

Questions	Answers
What are the appropriate bases for assumptions about:	--
CHP - i.e., deployment that has not yet been identified	We include all known CHP resources but it is impossible to predict future CHP additions that have yet to be identified. That is why we strive to maintain flexibility in our plans so as conditions change we can adjust other resource additions accordingly.
Electrification of vehicles	The pace of EV adoption is an unknown. We have opted to take a conservative approach in order to minimize the risk of overstating our load growth. In the base forecast, we considered only light-duty vehicles, and estimated EV adoption using a Bass Diffusion (i.e. technology adoption) model as well as an econometric model that evaluates the simple payback to consumers of choosing an EV vs. comparable internal combustion engine light-duty vehicle. EV vehicle price differential, battery prices, and gasoline prices affect the adoption decision. Other types of electrification will be considered in sensitivity analyses (see row 10).
Electrification of other sectors	The pace at which electrification will occur is an unknown. We are opting to take a conservative approach and only consider adoption of EVs as light-duty vehicles in our base forecast. We recognize there is likely to be some electrification of medium-duty vehicles, heavy-duty vehicles, space heating, water heating, and other end uses. These will be considered in one or more sensitivities (see row 10).
How does the demand forecast take into account the implications of a changing climate (e.g., for higher air conditioning, less cooling), given that Xcel Energy uses a 20-year historical estimate for weather)? Shouldn't Xcel Energy be using the insights from studies that indicate warming?	Our current load forecasting approach/methodology has been vetted and approved with our regulatory agencies. While available climate models do generally suggest higher average temperatures and more temperature extremes are possible in our regions, these models are generally at the national to regional (e.g. large regions of the U.S.) level of resolution, rather than predicting outcomes specific to our service territories. We will continue to evaluate what the models can tell us about our service territories. We will also look at high forecast sensitivities to inform how we might plan to accommodate increasingly volatile weather.
How is Xcel Energy addressing the historical experience that its demand forecasts typically end up being too high?	We are not including any forecasted climate driven changes and also excluding electrification growth beyond 2023 in the base forecast.
Why is the forecast of peak demand growing so much faster than the forecast of energy demand?	This is primarily due to the forecasted DSM impacts as they are projected to have a greater impact on energy sales than on demand.
How will E3's IRP and 2050 modeling be used to inform assumptions about electrification of other sectors and its implication for the demand forecast? For example, are there insights from improvements in efficiency that result electrification that should be built into the demand forecast?	E3's PATHWAYS modeling, as presented in stakeholder workshops to date, includes High Electrification and High Biofuels scenarios achieving Minnesota's 80% GHG reduction by 2050 goal, as well as a medium-electrification sensitivity based on NREL's Electrification Futures Study (less aggressive than the High Electrification scenario, but more aggressive than our base forecast). These scenarios/sensitivities are for Minnesota statewide. We are working with E3 to develop assumptions for at least one electrification sensitivity for Strategist. This will involve downscaling the E3 statewide forecast to our service territories; including light-, medium- and heavy-duty vehicles as well as space and water heating electrification; and examining the impacts on total energy needs as well as peak demand, depending on the unmanaged vs. managed profile of charging electrified loads.
What is the role of Xcel Energy's analysis of high and low load forecasts (90/10), in terms of how such results inform the plan?	The 90/10 forecasts may be used to conduct high and low load sensitivities if other more granular sensitivity forecasting methods do not materialize or are generally consistent. The purpose of the high and low load sensitivities is to help inform contingency planning and help design a flexible portfolio that can accommodate future changes to growth as best as possible.
Why not assume that the forecast assumes that organic/market-driven EE improves over time as a result of technology and increasing appliance efficiency standards?	Organic efficiency and cultural shifts are accounted for in the sales forecast, historical data reflects usage trends and the sales forecast projects those to continue. The Company has previously worked with a third party to more discretely isolate organic EE but a better predictor of trends than the Company is currently using was not apparent.
What are the detailed assumptions about EE (e.g., full accounting of the value and services EE provides to the system, in terms of reliability, flexibility, avoided transmission and distribution)?	In the IRP modeling, EE assumptions reflect those from the most recent CIP Triennial. The 2020-2022 CIP Triennial docket will provide updated assumptions. Notwithstanding the CIP Triennial process, the Statewide Potential study, when available, may influence modeled sensitivities.

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In light of changes in DSM and other factors (in the base case as well as in sensitivity case with respect to such things as natural gas prices), will Xcel Energy reevaluate its calculations of avoided cost? If so, how and when?	Avoided cost determinations are continually evaluated.
If DR aggregation were allowed (e.g., through a tariff), then there might be more aggressive DR resources than current being presumed, so how is that being evaluated in the IRP?	The Demand Response Potential study address the potential of demand response resources regardless of what type of program is provided to our customers. Having an aggregated DR resource would not provide additional potential in our analysis, it would be a methodology for making our current goals. Currently, this is an option we are reviewing.
