Before The Public Service Commission
Of the State of Montana

DOCKET NO. D2016.5.39

Application for Approval of Avoided Cost Tariff Schedule QF-1

May 2016

NorthWestern Energy
Delivering a Bright Future

May 3, 2016

Mr. Will Rosquist
Administrator, Regulatory Division
Montana Public Service Commission
1701 Prospect Avenue
P.O. Box 202601
Helena, MT 59620-2601

RE: Docket No. D2016.5.39
QF-1 Avoided Cost Rate Filing

Dear Mr. Rosquist:

Enclosed for filing are one original and ten copies of NorthWestern Energy's ("NorthWestern") Application for Interim and Final Approval of Revised Tariff No. QF-1, Qualifying Facility Power Purchase, which applies to certain Qualifying Facilities ("QFs") selling electricity to NorthWestern. The proposed QF-1 rates are based on NorthWestern's 2015 Electricity Supply Resource Procurement Plan ("2015 Plan") filed on March 31, 2016 in Docket No. N2015.11.91 and use forecasted market prices for natural gas and electricity from that 2015 Plan.

A critical aspect of this filing is a request that the Montana Public Service Commission ("Commission") adopt the proposed new QF-1 Tariff immediately, on an interim basis. As set forth in the prefiled testimony and exhibits supporting this filing, a significant number of large out-of-state QF developers are seeking to locate their projects in Montana because of the very high Commission-established avoided cost rates in the current QF-1 Tariff. NorthWestern has recently executed five purchase power agreements for 2- to 3-megawatt ("MW") solar facilities, has 43 active interconnection requests for 3-MW solar facilities under various stages of study in its interconnection queue, and has another 75 interconnection requests for 3-MW solar facilities in the pre-application phase.

NorthWestern's current aggregate exposure to 3-MW solar facilities seeking the avoided cost rates in the current QF-1 Tariff – as measured by signed contracts, formal requests for interconnection, and pre-applications for interconnection – is more than 350 MW. NorthWestern already has 275 MW of wind and QF resources over which it has no control. It has only limited control over its 442 MW of owned hydro resources, which are primarily run of the river. NorthWestern's customers only need, on a minimum load day, about 700 MW of generation during the peak load hour.

The avoided cost rates that NorthWestern would have to pay these QF developers under the current QF-1 Tariff are a pass-through to NorthWestern's customers. In the prefiled testimony and exhibits supporting this Application, NorthWestern demonstrates that its customers would have to pay approximately $5.1 million more for power from a single 3-MW solar generating facility, under a Commission-mandated 25-year standard rate contract, if the Commission declines to lower the avoided cost rates currently contained in the QF-1 Tariff. When multiplied by the number of interconnection requests for 3-MW facilities currently in NorthWestern's interconnection queue, or in the pre-application phase, the potential impact upon NorthWestern's customers is staggering. Prompt Commission action is essential.

Included in this submittal are the following:

- Application for Interim and Final QF-1 Tariff Change;
- Notice of Application for Interim Rate Adjustment and the associated Certificate of Service of said notice to the media;
- Prefiled Direct Testimony and Exhibits of John D. Hines that provide an overview of NorthWestern's filing and explain the importance of correctly estimating QF avoided costs and the equal importance of establishing new avoided costs immediately, through an interim avoided cost tariff;
- Prefiled Direct Testimony and Exhibits of John B. Bushnell supporting the rate calculations for the proposed QF-1 Rate Schedule based on NorthWestern's 2015 Plan;
- Prefiled Direct Testimony and Exhibit of Luke P. Hansen supporting the avoided energy costs calculated using the PowerSimm™ model and used by Mr. Bushnell to develop the revised QF-1 rates;
- Prefiled Direct Testimony and Exhibit of Autumn M. Mueller explaining the development of NorthWestern's interconnection queue, explaining the process NorthWestern must follow once it receives an application for interconnection, and describing the large number of interconnection requests NorthWestern has recently received for 3-MW solar generating facilities seeking standard rate contracts under current avoided costs and the large number of additional requests NorthWestern expects to receive in the future; and
- The proposed QF-1 Tariff as Appendix 1 to NorthWestern's Application and the redlined version of the proposed QF-1 Tariff as Appendix 2 to the Application.

