

Service Date: February 2, 2017

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

IN THE MATTER OF NorthWestern)
Energy's December 2015 Electricity Supply)
Resource Procurement Plan) REGULATORY DIVISION
DOCKET NO. N2015.11.91

**MONTANA PUBLIC SERVICE COMMISSION COMMENTS IN RESPONSE TO
NORTHWESTERN ENERGY'S 2015 ELECTRICITY SUPPLY PROCUREMENT PLAN**

APPLICANT:

NorthWestern Energy
11 East Park, Butte, Montana 59701

COMMENTERS:

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BEFORE:

Brad Johnson, Chairman
Travis Kavulla, Vice Chairman
Roger Koopman, Commissioner
Bob Lake, Commissioner
Tony O'Donnell, Commissioner

BACKGROUND

1. In December of each odd-numbered year, NorthWestern Corporation, doing business as NorthWestern Energy (NorthWestern), must file a comprehensive, long-term electricity supply portfolio management and resource procurement plan (as well as a near-term action plan) with the Montana Public Service Commission (Commission). Admin. R. Mont. 38.5.8226 (2016). After providing an opportunity for public comment, the Commission must issue written comments that identify any concerns and ways to remedy those concerns. Mont. Code Ann. § 69-8-420 (2015).

2. The planning and procurement rules are intended to facilitate: (1) Provision of adequate and reliable electricity supply services, stably and reasonably priced, at the lowest long-term total cost; (2) economic efficiency and environmental responsibility; (3) NorthWestern's financial health; and (4) a process through which NorthWestern identifies and cost-effectively manages and mitigates risks. Mont. Admin. R. 38.5.8203. The rules describe objectives for assembling and managing a supply portfolio, assessing portfolio needs, allocating costs and designing retail rates, acquiring resources, system modeling and analysis, demand-side resources, and affiliate transactions. *Id.* at 38.5.8201 to 38.5.8229. NorthWestern must thoroughly document its portfolio planning, management and resource procurement activities in order to justify the "prudence" of supply-related costs. *Id.* at 38.5.8201(3), 38.5.8220(2), 38.5.8226(2).

3. On November 25, 2015, NorthWestern filed a Motion for Extension (Motion) requesting an extension until March 31, 2016 to submit its 2015 Electricity Supply Resource Procurement Plan (2015 Plan). The Commission granted NorthWestern's Motion on December 9, 2015. On March 31, 2016, NorthWestern filed its 2015 Plan.

4. On April 21, 2016, the Commission issued a Notice of Electricity Supply Procurement Plan, Public Meeting, and Opportunity to Comment (Notice). On June 9, 2016, the Commission held a public meeting for the purpose of laying the foundation for the Commission, Montana Consumer Counsel (MCC), and stakeholders to "review, evaluate, and make

recommendations on technical, economic, and policy issues related to electricity supply resource portfolio planning, management, and procurement.” Notice 1, Mont. Admin. R. 38.5.8225. The MCC, GB Energy Park LLC, the Northwest Energy Coalition, Renewable Northwest, Montana Environmental Information Center, and NorthWestern participated in the public meeting. The Commission set August 19, 2016 as the deadline for submitting written comments on the 2015 Plan. Notice 1. The MCC, Montana Department of Environmental Quality, GB Energy Park, Hotrock Energy Research Organization, MADA Power, Montana Environmental Information Center, NW Energy Coalition, Renewable Northwest, and Sierra Club, submitted written comments. The Commission also received approximately 490 comments from members of the public expressing their preferences for the types of resources NorthWestern should use to supply its customers.

2015 PLAN SUMMARY AND CONCLUSIONS

5. In the 2015 Plan, NorthWestern, for the first time, applies a capacity-based long-term planning approach to address a large imbalance between its owned and contracted physical resources and its projected retail peak loads. The 2015 Plan estimates a current planning reserve margin of negative 28 percent and describes a strategy for achieving what NorthWestern considers minimal resource adequacy over a ten-year period. The 2015 Plan calls for the acquisition of flexible generating capacity that can provide ancillary services, follow retail loads and serve retail peak demand.

