheq Bay Renewables alternative are as follows:

- The Cheq Bay alternative does not provide transmission redundancy to Bayfield. In order to get a truly comparable submarine cable alternative, a submarine cable would need to go from Ashland to Bayfield, rather than from Ashland to Washburn as proposed by Cheq Bay.
- The proposed submarine cable degrades the system by connecting the electric load from Xcel Energy's Second Street Substation in Ashland to the Bayfield Peninsula's transmission system. While the submarine cable does add voltage support during normal operating conditions, the added load from Second Street would cause severe low voltage and potential voltage instability issues on the Bayfield Peninsula during contingency situations (i.e. line outage, maintenance).
- Since the proposed southern termination point (Second Street Substation) of the submarine cable is not a viable option, we also evaluated other possible connection options in Ashland. These options included terminating at either Bay Front Substation or Gingles Substation and all require substation expansion and overhead line construction.
- In order to protect the transmission system, the breaker substation proposed by Cheq Bay in Washburn would need to be located near Xcel Energy's existing Washburn 3-way switch. This substation would be similar to Xcel Energy's proposed Pikes Creek Substation in size and cost,thus no cost savings.
- Xcel Energy cannot require customer-owned emergency generation to be turned on nor can Xcel Energy require other utilities to transfer load between substations as proposed by the Cheq Bay alternative.

Xcel Energy is the transmission provider to all loads on the Bayfield Peninsula and is required to serve each load equally. While the Cheq Bay proposal includes a submarine cable, it is a generation and battery solution at its core and is not a substitute for a transmission line. Below are a few concerns with trying to use solar and batteries as a replacement for transmission lines.

- A solar farm cannot be considered a reliable source of power when it comes to supporting the transmission system during outages. System outages can occur at any time of the day and in all types of weather (when a solar farm is not generating electricity).
- The battery portion of the Cheq Bay alternative would be charged by the proposed solar farm. Unlike other battery installations the batteries are only charged during times when the solar farm is producing power and would not be to be charged during prolonged outages (i.e. at night and cloudy days).
- Batteries provide a finite supply of power and then need to be recharged. Batteries can be effective for decreasing the peak load at a substation for short durations (i.e. peak shaving) but do not address electric transmission system reliability.

4) **Q: What are the criteria used by Xcel Energy in identifying and selecting a route for a transmission line?**

A: Our route selection process is a multi-step analysis that emphasizes identifying route alternatives with minimal impacts to humans and the environment. We begin to develop preliminary routes in a geographic information system (GIS) map. We evaluate these preliminary routes for potential impacts to human settlement and the environmental setting, including, but not limited to:

- Natural Resource/Environmental impacts (waterways, wetlands, forest clearing, soils and steep slopes, archaeological sites, protected species)
- Route corridor sharing opportunities (existing corridors, highways and roads, recreational trails, section lines or field lines)
- Affected landowners (proximity to residences, permanent and temporary easements needed, tree clearing near homes, impacts to agricultural lands)
- Aesthetics (type, height, number and size of poles, visual appearance, tree clearing)
- Public/Protected lands (type of ownership and protection, designated uses, ability to get approval to cross)
- Constructability issues (outage risk, worker safety, construction vehicle access routes, engineering constraints)
- Estimated cost

The route selection process generally includes:

1. Developing preliminary route options,
2. Refine preliminary route options,
3. Field check preliminary route options,
4. Obtain agency, public, and government input on preliminary route options,
5. Review preliminary route options based on new information and comments from stakeholders,
6. Select which route or routes to submit in the permit application to the PSC.