If there were different EE program designs or rate designs that might affect adoption of EE, DERs and DRs, how would that be addressed in the planning process?	In addition to our own program development efforts we rely on national third party experts to bring new ideas in technology and design and identify additional potential for EE & DR. In this IRP we will be using findings from the Statewide Potential Study commissioned by the Dept. of Commerce. We have also asked for EE potential scenarios at different rebate levels to show how that will impact potential to inform higher impact scenarios. We understand that certain rate designs such as TOU may help bolster the use of complementary energy efficiency and demand response efforts and will evaluate these details as the pilots continue.
How are the efforts of the DR workshops being integrated into the IRP process?	The efforts of our DR workgroup is helping define the programs (or strategy) behind meeting our regulated goals and meeting our customer needs.
Could there be placeholders in Xcel Energy's IRP for the eventual results of the upcoming EE technical potential study?	The EE technical potential study is being used to determine the sensitivities of the IRP and will be added to future analysis as we complete our IRP process customer needs.
If Xcel Energy emphasizes that Strategist is "just a big adding machine and the thing that matters are the inputs and assumption," then when will we get to see the inputs and assumptions?	Major assumptions were shared at the stakeholder meeting on September 10, 2018 and the slides detailing those assumptions are available on edockets. If there are additional questions remaining, please contact Amber Hedlund at amber.r.hedlund@xcelenergy.com .
If the "reference case" isn't being characterized as "Xcel Energy's strategy," maybe it needs a different name that makes that really clear.	Thanks for the comment. Xcel Energy's strategy has traditionally been referred to as the "Preferred Plan" while the "Reference Case" represents our currently committed/status quo plans per what was approved in the last resource plan.
Given that Strategist uses the profile and characteristics of a single representative week per month, then how is Xcel Energy accounting for the value of solar during really unusual weeks?	Solar shapes utilized in Strategist capture the average energy contribution that the resource is making to the system so should provide a good general representation. In addition, we assume 50% capacity credit for solar resources for all years of the planning period. Unusual high and low weeks should generally average out so the representative shapes should be capturing the long term value of solar.
How will Xcel Energy address and provide more detail on how the company plans to address limitations of the Strategist model?	The company has addressed the capabilities of the Strategist model in a number of forums including past resource plans and workshops. Despite limitations due to lack of granularity and a simplified approach to generation dispatch, we feel that Strategist provides an accurate representation of the planning period. While Strategist does form the basis for resource decisions, it is just one part of our overall process in determining future resource needs and strategies. In addition, we have engaged E3 for this IRP, who uses different modeling tools, to corroborate our strategist results.
What will Xcel Energy do to show the results of its analyses of the implications of various scenarios in robust ways? For example, how will Xcel try to encourage a better understanding of how various sensitivities and scenarios interact?	We will share the modeling results to show the pros and cons of each of the scenarios and sensitivities. Generally we can share cost, portfolio capacity & energy, risk, carbon and other metrics across the different modeling runs.
Has Xcel Energy explored the cost implications of extending the lives of existing generating assets (for resource adequacy needs) instead of adding, say, new gas-fired capacity during the study period, and then seeing how much those existing resources operate (e.g., economic dispatch, emissions)?	Yes we have explored life extensions in the past. Generally the majority of our CT resources are planned to operate well beyond their original intended lives so extension is not an option due to risks associated with continued operation.
What are Xcel Energy's plans for its nuclear units? What is/are the future regulatory process(es) for cost recovery related to nuclear plants? What analyses exist to support either continued operation, operation to the operating life of the units, unit extensions?	We intend to run our baseload scenarios to explore different lifecycle options for the nuclear plants and determine the best path forward. In addition, E3 is conducting modeling to explore the same question.

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What are the varied approaches to coal retirements, including the assumptions and trade-off?	We intend to present the trade-offs once we conduct the baseload scenario analysis.
How is Xcel thinking about impacts on workers and communities that could result from future unit retirements, and how do such issues fold into the IRP process? [Those host communities are less concerned about the macro socio-economic impacts (e.g., in the state) and more concerned about the local impacts of potential/actual plant retirements.]	We will be working with MCEE to support an economic impact analysis that looks at the impacts our baseload facilities have on our host communities. We are committed to ensuring a just transition at all of our baseload facility locations upon retirement.
Will Xcel examine accelerated depreciation scenarios for nuclear, coal, gas, in terms of their cost profiles, their comparison to other options, the implications for stranded costs, their rate impacts?	We plan to explore accelerated depreciation for nuclear and coal scenarios but do not intend to explore accelerated depreciation for gas assets. We believe gas assets will continue to serve as an important resource for the foreseeable future.