6. In the 2015 Plan NorthWestern analyzed forecast loads and existing and potential resources using the PowerSimm analytical platform developed by Ascend Analytics. PowerSimm uses a stochastic modeling approach to account for uncertainty and allows NorthWestern to quantify and compare the long-term expected costs and risks of alternative resource portfolios. PowerSimm’s portfolio modeling occurs in two steps: first, hourly prices are simulated for the 2016-2035 planning period from an external price projection based on forward market information—the hourly price simulations maintain structural relationships between weather, load, wind, hydro generation, and market prices reflected in historical data; second, the energy production of dispatchable supply resources in the modeled portfolios is simulated based on market prices simulated in step one and operational constraints defined in the model (e.g., minimum run time, maximum starts, or air quality limitations).

7. NorthWestern's load forecast for the 20-year planning horizon, including impacts from demand-side management (DSM) programs, indicates an average annual growth rate of 0.75 percent in winter peak demand and 1.1 percent in summer peak demand. At these growth rates, NorthWestern estimates that its winter and summer peak demands will increase from 1,272 MW and 1,115 MW in 2014, to 1,365 MW and 1,363 MW, in 2035, respectively.

8. NorthWestern contracted with Nexant Consulting to perform an energy efficiency potential assessment of the amount of remaining, achievable, cost-effective DSM available in NorthWestern's service territory. However, the results of the assessment are not reflected in the 2015 Plan, which retains the current goal of acquiring 6 aMW of DSM per year. Nexant's results are expected in the first quarter of 2017.

9. The 2015 Plan reflects a long-term natural gas price forecast based on forward prices at the Alberta Energy Company Trading Hub (AECO) through 2020. After 2020, the near-term price curve is escalated using the rate of change in Henry Hub natural gas prices forecast by the Energy Information Administration (EIA) in its *2015 Annual Energy Outlook*. The 2015 Plan base case natural gas price forecast rises from \$2.28 per MMBTU in 2016 to \$5.33 per MMBTU in 2035, with a 20-year levelized price of \$3.52 per MMBTU.

10. NorthWestern used a similar method to project wholesale electricity market prices. The 2015 Plan base case around-the-clock electricity price forecast ranges from \$17.10 per MWh in 2016 to \$68.32 per MWh in 2035. The wholesale price of electricity increases by approximately \$12.00 per MWh in 2022 to account for the cost risk of potential future regulations on carbon dioxide emissions. The 20-year levelized price of around-the-clock electricity is projected to be \$37.30 per MWh.

11. The \$12.00 per MWh carbon dioxide cost risk adder in 2022 is based on emissions costs estimated by Synapse Energy Economics' in its *CO2 Price Reports, January, 2016*, and integrated resource plans developed by PacifiCorp, Xcel Energy, Puget Sound Energy, and Portland General Electric in 2015. Using these sources, NorthWestern set a base emissions cost of \$20.00 per short ton in 2022, which escalates at approximately 4.15 percent per year. The 2015 Plan also analyzed scenarios in which emissions have no cost or are double the base case cost. PowerSimm used a triangular distribution centered on the base case emissions cost to simulate emissions prices in the stochastic modeling process.

12. In the 2015 Plan NorthWestern identified several reasons for its new focus on resource adequacy and capacity-based planning. First, it pointed to the Northwest Power and Conservation Council's (NWPCC) assessment that the region is becoming increasingly capacity constrained. NWPCC estimates that the regional loss of load probability (LOLP) will be 8 percent in 2021. Second, NorthWestern concluded that participating in an energy imbalance market or a more comprehensive organized wholesale market would require it to contribute toward a resource adequacy standard. Third, in July 2016 NERC implemented a new transmission balancing and control standard, Reliability Based Control (RBC). NorthWestern indicated that additional capacity could be needed to comply with the RBC standard. The 2015 Plan described a LOLP analysis prepared by Ascend Analytics for NorthWestern's system which finds that to achieve the industry standard LOLP of one day in 10 years, NorthWestern would need to acquire 500 MW of capacity.

13. The 2015 Plan evaluated new thermal resources (natural gas plants), upgrades to existing hydroelectric plants, wind resources, and solar PV resources. NorthWestern contracted with Lands Energy Consulting to identify suitable natural gas-fired technologies and define their characteristics for PowerSimm modeling. It also contracted with CB&I to identify possible sites for a new 250 MW Combined Cycle Combustion Turbine (CCCT) generator. CB&I determined Billings, Montana would be the least-cost location for the CCCT. Table 1 lists the resources modeled in PowerSimm.