Three copies of this letter and documents submitted herewith are being delivered to the Montana Consumer Counsel. NorthWestern is also providing, via UPS Next Day Delivery, copies of this filing to the solar QF developers seeking interconnection for 3-MW facilities, as well as the QF developers on the service list in NorthWestern's last QF-1 rate filing in PSC Docket No. D2014.1.5. Notice has also been mailed to the media for general dissemination throughout NorthWestern's service territory.

The NorthWestern employee responsible for answering questions concerning this rate change request or for inquiries to the appropriate members of the utility staff is:

Mr. Joe Schwartzenberger
Regulatory Affairs Department
NorthWestern Energy
40 East Broadway
Butte, MT 59701
Joe.Schwartzenberger@northwestern.com

NorthWestern's attorney in this matter is:

Mr. John Alke
NorthWestern Energy
208 North Montana, Suite 205
Helena, MT 59601
John.Alke@northwestern.com

NorthWestern requests that the names of Joe Schwartzenberger, John Alke, and Tracy Killoy appear on all service lists in this proceeding.

If you have any questions, please call me at (406) 497-3362.

Sincerely,

Joe Schwartzenberger
Director
Regulatory Affairs

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NorthWestern Energy
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Helena, Montana 59601
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Attorney for NorthWestern Energy

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

IN THE MATTER OF NorthWestern Energy's Application for Interim and Final Approval of Revised Tariff No. QF-1, Qualifying Facility Power Purchase	))))	REGULATORY DIVISION DOCKET NO. D2016.5.39

NorthWestern Energy's Application for Interim and Final QF-1 Tariff Change

NOW COMES, NorthWestern Corporation d/b/a NorthWestern Energy ("NorthWestern" or "Applicant") by and through its undersigned counsel, and respectfully submits this Application to the Montana Public Service Commission ("Commission") for interim and final approval of a revised QF-1 Tariff. In support thereof, NorthWestern states as follows:

I.

Applicant's full name and address are:

NorthWestern Energy
11 East Park
Butte, MT 59701

II.

Applicant is a Delaware corporation doing business as NorthWestern Energy in the states of Montana, South Dakota, and Nebraska as a public utility.

III.

The following described tariff sheets are the only electric sheets impacted by the proposals in this submittal that are presently in effect in the State of Montana and on file with the Commission. All other electric tariff sheets remain as previously approved by the Commission:

Schedule	Description	Sheet No.
QF-1	Qualifying Facility Power Purchase	74.1 to 74.6

The new QF-1 Tariff for which NorthWestern seeks Commission approval, both on an interim and a final basis, is attached to this application as Appendix 1. Attached as Appendix 2 is a red-line of the current QF-1 Tariff, showing the changes that are being proposed.

IV.

Attached hereto and incorporated by reference are the following documents:

- Appendix 1 – Proposed QF-1 Tariff
- Appendix 2 – Redline Version of Proposed QF-1 Tariff
- Notice of Interim Rate Adjustment Request and the Certificate of Service of said notice to the media; and
- Prefiled Direct Testimony and Exhibits of John D. Hines, John B. Bushnell, Luke P. Hansen, and Autumn M. Mueller.

WHEREFORE, Applicant respectfully requests:

1. The issuance of a final order of the Commission approving the proposed QF-1 Tariff;
2. Pending the issuance of a final order, the prompt issuance of an interim order approving the QF-1 Tariff on an interim basis;
3. Such other and further relief as the Commission deems necessary to effectuate NorthWestern's request for relief in this docket.

RESPECTFULLY SUBMITTED this 3rd day of May 2016.

NORTHWESTERN ENERGY

By: John Alke

John Alke
Attorney for NorthWestern Corporation
d/b/a NorthWestern Energy

ELECTRIC TARIFF

NorthWestern Energy

	9th	Revised	Sheet No.	74.1
Canceling	8th	Revised	Sheet No.	74.1

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

APPLICABILITY: Applicable to any Seller with nameplate capacity of 3 MW or less who enters into a Power Purchase Agreement (Agreement) with the Utility for the sale of electric power to the Utility from a Qualifying Facility (QF) as defined under the Rules of the Commission.

The Utility shall purchase electrical energy for a term of not less than one month.

The QF-1 Tariff rates do not reflect Network Upgrade costs. Seller must apply for interconnection and enter into the applicable generation interconnection agreement with the Utility addressing those items in addition to entering into an Agreement under the terms of this Tariff.