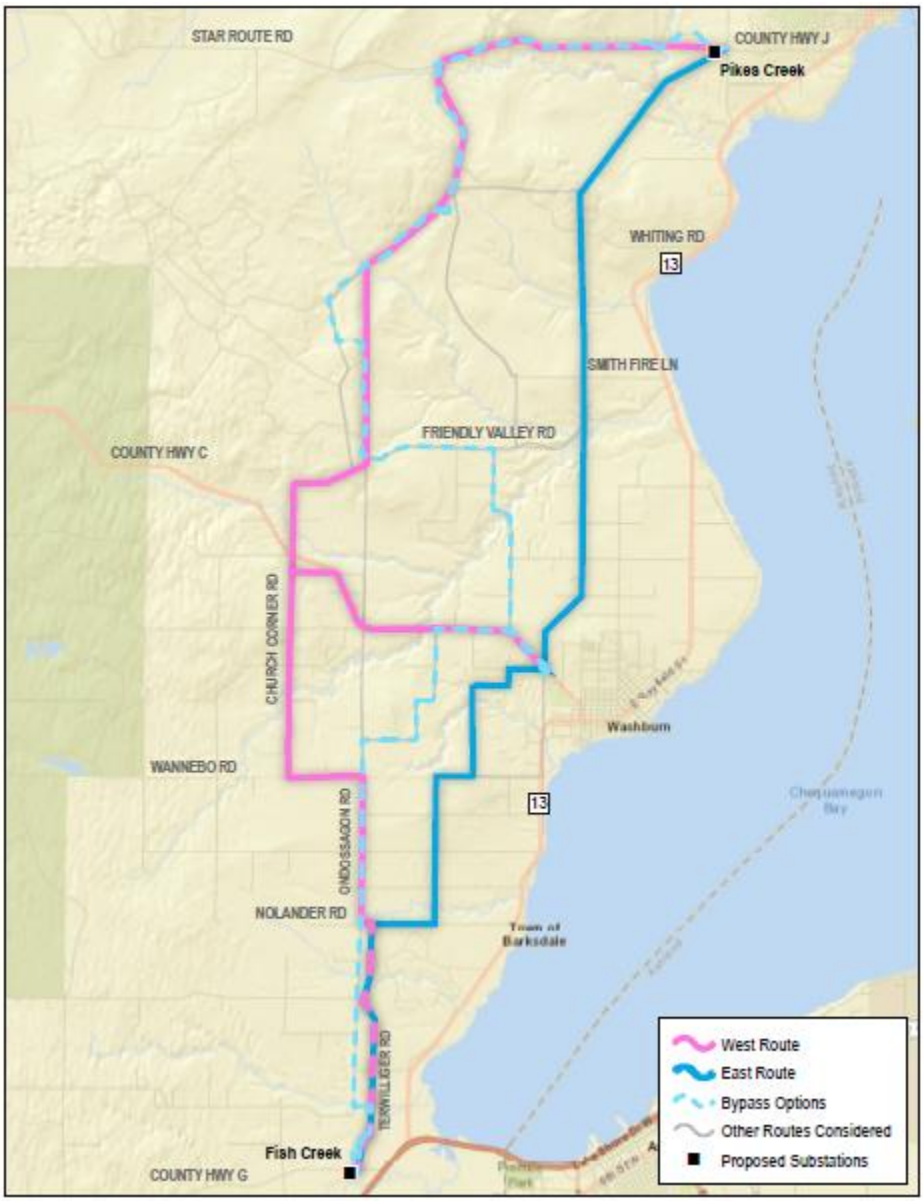
Route alternatives are typically eliminated from more detailed evaluation if the overall impacts clearly don't justify choosing them over other alternatives. Of those remaining, each alternative route will typically have different types and quantities of expected impacts. This can make direct comparisons difficult. For example, one route may require many acres of tree clearing while an alternative may have much less clearing, but be located near more homes. The project team works together to identify a preferred route or routes based on which route or routes, on balance, solves the electrical need, are the least impactful, and most cost effective.

5) **Q: What are the routes that are being considered for the proposed Bayfield Second Circuit project?**

A: During initial development we identified many different alignment options. This included 20 -25 different segments that could be linked together to create routes connecting the proposed Fish Creek and Pikes Creek Substation sites. Using the routing evaluation process described in FAQ #4 we narrowed the list down to a smaller number of options which we evaluated in greater detail.