Table 1. Potential Resource Additions

Resource Description	Fuel Source	Technology	Net Capacity	Capital Cost (\$/kW)	Fixed O&M (\$/kW-yr)	Variable O&M (\$/MWh)	Heat Rate (Btu/kWh)	Escalation Rate (%/year)
CCCT (1x1)	Natural Gas	GE 7FA.05 ACC	308	\$1,400	\$10	\$3	6,528	2.0%
CCCT (Duct Firing)	Waste Heat	GE 7FA.05 ACC	40	\$0	\$12	\$0	8,546	2.0%
SCCT - Small Aeroderivative	Natural Gas	PW FT8	53	\$1,017	\$6	\$5	10,500	2.0%
SCCT - Large Aeroderivative	Natural Gas	GE LMS100	93	\$1,187	\$17	\$3	8,867	2.0%
SCCT - Frame	Natural Gas	GE 7EA	79	\$997	\$12	\$3	11,286	2.0%
ICE - Internal Combustion Engine	Natural Gas	Wartsila 18V50SG	18	\$1,280	\$11	\$5	8,314	2.0%
Utility Scale Solar PV	Solar		25	\$3,176	\$43	\$1		-1.0%
Wind	Wind		40	\$1,980	\$38	\$2		-0.5%

14. NorthWestern contracted with HDR Engineering (HDR) to complete an operation capacity study of NorthWestern's hydroelectric facilities in 2015. HDR found that the

hydroelectric facilities can provide regulation services. The 2015 Plan assumed the hydroelectric facilities can provide 50 percent of NorthWestern's current regulating capacity requirements.

15. NorthWestern used PowerSimm to estimate the regulation capacity requirements of wind and solar resources under the pre-July 2016 transmission balance control standards that have since been replaced with the RBC standards. That modeling indicated that 100 MW of additional wind resources would require 12 MW (12.2% of nameplate) of additional regulation capacity while 100 MW of solar resources would require 5 MW (4.9% of nameplate) of regulation capacity. The 2015 Plan also estimated that integrating an additional 100 MW of wind would require about 85 MW of flexible capacity for ramping, while 100 MW of solar would require about 11 MW of such capacity.

16. Based on PowerSimm portfolio modeling, the 2015 Plan identified an economically optimal portfolio (EOP) centered on the acquisition of various types of natural gas-fired generating facilities. The 2015 Plan indicated that the modeled wind and solar resources do not meet time-sensitive load-serving needs. The 20-year net present value of the 2015 Plan's EOP is 7 percent lower than an alternative portfolio that relies on wholesale energy purchases. The EOP calls for the addition of three 18 MW internal combustion engines (ICE) in 2019 and a total of 10 18 MW ICE units by 2028. The largest resource addition in the EOP is a 348 MW Combined Cycle Combustion Turbine (CCCT) in 2025. Finally, the EOP adds two Frame Combustion Turbines in 2028 and 2029 to achieve a slightly positive system peak load reserve margin.

17. The 2015 Plan includes a three-year action plan key elements of which include:

- Resource Optimization—analyze and study the most efficient and cost-effective operation and management of NorthWestern's entire generation fleet;
- Additional evaluation of potential gas-fired resources;
- Evaluate the natural gas and electricity infrastructure in Montana to refine infrastructure costs related to additional electricity generation;
- Consider potential impacts of the Environmental Protection Agency's Clean Power plan;
- Study and plan for a higher level of operational integration by the Supply and Transmission business units;
- Examine potential benefits and costs of joining an organized market;
- Monitor and refine NorthWestern's understanding of the impacts of distributed resource integration such as rooftop solar;

- Plan for meeting requirements related to the renewable portfolio standard in Montana;
- Evaluate and analyze the DSM potential assessment study conducted by Nexant;
- Follow up on potential demand response opportunities from large key account customers;
- Work with stakeholders including the Commission, the Montana Consumer Counsel, and other interested parties to inform, educate, and use transparent processes so planning actions are presented clearly and easy to understand; and
- Study electric generation and energy storage technology advancements to assess potential benefits to NorthWestern's portfolio.