RATE OPTIONS: Seller may select from the following two rate options and sub-options:

For all Rate Options, refer to Special Terms and Conditions Item 3 Disposition of RECs, Item 4 Wind Integration and Item 5 Contingency Reserves.

The selected rate will be adjusted by the value of Contingency Reserves per the current Contingency Reserves Tariff CR-1. Subsequent to this adjustment, QFs must either self-provide or purchase Contingency Reserves as described in Item 5 under Special Terms and Conditions.

QFs selecting Option 1 Rates will be paid the Avoided Energy Rate which corresponds to their resource type and contract length as reflected in Table 1(a)(i) or Table 1(a)(ii) below. QFs selecting Option 1 Rates must also select a method for determining Capacity Contribution at time of contract signing. Hydroelectric, wind and solar QFs may select either of the two methods explained below for determining Capacity Contribution; all other QF resource types must use the first method.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	7th	Revised	Sheet No.	74.2
Canceling	6th	Revised	Sheet No.	74.2

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Method 1 - Capacity Contribution Calculation

1. Contract year one - Capacity Contribution is equal to Measured Capacity in contract year one.

   Contract year two - Capacity Contribution is equal to an average of Measured Capacity in contract years one and two.

   Contract year three - Capacity Contribution is equal to an average of Measured Capacity in contract years one through three.

   Contract year four - Capacity Contribution is equal to an average of Measured Capacity in contract years one through four.

   Contract years five through end of contract - Capacity Contribution is equal to a five-year average calculated using the Measured Capacity in the current contract year and four previous contract years.

Method 2 – Capacity Contribution Calculation

2. Contract year one – Capacity Contribution is equal to a five-year average calculated using four years of Default Capacity and the Measured Capacity in contract year one.

   Contract year two - Capacity Contribution is equal to a five-year average calculated using three years of Default Capacity and the Measured Capacity in contract years one and two.

   Contract year three - Capacity Contribution is equal to a five-year average calculated using two years of Default Capacity and the Measured Capacity in contract years one, two and three.

   Contract year four - Capacity Contribution is equal to a five-year average calculated using one year of Default Capacity and the Measured Capacity in contract years one, two, three, and four.

   Contract years five through end of contract - Capacity Contribution is equal to a five-year average calculated using the Measured Capacity in the current contract year and four previous contract years.

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ELECTRIC TARIFF

NorthWestern Energy

	4th	Revised	Sheet No.	74.3
Canceling	3rd	Revised	Sheet No.	74.3

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 1 Rates

a) Avoided Energy Rate:

i. Without Transfer of Environmental Benefits

Length of Contract	Hydroelectric and Other QF Resources	Intermittent Wind QF	Intermittent Solar QF
(years)	($/kWh)	($/kWh)	($/kWh)
1	$0.01672	$0.01694	$0.01854
2	$0.01731	$0.01744	$0.01917
3	$0.01782	$0.01786	$0.01980
4	$0.01825	$0.01832	$0.02031
5	$0.01895	$0.01898	$0.02114
6	$0.01957	$0.01957	$0.02185
7	$0.02014	$0.02012	$0.02248
8	$0.02035	$0.02035	$0.02272
9	$0.02064	$0.02068	$0.02301
10	$0.02106	$0.02121	$0.02340
11	$0.02148	$0.02167	$0.02380
12	$0.02189	$0.02209	$0.02426
13	$0.02232	$0.02256	$0.02470
14	$0.02275	$0.02302	$0.02515
15	$0.02317	$0.02346	$0.02559
16	$0.02358	$0.02389	$0.02601
17	$0.02399	$0.02432	$0.02644
18	$0.02442	$0.02477	$0.02689
19	$0.02483	$0.02521	$0.02734
20	$0.02526	$0.02567	$0.02779
21	$0.02569	$0.02612	$0.02823
22	$0.02614	$0.02661	$0.02868
23	$0.02659	$0.02710	$0.02913
24	$0.02703	$0.02770	$0.02971
25	$0.02746	$0.02829	$0.03027

Payments: Applicable Avoided Energy Rate multiplied by metered kilowatt-hours measured by the Utility or provided to the Utility by a wheeling entity for each hour.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	1st	Revised	Sheet No.	74.4
Canceling	Original	Revised	Sheet No.	74.4