After holding a routing workshop, and upon further study, Xcel Energy has identified two potential route alternatives for the project. The West Route alternative is approximately 22 miles long with an additional four mile 34.5 kV line connecting to the City of Washburn. The East Route alternative, which uses the existing transmission line corridor, is approximately 19 miles long, and would require construction of a temporary bypass line in a separate corridor during construction of the new line. More details on the routes as well as the interactive project map are available at www.xcelenergy.com/bayfield.

Figure 5. Potential Route Segments for the Bayfield Second Circuit Transmission Project



6) Q: Will the public have any input on the route selection?
A: Yes, the preferences of the public are taken into account along with many other considerations including engineering needs, maintenance requirements, environmental

resources, and legal and economic considerations. Residents and local government representatives have provided a significant amount of useful feedback on the proposed project to date. The public assists by providing local knowledge regarding characteristics and resources of the study area. We will make every effort to work through siting and other issues with the public, agencies, and other Project stakeholders. It is important that our siting process, public involvement efforts, environmental and engineering practices are transparent and acceptable to the public and agencies. We will continue to work with state and local agencies as well as environmental organizations, individuals and private and public groups in order to address their concerns.

Xcel Energy held a routing work group in April to provide those interested in participating the opportunity to work together with others to compare and evaluate route alternatives and to provide feedback to Xcel Energy. An open house will be held in September to update the public on the latest routes being studied for the project.

The public also has the opportunity to participate in the state Public Services Commission (PSC) review process once Xcel Energy has submitted an application for a Certificate of Authority. Residents will be able to provide written feedback and attend the public hearing and participate in person.

7) Q: Will the proposed 34.5 transmission line run across the Washburn soccer fields?

A: The West Route includes an emergency tie line to Washburn which passes the Washburn soccer fields. The proposed alignment here would follow the existing Bayfield Electric Cooperative (BEC) distribution line (purple line in the aerial photo). The proposed transmission line would NOT be built on the soccer fields. Rather, the current BEC line would be removed and new poles would be erected in the same alignment as the existing line. Xcel Energy would either add the existing BEC wire to the new poles that would be erected or bury the distribution line in this location. The right-of-way for the new transmission line would be 50 feet, 25 feet on either side of line. And just as with the current BEC line, no tall buildings or tall growing trees would be allowed within the 25 foot easement on the soccer field side of the line.

Figure 8. Proposed alignment near Washburn Soccer Fields

8) **Q: Did you consider building the proposed line in the same right-of-way as the existing transmission line?**
A: Yes, the East Route uses the same corridor where the existing transmission line is located. If the East Route is selected the new line will be built on double-circuit poles with the existing transmission line. The new line would be on one side and the existing line would be located on the other side of the poles. Because electric service to Washburn and Bayfield needs to be maintained throughout construction of the new line, the project team has determined that the most viable way to construct within the existing transmission line corridor would be to construct a temporary bypass line separated from the existing line. This would allow the existing line to be de-energized and removed before constructing the new line, and would alleviate a number of safety concerns and more challenging construction requirements. The proposed alignment for the temporary bypass line is shown in the project maps below. The bypass line would be done in two phases: Phase 1 from County Road G to Washburn and Phase 2 from Washburn to Bayfield. The intent would be to construct the bypass line as close to the roads as possible to avoid or minimize tree clearing that would be necessary.

Figure 9 Overlapping Transmission line ROW

9) Q: Does additional clearing need to take place if the proposed Second Circuit transmission line follows the existing route? If so, how much more?

A: Some additional clearing will be necessary for some long span lengths where the line crosses a valley and for access routes to and from the right-of-way. Some clearing may also be necessary in locations where the right-of-way has not been maintained to its full width.

10) Q: Did you consider placing part of the line in the Chequamegon Nicolet National Forest (CNNF)?