COMMISSION COMMENTS

18. In general, the action plan items in the 2015 Plan are reasonable. However, the analysis in the 2015 Plan is deficient in several important respects, and the EOP identified in the 2015 Plan is questionable. Consequently, the Commission recommends that if, after receiving these comments, NorthWestern decides to proceed with any near-term resource acquisitions it proceed cautiously. Commission preapproval of resources based on the analyses and results in the 2015 Plan would almost certainly not be in the public interest.

19. Rather than proceeding immediately to acquire new resources, NorthWestern should pursue a rigorous stakeholder process to validate the conclusions in the 2015 Plan. To enable NorthWestern to undertake such a process, the Commission will extend the deadline for NorthWestern to file its next plan to December 15, 2018. Active engagement with its technical advisory committee for a two-year period and a commitment to devote sufficient resources to the planning process may lead to a better planning process, higher-quality modeling and analysis, and greater confidence in planning results. NorthWestern should provide the Commission with written status reports every six months, and the Commission will hold this docket open to receive them. The Commission may notice receipt of such status reports and invite public comment on their contents. Additionally, the Commission will hold a technical conference on capacity planning in the second quarter of this year.

20. The Commission's concerns with NorthWestern's 2015 Plan fall into the following five categories: (1) the resource adequacy constraint NorthWestern imposed in the portfolio modeling process; (2) the scope of resource alternatives NorthWestern evaluated to meet future load requirements; (3) the multiple uncertainties NorthWestern, and its customers

face in the future; (4) the stakeholder process NorthWestern used in developing the 2015 Plan; and (5) the competitive resource procurement process. Each area of concern is discussed in further detail below.

Resource Adequacy

21. The single largest issue in the 2015 Plan is the capacity need it identifies based on a resource adequacy assessment. The Commission's comments on NorthWestern's 2011 plan endorsed a proposal to define system-specific resource adequacy standards (Comments, Dkt. N2011.12.96, ¶ 13 (Sept. 28, 2012)) and its comments on NorthWestern's 2013 plan lamented the lack of progress toward that objective (Comments, Dkt. N2013.12.84, ¶ 19 (May 26, 2015)).

22. The 2015 Plan addressed resource adequacy substantially for the first time, and it did so in two ways: first, it recognized the NWPCC's assessment that the region faces a need for additional capacity resources in the 2021 time frame due to the planned closure of coal-fired generation in the Pacific Northwest; and second, it calculated NorthWestern's system-specific LOLP using its physical resources and retail loads, and defines an objective of meeting "minimal resource adequacy" by 2028, which appears to mean having physical resources equal to its retail peak load. However, several questions remain unanswered.

23. With respect to NorthWestern's need for capacity, the resource adequacy analysis in the 2015 Plan is deficient in several ways. First, NorthWestern has not completed a system optimization study with its entire fleet of resources to determine what capacity its base portfolio provides and, thus, what type of incremental capacity is needed. NorthWestern must determine the base capacity capability its current resource portfolio provides before it can determine what type of capacity it needs. In that regard, the 2015 Plan does not clearly define the term "capacity." As it pertains to resource types, the plan defined "capacity" as "an expression of [their] capability to serve load." Vol. 1, Appendix 2. What is not clear is whether the 2015 Plan identified a need for resources solely capable of serving the relatively few truly peak load hours of the year, or resources capable of serving heavy-load hours more broadly, or integrating intermittent resources, and how much capacity is needed for each of these purposes. Is it the likely availability of a resource at a sample of peak hours? How does it incorporate flexibility, such as ramping? Is there a benefit to resources that operate at less than full load? How does capacity relate to ancillary services?

24. Second, the 2015 Plan provided no analysis justifying a resource adequacy standard based solely on a NorthWestern system-specific LOLP. NorthWestern identified capacity shortages on a region-wide basis by 2021 as the problem, but a utility-specific measure of capacity need as the yardstick for the solution. This is incongruous. NorthWestern's peak load is not coincident with the region's peak load or the interconnection's peak load. There will be times when resources owned by other utilities are not being used to serve other utilities' peaks, at the time when NorthWestern's retail load does peak. The same situation is true in reverse. NorthWestern's resource adequacy should be measured by its retail load's position relative to the region's or interconnection's peak demand, while taking into consideration import limitations. Measuring resource adequacy needs otherwise will systematically overstate the utility's needs, and it could lead to a substantial overbuild if not corrected.