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 1 Rates – (continued)

a) Avoided Energy Rate:

ii. With Transfer of Environmental Benefits

Length of Contract	Hydroelectric and Other QF Resources	Intermittent Wind QF	Intermittent Solar QF
(years)	($/kWh)	($/kWh)	($/kWh)
1	$0.01672	$0.01694	$0.01854
2	$0.01731	$0.01744	$0.01917
3	$0.01782	$0.01786	$0.01980
4	$0.01825	$0.01832	$0.02031
5	$0.02027	$0.02062	$0.02243
6	$0.02177	$0.02231	$0.02404
7	$0.02298	$0.02367	$0.02527
8	$0.02383	$0.02475	$0.02596
9	$0.02459	$0.02574	$0.02662
10	$0.02546	$0.02683	$0.02746
11	$0.02629	$0.02781	$0.02823
12	$0.02716	$0.02877	$0.02913
13	$0.02797	$0.02965	$0.02998
14	$0.02886	$0.03058	$0.03094
15	$0.02977	$0.03149	$0.03188
16	$0.03063	$0.03237	$0.03277
17	$0.03148	$0.03323	$0.03364
18	$0.03229	$0.03405	$0.03447
19	$0.03307	$0.03485	$0.03528
20	$0.03385	$0.03564	$0.03608
21	$0.03459	$0.03641	$0.03684
22	$0.03531	$0.03715	$0.03758
23	$0.03601	$0.03786	$0.03830
24	$0.03670	$0.03866	$0.03910
25	$0.03736	$0.03943	$0.03988

Payments: Applicable Avoided Energy Rate multiplied by metered kilowatt-hours measured by the Utility or provided to the Utility by a wheeling entity for each hour.

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ELECTRIC TARIFF

NorthWestern Energy

	2nd	Revised	Sheet No.	74.5
Canceling	1st	Revised	Sheet No.	74.5

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 1 Rates – (continued)

b) Avoided Capacity Rate:

Length of Contract	All QF Resources
(years)	($/kW-Year)
1	$0.00
2	$9.29
3	$17.98
4	$26.11
5	$33.72
6	$40.85
7	$47.51
8	$53.75
9	$59.59
10	$65.05
11	$70.16
12	$74.95
13	$79.43
14	$83.62
15	$87.55
16	$91.22
17	$94.66
18	$97.88
19	$100.89
20	$103.72
21	$106.36
22	$108.83
23	$111.15
24	$113.32
25	$115.35

Payments: Applicable Avoided Capacity Rate multiplied by the Capacity Contribution.

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ELECTRIC TARIFF

NorthWestern Energy

	3rd	Revised	Sheet No.	74.6
Canceling	2nd	Revised	Sheet No.	74.6

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 2: Agreement length of up to 25 years.

Rate: This rate is equal to the published Intercontinental Exchange (ICE) Mid-C index price for Heavy Load Hours and Light Load Hours, less $.001/kWh market price differential between Mid-C and Montana, and applied to the Heavy Load and Light Load metered production of Seller. Another Mid-C price index may be substituted if necessary, if ICE is no longer available.

Payments: Daily Heavy Load Hour and Light Load Hour Rate x Heavy Load and Light Load kWh

kWh = Metered kilowatt hours supplied to the Utility in each daily Heavy Load and Light Load period.

SPECIAL TERMS AND CONDITIONS:

1) Definitions:

A. “Agreement” means the Power Purchase Agreement between Seller and the Utility for a term of not less than one month.

B. "Capacity Contribution" means the Default Capacity and/or Measured Capacity as defined in Method 1 or Method 2 in Rate Options above.

C. “Commission” means the Montana Public Service Commission.

D. “Contingency Reserves” are an amount of spinning and nonspinning reserves (at least half must be spinning reserve) sufficient to meet the North American Electric Reliability Council (NERC) Disturbance Control Standard BAL-002 consistent with Western Electric Coordinating Council and Northwest Power Pool requirements.

E. “Contract Length” means the length of a Seller’s contract with NorthWestern measured in whole years. For contract terms not in whole years, the length of a Seller’s contract will be rounded up to the next whole year for purposes of determining applicable rates.