A: Yes. When we began reviewing this project, we looked at all opportunities and constraints for routes. We reviewed the potential to route the line in the CNNF. We have several lines going through CNNF land in other parts of our service territory and in the past have used those corridors to route additional lines to our system. There are two primary items that impact our decision:

1. Are there existing corridors in the CNNF for the project to follow?
2. Are there reasonable alternatives to avoid the CNNF?

A route passing through the CNNF has the following concerns to address:

- There were no existing corridors to follow.
- It is longer than other routes under consideration.
- A greater amount of forest clearing would be required in the CNNF than on other routes under consideration.
- The Federal process for acquiring a permit would take 2-3 years.
- The Federal process can also be costly, and in this case could range from $500,000 to $2 million for the studies, outreach and review of the proposal. In addition we would expect opposition from various parties.
- There are reasonable alternatives, and therefore it would be unlikely the Forest Service would approve the route.

11) Q: Can the transmission line be built underground?

A. Yes. However, that is an alternative that we are not pursuing for this project. Utilities must approach all projects from a prudent business position, and for this project overhead transmission is the most prudent option. It is more reliable, has less environmental impact than an underground line and is far less expensive. Unlike undergrounding a distribution line, placing transmission lines underground is a difficult process. Due to the technical limitations on underground transmission lines, installations throughout the country are rare and limited to the shortest distance possible. An overhead 34.5kV transmission line generally requires an approximately 50-foot easement that can continue to be used for many activities. An underground transmission duct bank for a 34.5 kV line would require a permanently cleared right-of-way of approximately 15 to 25 feet. An underground line must also be routed to avoid other underground installations, such as water, gas and sewer lines. Unstable slopes, hazardous material sites, wetlands and bedrock must be avoided for underground lines, whereas overhead lines can more easily accommodate these areas. Going under a road, highway or river requires expensive construction techniques such as directional boring. Underground installation requires lengthy, more disruptive construction

techniques than overhead lines. Design concerns such as capacity, voltage drop, and heat dissipation are frequent limitations for underground lines. Equivalent underground transmission lines generally cost six to 10 times more than an overhead line on a per mile basis.

Underground Technical Issues:

Cable - The most commonly used underground cable system is solid dielectric. Solid dielectric systems require open trenched installation of three separate cables, typically installed in PVC conduits and encased in concrete.

Heat - Transmission lines generate heat when conducting electricity. With overhead lines, air cools the lines and keeps them at a safe operating temperature. Underground lines require cooling mechanisms, which increases cost and decreases reliability. Solid dielectric cables are encased by thermal concrete and the native soil or thermal soil help to dissipate heat.

Repair and maintenance - Underground transmission lines take much longer to repair than overhead lines on average. Estimates show that locating and repairing faults can take between two and eight weeks. Overhead lines in contrast can generally have the fault located and repaired in a matter of hours or days after a failure occurs.

12) Q: How tall are the existing transmission structures? How tall would the structures be on the proposed line?

A: **The existing transmission structures are typically 45 to 55 feet tall** Typical heights for structures on the proposed East Route would be around 60 feet tall; typical heights for structures on the West Route would be around 65 feet tall. The taller poles on the West Route are due to longer span lengths, which reduces the overall number of poles.

13) Q: Can structures be lowered to minimize the visual impact?

Yes. However, there are tradeoffs. We need to have sufficient height and span length to support the wires and to comply with all safety and operational requirements. While we can consider shorter structures, they would result in a higher number of structures per mile.

14) Q: What activities can I expect in the corridor during line construction?

A: Line construction involves a series of distinct activities that are performed in sequence, including: vegetation clearing, installation of access roads and gates, staging the structures, foundation construction, framing and erecting the structures, stringing the wires, and clean-up and reclamation. Line construction work is not continuous; rather, it is conducted in phases so delays may be expected between portions of work.

15) Q: What is the expected in-service date for the proposed project?

A: At this time we anticipate that the line will be in service sometime in 2021.