25. Third, the 2015 Plan provided little analysis and documentation to support its selected capacity acquisition rate that produces "minimal resource adequacy" by 2028; in other words, how should NorthWestern phase in any additional capacity resources. The costs and benefits of NorthWestern's chosen capacity acquisition rate are not identified and compared to the costs and benefits of alternatives. NorthWestern's chosen capacity acquisition rate is a significant modeling input that is not sufficiently documented.

26. Finally, as discussed more below, capacity-based planning requires evaluating resource alternatives in terms of their contributions to NorthWestern's capacity requirements. The 2015 Plan falls short of providing a thorough analysis of the capacity contributions of various resource alternatives, particularly large scale wind and solar resources.

27. The Commission, as discussed above, will hold a technical conference in the second quarter of this year to discuss capacity planning.

Evaluation of alternative resources

28. NorthWestern's stochastic modeling focused on natural gas, wind, and solar PV resources. According to NorthWestern, that approach reflected the advice it received from its advisory committee. However, several commenters, including some on the advisory committee, expressed concern over this narrow focus. The Commission shares many of these concerns and finds that NorthWestern's 2015 Plan falls short of an "evaluation of the full range of cost-effective supply and demand-side management options" required in Mont. Code Ann. § 69-8-

419. Some of the supply and demand-side management options NorthWestern did not include in its portfolio modeling analysis are described below. The 2015 Plan did not provide analyses or explanations as to why these resource options are not cost-effective or should otherwise be excluded from the modeling analysis.

Pumped Storage Hydro. A pumped storage hydro project could provide flexible capacity and both incremental and decremental regulation service. Given NorthWestern's emphasis on capacity resources and RBC-based reliability standards, it would be reasonable to provide the capacity expansion model the option of selecting a pumped storage hydro project, in various configurations, to gain insight into the economic potential for such a resource. NorthWestern stated that a feasible pumped storage project would require support from multiple utilities, but it should be possible to model a resource that represents a reasonable share of a larger generation project serving multiple utilities.

Carbon Capture and Sequestration (CCS). This technology is not commercially viable without substantial offsetting revenues in the form of tax subsidies, direct government support, and revenues from industries that use waste gas for enhanced oil recovery, but it may hold promise to help reduce future carbon emissions from NorthWestern's Colstrip thermal resources and risk associated with those emissions. The Commission is also aware of federal legislative and agency efforts that would incent the deployment of this technology. NorthWestern should model those eventualities.

Geothermal Energy Systems. A geothermal energy resource could potentially provide the type of capacity that pairs well with other renewable resources that are more intermittent. Alternatively, it could represent a form of distributed generation.

Battery Storage. NorthWestern described the mechanics of a PV solar/battery microgrid project it is piloting to serve 17 customers on a radial distribution circuit near Deer Lodge and a small battery storage project on a distribution line near its Helena district office. The results of these projects might allow NorthWestern to model the economics of larger scale battery storage systems.

Large Scale Wind and Solar. NorthWestern modeled portfolios that doubled and tripled existing wind and solar resources. Double wind and solar added 224 MW of wind and 24 MW of solar. Triple wind and solar added 448 MW of wind and 42 MW of solar. The characteristics and needs for additional wind were modeled using information from existing wind resources while those for solar PV were modeled based on analysis performed by DNV KEMA Renewables (DNV-GL). Portfolio optimization analyses that allowed these resource to pair with alternatives to natural gas plants, however, were not performed. Apart from scenario analysis, NorthWestern constrained wind and solar resources to smaller-scale resources; there is no basis for this modeling constraint, and it serves to overstate the cost of projects that have known economies of scale.

Colstrip Performance Upgrades. If there could be upgrades to Colstrip Units 3 and 4 that would improve their efficiency when the units are cycled and reduce their carbon dioxide emissions, the costs and benefits of those upgrades should be evaluated.