F. "Default Capacity" means 11.1 percent of Nameplate Capacity for Hydroelectric QFs, 5 percent of Nameplate Capacity for Wind QFs and 7.8 percent of Nameplate Capacity for Solar QFs.

G. “Heavy Load Hours” means the weekday and Saturday hours ending 7 and through hour ending 22 inclusive, Pacific Prevailing Time, except NERC defined holidays. For purposes of this Tariff, Heavy Load Hours correspond to Peak hours as used on the ICE web site.

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ELECTRIC TARIFF

NorthWestern Energy

Original Revised Sheet No. 74.7
Canceling Revised Sheet No. 74.7

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

H. "Intermittent" means generation resources with variable generation output from hour to hour. Specifically, wind and solar PV are considered to be Intermittent resources.

I. "Light Load Hours" means those hours not included in the definition of Heavy Load Hours. For purposes of this Tariff, Light Load Hours correspond to Off-Peak hours as used on the ICE web site.

J. "Measured Capacity" means that level of generation, as measured on an integrated hour, that a Qualifying Facility exceeds 85 percent of the time during the highest 10 percent of On-Peak hours. Measured Capacity is an annual calculation determined upon the conclusion of a contract year.

K. "Network Upgrades" means additions, modifications, and upgrades to NorthWestern's transmission system required at or beyond the point at which the Small Generating Facility interconnects with the transmission system to accommodate the interconnection with the Small Generating Facility to NorthWestern's transmission system. Network Upgrades do not include Distribution Upgrades.

L. "Off-Peak Hours" means those hours in the year not included in the definition of On-Peak Hours.

M. "On-Peak Hours" means the Heavy Load hours for the months of January, February, July, August, and December.

N. "Other QF" means QF facilities other than hydroelectric, wind or solar powered resources.

O. "REC" means renewable energy credit. One megawatt hour of renewable energy generation gives rise to one REC, and this REC embodies all environmental attributes of that renewable energy generation.

P. "Regulating Reserve" is spinning reserve immediately responsive to Automatic Generation Control (AGC) to provide sufficient regulating margin to allow the Balancing Authority to meet NERC's Control Performance Criteria (BAL-001).

Q. "Seller," for purposes of this schedule, is any individual, partnership, corporation, association, government agency, political subdivision, municipality or other entity that:

a. Operates a QF; and

b. Has entered into an Agreement(s) with the Utility stipulating the terms and conditions of the interconnection and separately the sale of electric power to the Utility.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

Original Revised Sheet No. 74.8
Canceling Revised Sheet No. 74.8

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

R. "Utility" means NorthWestern Energy.

S. "Wind Integration Services" means those services necessary to integrate wind generation into the Utility's electric transmission and/or distribution system(s) in a manner such that all operational and reliability criteria are met. Wind Integration Services include, but are not limited to, Regulating Reserves, imbalance service, and scheduling.

2) Net Billing Option: If Seller contracts for Net Billing and the Seller's consumption kWh exceeds its production kWh, Seller shall be billed for power supply for the consumption kWh in excess of the production kWh in accordance with the Utility's applicable rate schedule. If Seller's consumption kWh is less than its production kWh, Seller shall receive a power supply payment (credit) for the production kWh in excess of the consumption kWh at the Rates specified above.

3) Disposition of RECs: QFs selecting Option 1 Rates may choose to retain all of the project's environmental benefits, including RECs, or to transfer them to NorthWestern Energy. A QF which chooses to retain its environmental benefits must take the applicable Option 1(a)(i) Avoided Energy Rate. Option 1(a)(ii) Avoided Energy Rates are only available to QFs who transfer all of the QF project's environmental benefits, including RECs, to NorthWestern Energy for the life of the QF contract.

4) Wind Integration: Sellers of Wind Energy must contractually agree to the provision of wind integration services for the term of the Agreement and may either self-supply sufficient within-hour regulating reserves under terms acceptable to NorthWestern or pay the Utility for these services according to the Wind Integration Tariff (WI-1). Payment to the Utility for selection of service through WI-1 will result in a deduction from the total monthly payment made to the QF to reflect the provision of integration services.

5) Contingency Reserves: QFs must either self-supply contingency reserves, or purchase the needed reserves from NorthWestern at the rate as specified according to the Contingency Reserves Tariff (CR-1). If the QF purchases reserves from NorthWestern, the CR-1 rate for the appropriate resource type will be deducted from the total monthly payment made to the QF to reflect the provision of contingency reserves.