16) Q: When was the existing 34.5kV transmission line on the peninsula built?

A: The existing line was built in 1957. Since then there have been some sections rebuilt due to road moves and customer additions.

17) Q: What happens if the project is not built?

A: Low voltage issues and reliability of the transmission system in the Bayfield Peninsula have been of concern for many years, and if we do not address the issue, both reliability and voltage issues will grow. Additionally, the 34.5 kV transmission system west of

Bayfield needs to be rebuilt due to the condition of the line. Without the project in service, rebuilding the aging transmission lines in the Bayfield Peninsula may not be possible.

18) Q: Will this project improve our electric service?

A. Yes. This area is susceptible to long outages when there is an event on the line that takes it out of service. Since this project is an addition to the transmission line already operating in the area, it will improve overall system operations, performance and reliability.

19) Q: I'm a Bayfield Electric customer, how will this project benefit me?

A: Dairyland Power Cooperative (DPC) is the generation and transmission entity that provides power and transmission line service to the Bayfield Electric Cooperative customers in this area. Xcel Energy and DPC both serve Western Wisconsin and jointly share facilities through over 150 interconnections on our systems in order to avoid duplication of facilities. In this area, Bayfield Electric's substations tie into the Xcel Energy transmission system. Therefore the proposed transmission improvements will result in more reliable power to Bayfield Electric customers and Xcel Energy customers on the peninsula.

20) Q: Where does the energy come from that serves our area?

A: The closest source of energy is from Xcel Energy's Bayfront Generating Station in Ashland that burns biomass, primarily wood and shredded tires from local sources. However, since the transmission system is fully integrated, the various lines in the region also bring power from our mix of energy sources, including natural gas, nuclear, wind, coal and hydro power.

21) Q: Does Xcel Energy have a solar energy generation facility in the area?

A: Xcel Energy does not currently have any solar generation on the Peninsula, however the Company has announced plans for a one-megawatt solar garden in Ashland to serve our Solar*Connect Community program. If sufficient customer interest is demonstrated, the Ashland garden will be built in 2019 by OneEnergy Renewables, pursuant to a long term contract with Xcel Energy.

22) Q: Why not use solar or another source of power generation as a model for other communities?

A: Typically generation is not a substitute for transmission. Xcel Energy has announced plans for a one-megawatt solar garden in Ashland to serve our Solar*Connect Community program.

23) Q: How will the proposed project be funded?

A: The proposed project will generally be funded through rates which are determined by the Public Service Commission of Wisconsin.

24) Q: Will this project increase our electric rates?

A: The cost for a portion of these transmission line facilities will be included in Company's rates once the project is completed and put in service, but the rate impact will be minimal. When rates for Wisconsin customers are determined by the Public Service Commission of Wisconsin, the cost recovery of the transmission line facilities is spread over the life of the asset, typically 40 years for a transmission asset. Xcel Energy

works hard to manage costs and keep the cost of the electricity we provide to our customers as low as possible.

25) Q: What permits will be required for the project?

A: There are a number of permits and approvals that must be obtained before the transmission line can be built. Based on a preliminary assessment of the project, the following permits or approvals may be required for this project:

- Certificate of Authority - Public Service Commission of Wisconsin
- Utility General Permit (wetlands and waterways) - Wisconsin Department of Natural Resources (DNR)
- Endangered Resources Review - WI DNR
- Regional General Permit - US Army Corps of Engineers
- Conditional Use Permit - Bayfield County
- Wisconsin Pollutant Discharge Elimination System (WPDES) Permit – WI DNR
- Special Use Permit – US Fish and Wildlife Service

26) Q: Does Xcel Energy require approval from Bayfield County to build the proposed project?

A: We will need county approval for easements to locate the line on county land and for conditional use permits for the two substation sites. The Public Service Commission of Wisconsin is responsible for reviewing and approving the entire project.

27) Q: What is a transmission line?