Demand Response. NorthWestern identified about 35 MW of potential demand response based on a survey of large commercial customers (35 MW represents about two-thirds of the amount of natural gas internal combustion engine capacity included in the EOP for inclusion in 2019). However, the survey design did not provide customers a set of specific price points to allow construction of a demand curve, i.e., a relationship between the price of demand response (compensation to participants) and achievable demand reduction, and it is not clear that the resource expansion model involved competition between demand response resources and supply-side resources like natural gas peaking plants.

29. All of these alternative resources should be defined in terms of their costs and output characteristics, especially their capacity contributions, and evaluated along-side more traditional natural gas resources in a way that allows the resource expansion model to select a resource mix that minimizes cost and risks over the planning horizon. Defining costs for some of these alternatives may be difficult to the extent their development involves customized design, engineering, and construction. In those cases a range of resource cost assumptions (scenarios) may need to be modeled, and to the degree that NorthWestern is aware of projects that are

currently being developed or conceptualized, NorthWestern should work with third parties to identify the appropriate inputs for the modeling exercise.

30. It could be reasonable for NorthWestern to perform a pre-modeling analysis of technically feasible resource alternatives in order to identify those that are economically plausible and to focus portfolio cost modeling on the economically plausible resources. However, if that approach is taken, the pre-modeling analysis should be thoroughly documented in the plan.

Evaluating sources of uncertainty

31. Mont. Code Ann. § 69-8-419 requires NorthWestern to identify and cost-effectively manage and mitigate risks related to its obligation to provide electricity supply service. Uncertainty can imply risk if it increases the probability of making uneconomic resource decisions. The Commission finds that NorthWestern's 2015 Plan falls short in its evaluation and consideration of multiple sources of uncertainty. These sources of uncertainty and the assumptions NorthWestern makes about them affect the portfolio modeling results. Some of these sources of uncertainty could be addressed through additional analysis (and the Commission has previously encouraged such analysis), while others depend primarily on external factors (*See* Comments N2013.12.84). Important sources of uncertainty include:

Resource Costs and Capacity Contributions. Commenters questioned the accuracy and/or validity of NorthWestern's assumed capital costs for wind and utility-scale solar PV resources modeled in the plan as well as the capacity contributions NorthWestern attributed to these resources. Use of inaccurate assumptions for these parameters could distort modeling results and, in turn, decisions regarding the optimal resource strategy. Given the pace of technological change with respect to these technologies it may be useful to evaluate a range of capital cost assumptions. In addition, NorthWestern's evaluation of the capacity contribution of intermittent resources should be aligned with its evaluation of resource adequacy measures.

Transition to RBC Regulation. While the 2015 Plan used CPS2 as the basis for determining regulation requirements, NERC's balance control performance metric

changed to Reliability Based Control (RBC) in July, 2016. The need for and cost of regulating/following capacity reserves (up and down), affects the economics of all resources.

Wind and Solar Integration Requirements

Relatedly, NorthWestern has acquired over 100 MW of additional wind since it last studied wind resource integration capacity requirements and has acquired 442 MW of hydroelectric generating capacity with some regulating capability. A substantial additional quantity of wind and solar either is contracted to NorthWestern or is in its transmission interconnection queue. The Commission has often criticized in the past several years the lack of a study to understand the degree to which intermittent renewables require integration services. (See Comments N2011.12.96; Order 7199d, Dkt. D2012.1.3 ¶ 65 (Dec. 7, 2012); Order 7347a, Dkt. D2014.4.43, ¶ 30 (April 14, 2015); Order 7338b, Dkt. D2014.1.5, ¶ 24-26 (May 4, 2015); Comments N2013.12.84; Order 7395d, Dkt. D2015.2.18, ¶ 36-37 (May 27, 2015); Order 7436d, Dkt. D2015.8.64, ¶ 55 (Sept. 16, 2016).