What are the going-forward costs for nuclear units (e.g., are they primarily fixed O&M and capital investments)?	The IRP Reference Case includes O&M and capital forecasts aligned with respective end of license dates (early 2030's). For scenarios evaluating changes to these dates, such as an early retirement, revised forecasts have been developed.
How will Xcel explore the sensitivity of results, in light of different cost or performance assumptions (e.g., about storage, or DERs, or nuclear costs)?	The Company models several scenarios each with multiple sensitivities. Sensitivities may include high/low variations for inputs such as fuel costs, market energy, load variations, DER adoption, future resource capital costs. Comparison of the resulting NPV's helps to inform which inputs drive changes in resource selections, costs and emissions.
What are the assumptions regarding storage technologies, performance, cost?	We provided a generic 4 hour battery storage forecast in the stakeholder meeting on September 10, 2018. Specific characteristics are still under development for incorporating in Strategist, however, we are consulting a variety of sources in an effort to get the most accurate view possible.
How will Xcel address stakeholder concerns about how the company is valuing internal existing resources with external existing or new resources (e.g., PURPA, storage)?	The Company models several scenarios each with multiple sensitivities (ex high/low fuel costs, market energy, load variations). Capital forecasts for new resources are generally tied to national projections (NREL) with site specific adjustments as appropriate. Existing resource retirements and life extension projects are also evaluated by Energy Supply. Market energy value is low and gas prices are low, therefore resulting in low small power producer pricing.
How will Xcel share more information about the results of Colorado solar and storage procurements, and adjust them for conditions in Minnesota and the upper MW?	Median bid prices in the CO procurements were made public in filings in that state. Those costs helped inform our 4 hour battery storage generic forecast. Renewable costs are based on NREL ATB forecasts which are generally consistent with pricing seen in CO when adjusted for locations.
How are transmission and distribution plans and investments reflected in the IRP? And DC transmission, in particular?	Project specific transmission and distribution costs are included as part of project capital costs, and modeled as such. Specific scenarios developed around a broader transmission initiative (such as a DC line) would incorporate changes to the overall transmission cost assumptions in the model, in addition to project specific costs.
What are the carbon impacts for each scenarios in Xcel's IRP analysis?	The reference case carbon was presented on October 23, 2018. Carbon impacts for scenario modeling will be also be assessed and communicated. We are currently planning to constrain the modeling to achieve specific carbon free energy targets. We place much weight on carbon reductions as it is a key component of our long term strategy. We focus on emissions of the NSP system and achieving a level of carbon reduction that is commensurate with our goals.
How much weight does the Company place on carbon reductions in the formulation of the preferred plan?	
How do other states' emissions' trajectories affect Xcel's plans?	
In light of the Commission's IRP rules requiring an evaluation of rates and bills, how will Xcel being addressing that? For example, how can stakeholders understand the translation of NPV \$ into rates and bill impacts?	Rate impact is not directly correlated with NPV. Variations in rate base expenses, fuel costs, and purchased power influence rate impact differently. The Company is working to develop a less cumbersome method of representing rate impact variations associated with scenarios and sensitivities, similar to the previous NPV tables presented in prior IRPs.
If natural gas prices drive power dispatch and prices during the study period, then want to see more about the implications of different gas price forecasts	The Company models several scenarios each with multiple sensitivities. Sensitivities do include high/low variations in fuel costs, as well as market energy. The Company's Risk Analytics group develops these forecasts for the modeling. The comparison of the resulting expansion plans, total emissions, energy mix profiles, and NPV's help to identify the impact of changes in fuel pricing.
If Xcel is proud of CSG program, why has it proposed a cap and why has Senator Goggin (Xcel Engineer) proposed bill to gut it?*	Xcel Energy supports solar but wants it to be at a fair price for all of our customers. Right now, the Community Solar Garden program is very expensive compared to other solar and generation options. Accordingly, we are seeking legislative changes.

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Why is the stakeholder session on (the) preferred plan (from 8:30-12:00PM) on a Monday?*	It has been our experience that stakeholder sessions are better attended during business hours. As we continue to move forward, we will assess scheduling alternatives for all workshops and sessions to better meet the expectations of our customers, interested stakeholders, and the general public.
What is being done to support host communities of coal or nuclear or gas plants, to transition the workers of these plants?*	We are currently participating in a study on the impacts of coal and nuclear plants on host communities in Minnesota. CEE is overseeing the study and the Minnesota Host Community Coalition, Prairie Island Indian Community, and Minnesota Power are also participating. CEE and the Minnesota Host Communities, including Becker, Oak Park Heights, Red Wing, Monticello, and the Prairie Island Indian Community, presented on the study scope and their experiences as host communities at an IRP stakeholder workshop on February 12. We will be incorporating the results of the CEE study into our Integrated Resource Plan. We acknowledge the impact the plants have on the communities we serve and we are committed to work with each community to develop transition plans. For example, the Company has worked to bring new business to the City of Becker where our Sherco site is. We worked with Google to develop a plan to bring a data center to Becker and with Northern Metals to move their Recycling Center there. We also have the Certified Site Program where we partner with communities to grow jobs and capital investment. The program focuses on establishing real estate options for business attraction and expansion projects which will increase speed to market and generate multiple marketing channels to promote available sites to potential customers within our communities.