A: A transmission line is an electric line that delivers power from a generation station to a substation or between substations. Once the transmission line enters the substation, the voltage is reduced and power is transmitted over lower voltage sub-transmission lines to distribution substations. The power is transformed again to a lower voltage for delivery to customers. Final transformation usually occurs near the user's location. View more information. View video on how transmission works.

28) Q: What is a substation?

A: Electric substations are a key component of any electric delivery system. Substations receive electric power from high voltage lines. Electrical equipment within the substations reduces, or "transforms", higher voltage levels to lower voltage levels. Once the voltage is reduced, it is distributed to other substations or customers by way of electric distribution lines, or "feeders."

29) Q. What is an easement?

A: An easement is defined as a permanent land right acquired by a person or party to use the land or property of another for a special or particular purpose. Landowners are paid a fair price for the easement and can continue to use the land for most uses, such as agriculture.

30) Q: What is the difference between a right-of-way (ROW) and an easement?

A: These terms are often used interchangeably but an easement is a permanent land right and the right-of-way is the land area on which the facilities are located.

31) Q: Can I have a garden/soccer field/ATV trail under the proposed line?

A: Yes. Land within the right-of-way may be used for any purpose that does not interfere with the safe operation or maintenance of the transmission line. In agricultural areas, the land may be used for gardens, crop production and pasture. In areas where the land will be developed, streets, lawn extensions, underground utilities, curbs and gutters, etc., may cross the right-of-way with prior written permission from the utility. Outdoor recreation uses are common within transmission line right-of-way. Rural routes are often marked and used for snowmobile and ATV trail routes. Locations closer to towns often are utilized as part of the city/community parks and walking/biking trail systems.

32) Q: How will trees be maintained under or near the proposed line and how often will they be trimmed?

A: We will work with each landowner since conditions will vary. The primary building and planting restrictions within the right-of-way are in place to ensure that a utility has the necessary clearance for operation and maintenance and to comply with the National Electric Safety Code. Restrictions within the right-of-way prohibit constructing buildings and structures, storing flammable materials and planting tall-growing trees. Xcel Energy typically clears vegetation on a four to five year maintenance cycle.

33) Q: How can we insure that herbicides are not used to keep vegetation cleared underneath the lines?

A: Xcel Energy's vegetation management philosophy is to attain sustainability along our maintenance corridors by implementing and maintaining an Integrated Vegetation Management (IVM) program. IVM is a data-driven, progressive system of information gathering utilized to best plan and complete work, including follow-up auditing, to better ensure the desired results are achieved. It involves the use of various types of vegetation management treatment including the removing, pruning and mowing of vegetation and the treatment of vegetation with herbicides. The overall goal of a utility IVM program is to develop compliant, site-specific, environmentally sensitive, cost-effective and socially responsible solutions to vegetation control near electric and natural gas facilities.

Vegetation Management Overview - XcelEnergy.com

Vegetation Management FAQ - XcelEnergy.com

Transmission Right of Way Tree Clearing and Maintenance - A Balanced Approach to Vegetation Management

34) Q: How will the proposed line affect my property value?

A: A significant number of studies have shown that the presence of transmission lines has very little effect on property values. Xcel Energy will provide compensation in the form of easement payments based on fair market value to property owners for the property where new easements are necessary. This considers the impact of the line on the strip of land it is placed on. Property owners may continue to use the land around transmission structures as long as it doesn't interfere with the safe operation of the transmission line facilities.

35) Q: Will the new transmission line be safe?

A: Every effort is made to ensure safety in construction, operation and maintenance of transmission lines. Lines and line infrastructure are designed to withstand extreme weather conditions. Protective devices at line terminals stop the electricity flow under

any abnormal operating circumstances. Utility practices meet or exceed standards set by national electric safety codes as well as those adopted by local governments.

36) Q: What about the EMF health effects?