Load Forecast. In its review of the plan, the Commission has not undertaken an in-depth investigation of NorthWestern's load forecast, but notes that it is on the high end of the region's projections. Northwest Power and Conservation Council's Seventh Plan, p. 7-14. Uncertainty associated with NorthWestern's peak demand and energy load forecasts is primarily the result of uncertainty in predicting customer growth, weather, economic conditions, technological progress, conservation acquisition, and changes in patterns of use, which could increasingly be affected by behind-the-meter generation. Despite an abundance of political activity on the subject of behind-the-meter generation, including representations made by NorthWestern of the significance of this industry trend, the plan contains very few details on the subject. NorthWestern should be documenting an adequate sample of distributed generation resources so that the seasonality, reliability, and size of the energy production and capacity value of these resources can ultimately be measured, not only for the purpose of eventual ratemaking but also for the purpose of

creating a more suitable forecast of distributed generation's effects on consumer demand for electricity.

Natural Gas Price Forecast. Projections of future natural gas prices influence the cost of operating natural gas-fired generators and, in turn, the relative merits of acquiring such resources compared to alternatives. Supply uncertainty is driven in part by uncertainty in federal regulation, depletion rates of existing fields, discovery of new fields, technological change, and market lags in natural gas development. Demand uncertainty is caused in part by uncertainty in federal regulation and growth in natural gas generation and LNG export.

CO₂ Regulation. Like natural gas prices, projections of future carbon costs influence the cost of operating natural-gas fired generators and the relative merits of acquiring alternative resources. The uncertainty in forecasting future carbon costs is manifold and may be influenced by politics at the state and federal levels. With the change in presidential administrations, and a new administration which has promised to eliminate the major regulatory vehicle by which electric utility sector carbon emissions were to be regulated, it is unclear how forecasting for carbon price should change, other than to delay the onset of the projected price. Order 7505b, Dkt. D2016.7.56, ¶¶ 62-64 (Jan. 5, 2017).

Natural gas and electric infrastructure costs. NorthWestern performed what it called "high level" assessments of the natural gas and electric infrastructure costs associated with modeled natural gas plants. The uncertainty regarding such infrastructure costs contributes to uncertainty in comparisons of alternative portfolio strategies.

Regional EIM Participation. The expansion of organized wholesale markets in the western interconnect has the potential to provide benefits in the form of dispatch efficiency, reduced reserve margins, improved reliability, and renewable integration. The costs to participate in a security-constrained economic dispatch market include up-front capital costs: upgrades to metering and telemetry systems for NorthWestern and a lump-

sum payment to accommodate the expansion of the market operator's network model. There also may be increased operating costs, such as increased personnel. While the Commission suggests that cost-benefit analysis should drive utility behavior, it is important that NorthWestern not disregard the less quantifiable benefits a market can provide by failing to make allowances for them in such an analysis. NorthWestern's experience in South Dakota suggests that participants in a wholesale bilateral market can see liquidity diminish if a sufficiently large organized wholesale market materializes. For a utility such as NorthWestern, which relies on the market for energy and capacity, illiquidity is a significant threat, which thankfully can be solved not just through hardware solutions such as acquiring additional capacity of its own, but also through software solutions such as participating in a more integrated regional marketplace. While a real-time energy market has market rules which could pose a risk to NorthWestern, these issues are small compared to the market rules that attend a fully integrated organized wholesale market. NorthWestern should be mindful that it is not just its retail customers who have an interest in whether the utility joins an EIM or not, but also choice customers, load-serving entities who receive Schedule 4 imbalance service from NorthWestern, and third-party generators. NorthWestern should be consulting with all of them as it makes strategic decisions on this topic. The Commission welcomes NorthWestern's study of this topic.

ISO Development. A longer-term issue than a real-time energy market is the development of a regional Independent System Operator. Unlike an EIM, an ISO would probably come with stricter resource adequacy rules that govern the measured capacity contribution of resources, and require adequacy over a longer duration, instead of mere resource sufficiency rules for the operating hour. Also unlike an EIM, the governance structure, together with the lack of an easy exit from the market once a balancing authority joins, is a more significant issue than in an EIM. NorthWestern should generally stay abreast of developments on this topic.