6) Hourly Metering: Sellers are required to install interval metering capability if necessary to support the Rate Option chosen.

SERVICE AND RATES SUBJECT TO COMMISSION JURISDICTION: All rates and service conditions under this Rate Schedule are governed by the rules and regulations of the Public Service Commission of Montana and are subject to revision as the Commission may duly authorize in the exercise of its jurisdiction.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	8th	Revised	Sheet No.	74.1
Canceling	7th	Revised	Sheet No.	74.1

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

APPLICABILITY: Applicable to any Seller with nameplate capacity of 3 MW or less who enters into a Power Purchase Agreement (Agreement) with the Utility for the sale of electric power to the Utility from a Qualifying Facility (QF) as defined under the Rules of the Commission.

~~QFs with nameplate capacity greater than 3 MW may also request a short-term Agreement under this Tariff, prior to completion of the next competitive solicitation, whereby purchases between the Utility and a Seller shall be accomplished in accordance with Rate Option 1(b), 2(a) or 2(b) of this Tariff.~~

The Utility shall purchase electrical energy for a term of not less than one month.

The QF-1 Tariff rates ~~reflect system Interconnection Facilities related costs but~~ do not reflect Network Upgrade costs. Seller must apply for interconnection and enter into the applicable generation interconnection agreement with the Utility addressing those items in addition to entering into an Agreement under the terms of this Tariff.

~~An existing qualifying facility smaller than 10 MW whose contract with a utility expires prior to July 1, 2015 will not be subject to the 3 MW size limitation for the purpose of obtaining a new contract under an existing standard rate option.~~

RATE OPTIONS: Seller may select from the following two rate options and sub-options:

For all Rate Options ~~1 and 2~~, refer to Special Terms and Conditions Item 3 Disposition of RECs, Item 4 Wind Integration and Item 5 Contingency Reserves.

~~For all Rate Options 1, the~~The selected ~~Option 1 Rate~~rate will be adjusted by ~~addition of~~ the value of Contingency Reserves ~~for thermal generation,~~ per the current Contingency Reserves Tariff CR-1. Subsequent to this adjustment, QFs must either self-provide or purchase Contingency Reserves as described in Item 5 under Special Terms and Conditions.

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ELECTRIC TARIFF

NorthWestern Energy

	9th	Revised	Sheet No.	74.2
Canceling	8th	Revised	Sheet No.	74.2

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

~~**Option 1(a)**: Non-Wind Installations Only: Agreement lengths: 19 months to 25 years – long-term.~~

~~RATE:~~

QFs selecting Option 1 Rates will be paid the Avoided Energy Rate which corresponds to their resource type and contract length as reflected in Table 1(a)(i) or Table 1(a)(ii) below. QFs selecting Option 1 Rates must also select a method for determining Capacity Contribution at time of contract signing. Hydroelectric, wind and solar QFs may select either of the two methods explained below for determining Capacity Contribution; all other QF resource types must use the first method.

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ELECTRIC TARIFF

NorthWestern Energy

	8th~~7th~~	Revised	Sheet No.	74.3
Canceling	7th~~6th~~	Revised	Sheet No.	74.3

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Method 1 - Capacity Contribution Calculation

1. Contract year one - Capacity Contribution is equal to Measured Capacity in contract year one.

   Contract year two - Capacity Contribution is equal to an average of Measured Capacity in contract years one and two.

   Contract year three - Capacity Contribution is equal to an average of Measured Capacity in contract years one through three.

   Contract year four - Capacity Contribution is equal to an average of Measured Capacity in contract years one through four.

   Contract years five through end of contract - Capacity Contribution is equal to a five-year average calculated using the Measured Capacity in the current contract year and four previous contract years.

Method 2 – Capacity Contribution Calculation

2. Contract year one – Capacity Contribution is equal to a five-year average calculated using four years of Default Capacity and the Measured Capacity in contract year one.

   Contract year two - Capacity Contribution is equal to a five-year average calculated using three years of Default Capacity and the Measured Capacity in contract years one and two.

   Contract year three - Capacity Contribution is equal to a five-year average calculated using two years of Default Capacity and the Measured Capacity in contract years one, two and three.