A: Electric and magnetic fields (EMF) are created by anything that conducts electricity, including transmission lines, household appliances and business equipment. These fields are strongest closest to their source, so the farther away you are from the source; the less EMF reaches your body. The EMF associated with a high voltage transmission line occurs mainly on the transmission line right-of-way since the electric and magnetic fields surround the conductor and decrease rapidly with increasing distance from the conductor. Magnetic fields travel through most materials including iron, steel, lead, and the soil. Magnetic and electric field strengths drop rapidly as distance increases from the conductors such that at a few hundred feet from the line the fields are non-detectable. Depending on the flow of electrons, when there are two lines side-by-side, there can be cancellation of EMF. Magnetic fields are caused by current, not voltage. With a higher voltage more power is delivered with less current. Considerable research and study has been done to investigate potential health effects of EMF from high-voltage transmission lines on living organisms. Based on evidence to date, no cause-and-effect relationship has been found between exposure to magnetic fields and human disease. Nevertheless, the proposed transmission line will be designed to operate within the EMF parameters deemed reasonable by the Public Service Commission of Wisconsin. The proposed transmission line will also be designed and constructed to meet or exceed all applicable requirements of the National Electric Safety Code.

More information about EMF is available at the following locations:

Xcel Energy: https://www.xcelenergy.com/staticfiles/xe/Corporate/All-EMF-Brochure.pdf

PSCW: https://psc.wi.gov/documents/emf.pdf

37) Q: Are both transformers at the Iron River Substation connected and in use? If not, would installing both transformers help the issues on the Bayfield Peninsula?

A: There are two transformers at Iron River Substation, one normal and one spare. The normal transformer is the smaller of the two transformers but is large enough for serving the load on the Bayfield Peninsula for the long term. Connecting the normal and spare transformers together is not possible and would not help the reliability issues on the Bayfield Peninsula. The spare transformer is wound delta-wye, not delta-delta like the normal transformer. The spare transformer is strictly to provide radial back-up in the event of the normal transformer failing. This situation is okay for now since we operate the system with a normally open switch near Cornucopia due to system limitations. However, we would be unable electrically to use the spare transformer in our planned upgrade since we can't connect in two sides of the system 30 degrees out of phase.

38) Q: How many miles of transmission line west of Bayfield need to be rebuilt?

A: There are approximately 40 miles of transmission line between the Bayfield tap and the Iron River Substation that need to be repaired, regularly maintained, and ultimately will need to be rebuilt. This transmission line rebuild will occur after the proposed Bayfield Second Circuit project is complete. The proposed Bayfield Second Circuit project allows the

Company to repair, maintain, and ultimately rebuild these segments of line without interruption to service.

39) **Q: The electrical issues seem to be the worst around Bayfield; does Xcel Energy have any interruptible customers in the Bayfield area or any customer owned emergency generation that Xcel Energy can turn on in the Bayfield area?**
A: Xcel Energy does have a small amount of interruptible load in the Bayfield area, however it totals less than one percent of the load in the area. To the extent there is customer owned emergency generation, Xcel Energy cannot control customer owned emergency generation.

40) **Q: Does Xcel Energy have any mobile or emergency generation at any of their substations on the Bayfield Peninsula?**
A: Xcel Energy does not have any load serving mobile or emergency generation at any of its substations.

41) **Q: The Bay Front plant seems to have multiple power lines going into it, where are these lines going and can any of these help serve the Bayfield Peninsula?**
A: Three transmission lines terminate at Bay Front Substation and provide both generation outlet and local load serving functions. These three lines are the Stinson – Bay Front 115 kV line (which heads west towards Superior), Gingles – Bay Front 115 kV line (which heads south towards White River), and Norrie – Bay Front 88 kV line (which heads east towards Hurley and Ironwood). The proposed second circuit project would tie into the Stinson – Bay Front 115 kV line and then head north in order to support the Bayfield Peninsula. The other two 115 kV lines that terminate at the Bay Front Substation are not able to directly serve the Bayfield Peninsula.