Stakeholder involvement

32. The Commission's resource planning rules encourage NorthWestern to make effective use of an independent advisory committee of respected technical and public policy experts. *See* Mont. Admin. R. 38.5.8201(2), 38.5.8219(4). Several commenters were critical of NorthWestern's planning process and particularly of the lack of meaningful engagement with its advisory committee as the plan was being developed. Information in the 2015 Plan indicated that NorthWestern met just five times with its advisory committee starting December 18, 2014 and ending January 25, 2016. The Commission's staff, which regularly attends NorthWestern's advisory committee meetings, also observed that materials related to the meetings frequently are not provided with sufficient lead time to allow for critical review and thoughtful input by committee members. As MEIC commented, NorthWestern provided the advisory committee only three days to provide input on a complete draft of the 2015 Plan and did not hold a follow-up meeting to discuss the draft.

33. The process NorthWestern used to develop the 2015 Plan failed to adequately engage stakeholders. The lack of stakeholder engagement is visible in the widespread discomfort among stakeholders with the planning process and the results of that process; on balance the stakeholder comments express a lack of confidence that NorthWestern's resource management and acquisition strategy will minimize long-term costs and risks, and produce just and reasonable rates for customers. Such widespread discomfort with the process and outcome of the 2015 Plan is cause for significant concern.

34. NorthWestern should invite all of the parties who have commented on the plan to join its advisory committee. While the Commission understands that NorthWestern may be hesitant to invite developers to this forum, the Commission notes that NorthWestern, inasmuch as it may own generating assets, has a similar interest in the outcomes of the planning process, so there should be no concern in this respect to having developers at the table. Additionally, and more importantly, developers may have the resources to hire technical experts whose input to the planning process may be more valuable in certain respects than advocacy from a non-profit organization. In this way NorthWestern might be able to unleash the creative competition on which more competitive sectors rely.

35. Additionally, with respect to public interest groups who participate in the advisory committee and who do not have a private-profit motive, NorthWestern should do its best to add

to the type of groups who are present. Currently, the largest number of groups have an environmentalist perspective. In addition to these groups, NorthWestern should consider reaching out to groups who represent consumers, such as an organization that advocates for the interests of older persons, or to groups that have a different ideological interest that could be applied to resource planning, such as a free-market think tank.

36. The Commission also notes that other utility commissions in the region have access to the portfolio modeling software used by a utility for resource planning. In this respect, those commissions may have expertise that this Commission does not. The Commission will attempt to become more sophisticated in its understanding of NorthWestern's planning model, and, if it cannot, may rely on its statutory authority to hire experts in this field. NWE, meanwhile, should commit to accommodating the requests it may receive from the Commission, the MCC, and other parties with a legitimate public policy or legal interest in resource planning, for access to the model. A model that is systematically unavailable to anyone other than NorthWestern creates an information asymmetry that undercuts the legitimacy of NorthWestern's resource-planning exercise

Competitive procurement process

37. Mont. Code Ann. § 69-8-419 requires NorthWestern to use open, fair, and competitive procurement processes whenever possible to acquire any new resources needed to supply its retail customers. As described above, the Commission has multiple concerns with the 2015 Plan and the process used to develop it. However, even if the portfolio strategy NorthWestern identified in the 2015 Plan was adequately supported, it does not demonstrate how NorthWestern intends to ensure that the identified resources will be procured through an open, fair, and competitive processes. Although the 2015 Plan indicated NorthWestern will issue an RFP for the identified capacity need, it does not explain the steps it will take to ensure the integrity of that process. It would be prudent for NorthWestern to consult with its advisory committee and, possibly, potential bidders in this regard prior to issuing any RFP. In that respect, it is troubling that the minutes of advisory committee meetings suggest that in June 2015 stakeholders requested an opportunity to review a NorthWestern RFP for CREP resources before it was issued, but do not indicate that NorthWestern accommodated the request or record how the review impacted the RFP process.

38. In conclusion, we hold this docket open to receive biannual reports until the next plan is filed in December 2018; we will hold a technical conference on capacity planning in the next quarter; and the Commission may revisit adding technical expertise pursuant to Mont. Code Ann. § 69-8-421(10) at the appropriate time in the context of this docket and the docket it will later open to receive the 2018 Resource Procurement Plan.

BY THE MONTANA PUBLIC SERVICE COMMISSION

BRAD JOHNSON, Chairman
TRAVIS KAVULLA, Vice Chairman
ROGER KOOPMAN, Commissioner
BOB LAKE, Commissioner
TONY O'DONNELL, Commissioner