   Contract year four - Capacity Contribution is equal to a five-year average calculated using one year of Default Capacity and the Measured Capacity in contract years one, two, three, and four.

   Contract years five through end of contract - Capacity Contribution is equal to a five-year average calculated using the Measured Capacity in the current contract year and four previous contract years.

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ELECTRIC TARIFF

NorthWestern Energy

	4th	Revised	Sheet No.	74.4
Canceling	3rd	Revised	Sheet No.	74.4

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 1 Rates

a) Avoided Energy Rate:

i. Without Transfer of Environmental Benefits

Length of Contract (years)	Hydroelectric and Other QF Resources ~~Energy~~ ($/kWh~~):~~)	Intermittent Wind QF ($/kWh)	Intermittent Solar QF ($/kWh)
~~Off-Peak Hours~~ 1	$~~0.05314~~01672	$0.01694	$0.01854
~~On-Peak Hours:~~ 2	$~~0.09273~~01731	$0.01744	$0.01917
3	$0.01782	$0.01786	$0.01980
4	$0.01825	$0.01832	$0.02031
5	$0.01895	$0.01898	$0.02114
6	$0.01957	$0.01957	$0.02185
7	$0.02014	$0.02012	$0.02248
8	$0.02035	$0.02035	$0.02272
9	$0.02064	$0.02068	$0.02301
10	$0.02106	$0.02121	$0.02340
11	$0.02148	$0.02167	$0.02380
12	$0.02189	$0.02209	$0.02426
13	$0.02232	$0.02256	$0.02470
14	$0.02275	$0.02302	$0.02515
15	$0.02317	$0.02346	$0.02559
16	$0.02358	$0.02389	$0.02601
17	$0.02399	$0.02432	$0.02644
18	$0.02442	$0.02477	$0.02689
19	$0.02483	$0.02521	$0.02734
20	$0.02526	$0.02567	$0.02779
21	$0.02569	$0.02612	$0.02823
22	$0.02614	$0.02661	$0.02868
23	$0.02659	$0.02710	$0.02913
24	$0.02703	$0.02770	$0.02971
25	$0.02746	$0.02829	$0.03027

Payments: Applicable Avoided Energy Rate ~~x kWh~~multiplied by metered ~~during each Off-Peak Hours and On-Peak Hours period.~~

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	4th	Revised	Sheet No.	74.5
Canceling	3rd	Revised	Sheet No.	74.5

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

~~kWh = Metered~~ kilowatt-hours ~~supplied~~measured by the Utility or provided to the Utility by a wheeling entity for each ~~Off-Peak Hours and On-Peak Hours period~~hour.

~~**Option 1(b)**: Agreement lengths: 1 month to 18 months – short-term.~~

~~RATE:~~

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	1st	Revised	Sheet No.	74.6
Canceling	Original	Revised	Sheet No.	74.6

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 1 Rates – (continued)

a) Avoided Energy Rate:

ii. With Transfer of Environmental Benefits

Length of Contract (years)	Hydroelectric and Other QF Resources ~~Energy~~ ($/kWh~~):~~)	Intermittent Wind QF ~~$ 0.03347~~ ($/kWh)	Intermittent Solar QF ($/kWh)
1	$0.01672	$0.01694	$0.01854
2	$0.01731	$0.01744	$0.01917
3	$0.01782	$0.01786	$0.01980
4	$0.01825	$0.01832	$0.02031
5	$0.02027	$0.02062	$0.02243
6	$0.02177	$0.02231	$0.02404
7	$0.02298	$0.02367	$0.02527
8	$0.02383	$0.02475	$0.02596
9	$0.02459	$0.02574	$0.02662
10	$0.02546	$0.02683	$0.02746
11	$0.02629	$0.02781	$0.02823
12	$0.02716	$0.02877	$0.02913
13	$0.02797	$0.02965	$0.02998
14	$0.02886	$0.03058	$0.03094
15	$0.02977	$0.03149	$0.03188
16	$0.03063	$0.03237	$0.03277
17	$0.03148	$0.03323	$0.03364
18	$0.03229	$0.03405	$0.03447
19	$0.03307	$0.03485	$0.03528
20	$0.03385	$0.03564	$0.03608
21	$0.03459	$0.03641	$0.03684
22	$0.03531	$0.03715	$0.03758
23	$0.03601	$0.03786	$0.03830
24	$0.03670	$0.03866	$0.03910
25	$0.03736	$0.03943	$0.03988