42) **Q: What are the transmission and distribution voltages at Bay Front?**
A: The transmission voltages at Bayfront are 115 kV and 88 kV. The distribution load at Bayfront is served at 13.8 kV.

43) **Q: Is there a substation between Herbster and Cornucopia? Does this substation serve load or what is its purpose?**
A: There is a voltage regulator located near Bark Bay which is used to boost the voltage towards Iron River from the Gingles Substation on rare occasions. This regulator is manually operated and generally not needed since it boosts the voltage from Cornucopia towards Iron River and not the other way around. As part of the Proposed Second Circuit project, this regulator would be removed from service as it is not needed.

44) **Q: How much load is located in the Bayfield Peninsula?**
A: There is approximately 21 megawatts (MW) of load on the Bayfield Peninsula. Individual substation loads, as studied, are included in the Transmission Planning Report.

45) **Q: What are the major differences between building transmission lines in this area at 34.5 kV compared to 69 kV? What are the cost differences?**

A: The Company is proposing to build a line and operate it at 34.5 kV, but build the line to 69 kV standards. The design for all new 34.5 kV transmission lines utilizes horizontal post 69 kV insulators and shield wire, which provides greater reliability advantages over the existing 34.5 kV line's design. This shielded compact design allows the Company to accommodate longer spans (less footprint), necessary lightning protection, and more robust structural load considerations to reliably traverse open expanses of territory. Conventional "distribution" type geometry and line design used in 34.5 kV construction, such as the existing 34.5 kV system serving the Bayfield Peninsula, is suited for short spans in urban areas with smaller wire and multiple load serving taps. The conventional distribution style design is not well suited for the Bayfield Peninsula area due to the remote and difficult access in many locations.

The primary difference in transmission line construction between 34.5 kV and 69 kV is the size of the materials used in construction and spacing (between poles and from the wires to the ground) required by the National Electrical Safety Code (NESC). The NESC spacing difference equates to approximately five foot taller transmission poles and one foot longer insulators. These increases have an associated increase in cost to both materials and the labor required to install. In the case of Xcel Energy's Bayfield Peninsula lines the estimated difference in cost between 34.5kV construction and 69kV construction would be less than 10%.

46) **Q: The Transmission Planning Study mainly compares the 34.5 kV alternative to larger transmission alternatives. Did Xcel Energy do an iterative process and look at multiple different options as alternatives to the Proposed Second Circuit project?**
A: When the existing line on the Bayfield Peninsula was built, it was intended to create a loop around the entire peninsula. Because of voltage conditions, the Company has split the loop into two radial lines (the break in the loop is near Cornucopia). What this means is that if something happens on the line (for example, south of Washburn) all customers served by the line north of that point up until the break in the loop at Cornucopia will be effected by the outage. The Company is proposing a long term solution that will greatly mitigate the issue described, and allow the Company to more efficiently perform normal load serving and maintenance work.

The Company believes the current Bayfield Peninsula project incorporates the best of all previous iterations with an end result being the proposed second 34.5 kV line to Bayfield and a short emergency tie to Washburn. The analysis for this project included many variations including single and double circuit versions of 34.5 kV and 115 kV line projects. Capacitor banks were also analyzed as individual projects but the system is not strong enough to reliably serve load under contingency with only the existing system and capacitor banks. At a high level, the analysis looked at renewable energy and battery alternatives. Generally speaking, renewable energy and storage are not a substitute for transmission facilities. Wind and solar power are important resources in a diverse generation fleet, however these resources will not solve the voltage support and reliability needs for the Bayfield Peninsula because they are intermittent sources of power (i.e., we cannot know with certainty when power will be available from wind or solar generation due to variability in weather). While batteries are sometimes paired with intermittent sources in order to provide

power when the intermittent sources cannot, batteries are a finite resource because they can only hold a set amount of power, and cannot generate or receive power from other sources if the intermittent sources are not producing electricity. No realistic amount of battery storage can solve the voltage support and reliability needs for the Bayfield Peninsula.