Comments have been made that wind doesn't always blow and sun isn't always shining by multiple Xcel staff. Of course not, but it is always (shining & blowing) somewhere. So what is being considered for increased transmission to (MISO)?*	<p>Xcel Energy is an avid participant in regional transmission planning efforts in all of our service territories. For NSP specifically, our planning staff is active in the annual MISO Transmission Expansion Planning (MTEP) efforts that include an economic analysis based on cost effective expansion of transmission to leverage the regional diversity of the MISO footprint. This process develops several different scenarios, referred to as Futures, to analyze the economic potential for transmission expansion taking into account numerous different assumptions. These assumptions include varying levels of renewable expansion in the most cost effective locations of the footprint as well as the benefits of weather and demand differences across the MISO footprint. Xcel Energy staff also participates in the MISO-SPP Interregional Planning process, which takes a similar approach to the MISO economic planning process described above, but expands the area analyzed to include the neighboring Regional Transmission Operator (RTO) regions.</p> <p>One example of transmission expansion to allow for greater utilization of the most cost effective, and regionally diverse renewable resources is the Huntley to Wilmarth 345 kV transmission line project. This project was approved by MISO in the 2016 MTEP cycle and is currently in the Minnesota Certificate of Need and Route permitting processes.</p> <p>Despite these efforts, there are documented cases in which solar and wind resources fail to meet their expected performance levels on a region-wide bases. These situations require additional resources to make up any gap between customer demand and the energy being produced. For instance, on July 29, 2018, the low point of the ~18,000 MW of installed wind generation in the MISO footprint was a total of -11 MW for one of the hours during a potential peak demand time. There are also situations in which local renewable resources produce energy at a rate which exceeds local customer demand, resulting in a high energy transfer scenario that stresses the transmission system capabilities.</p>
How will the concept and consideration of "decoupling" (restructuring how regulated utilities make money) relate to the IRP process?*	Generally, the goal of an IRP is to set out a reasonable plan to ensure that a utility can meet its customers' needs in a reliable and low-cost manner. Cost-recovery is generally dealt with in rate case and rider proceedings, so decoupling would be discussed in those forums. However, on a broader note, there is also a performance based rate proceeding (Docket No 17-401) under way and that docket will also be addressing utility incentives.

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<p>Like in 2017, there was news that Xcel in Colorado has received responses to an RFP for new generation capacity where solar and battery bids lowest cost. What's the update on that process, and how will Xcel be factor(ing this RFP information) into the IRP?*</p>	<p>Strategist inputs for storage are based on PSCo bid information, based on a 2020 installation with a 4-hour duration, and an "experience curve" to reflect future declining prices. The information the Company is using right now is based on bids received, not final contracts or existing operations. As these resources become operational, the assumptions can be modified to reflect actual, rather than proposed, operational constraints.</p>
<p>Does Xcel have TOU plan for EVs?*</p>	<p>There are several TOU EV options at this time. For more information please see Docket Nos. 15-111 (EV-specific time-of-use rate for residential customers), 17-817 (Incorporates time-of-use rate using EV charger as metering technology), 18-643 (Fleet and Public Charging Pilot Petition), and 19-186 (Residential EV Subscription Service Pilot Petition).</p>
<p>I know there is a bio-digester/biomass energy production facility in the Becker area. Considering our factory farming waste pollution issue, would it not be being a better corporate citizen for Xcel to scale this up to replace Sherco's coal fired energy generator(s) with bio-digestion and biomass technologies?</p>	<p>The volume of waste material (examples: biomass, refuse derived fuel, municipal solid waste) necessary to replace the capacity from Sherco would require transporting the fuel sources long distances, adding transmission emissions and costs to the net impacts. Biomass generation sites provide definite benefits to the community related to reduced landfill needs, however these generation production sites are typically smaller scale. We believe the bio-digester referenced in the question is an anaerobic digester used to treat the industrial wastewater of a regional manufacturer. The operational objectives of the process addressed downstream needs of the local wastewater treatment facility, and also reduced manufacturer waste disposal costs. Energy offtake from these systems is typically small, less than the needs of the manufacture's total production operation.</p>

* These hand-written questions were submitted during the public session on April 2, 2019. Any errors or omissions in transcription are unintentional.