Payments: ~~Hourly~~Applicable Avoided Energy Rate ~~x Hourly kWh~~

~~kWh = Metered~~multiplied by metered kilowatt~~-~~hours ~~supplied~~measured by the Utility or provided to the Utility ~~in~~by a wheeling entity for each hour.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	1st	Revised	Sheet No.	74.7
Canceling	Original	Revised	Sheet No.	74.7

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

~~**Option 1(c)**: Wind Installations Only: Agreement lengths: 19 months to 25 years – long-term.~~

~~RATE:~~

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	~~6th~~ 2nd	Revised	Sheet No.	74.8
Canceling	~~5th~~ 1st	Revised	Sheet No.	74.8

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 1 Rates – (continued)

b) Avoided Capacity Rate:

~~Off-Peak Hours:~~ Length of Contract	~~$ 0.05314~~All QF Resources
(years)	($/kW-Year)
~~On-Peak Hours:~~1	$~~–~~0.~~0585000~~
2	$9.29
3	$17.98
4	$26.11
5	$33.72
6	$40.85
7	$47.51
8	$53.75
9	$59.59
10	$65.05
11	$70.16
12	$74.95
13	$79.43
14	$83.62
15	$87.55
16	$91.22
17	$94.66
18	$97.88
19	$100.89
20	$103.72
21	$106.36
22	$108.83
23	$111.15
24	$113.32
25	$115.35

Payments: ~~Hourly~~Applicable Avoided Capacity Rate ~~x Hourly kWh~~multiplied by the Capacity Contribution.

~~kWh = Metered kilowatt hours supplied to the Utility in each hour.~~

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	3rd	Revised	Sheet No.	74.9
Canceling	2nd	Revised	Sheet No.	74.9

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

Option 2~~(a)~~: Agreement length of up to 25 years.

~~Rate: This rate is equal to NorthWestern Energy's (NWE's) highest actual cost 25 MWh purchases in the Mid-Columbia (Mid-C) market in each hour based on all day-ahead and real-time transactions, less $.001/kWh market price differential between Mid-C and Montana. This rate will be filed with the Commission on a lagged monthly basis, such that the calculated hourly rates for each hour in Month 1 must be filed by the first of Month 3.~~

~~The floor price for each hour shall be based on the previous year's C4 annual fuel costs escalated through June 30th of the effective year and updated each Agreement Year. The present floor rate is:~~

~~Energy ($/kWh): $ 0.0173221~~

~~Payments: Hourly Rate x Hourly kWh~~

~~kWh = Metered kilowatt hours supplied to the Utility in each hour.~~

~~**Option 2(b)**: Agreement length of up to 25 years.~~

Rate: This rate is equal to the published Intercontinental Exchange (ICE) Mid-C index price for Heavy Load Hours and Light Load Hours, less $.001/kWh market price differential between Mid-C and Montana, and applied to the Heavy Load and Light Load metered production of Seller. Another Mid-C price index may be substituted if necessary, if ICE is no longer available.

Payments: Daily Heavy Load Hour and Light Load Hour Rate x Heavy Load and Light Load kWh

kWh = Metered kilowatt hours supplied to the Utility in each daily Heavy Load and Light Load period.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	3rd	Revised	Sheet No.	74.10
Canceling	2nd	Revised	Sheet No.	74.10

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

SPECIAL TERMS AND CONDITIONS:

1) Definitions:

A. "Agreement" means the Power Purchase Agreement between Seller and the Utility for a term of not less than one month.

~~B. "Agreement Year" means a twelve-month period beginning on July 1 of any year.~~

B. "Capacity Contribution" means the Default Capacity and/or Measured Capacity as defined in Method 1 or Method 2 in Rate Options above.

C. "Commission" means the Montana Public Service Commission.

D. "Contingency Reserves" are an amount of spinning and nonspinning reserves (at least half must be spinning reserve) sufficient to meet the North American Electric Reliability Council (NERC) Disturbance Control Standard BAL-002 consistent with Western Electric Coordinating Council and Northwest Power Pool requirements.

E. "Contract Length" means the length of a Seller's contract with NorthWestern measured in whole years. For contract terms not in whole years, the length of a Seller's contract will be rounded up to the next whole year for purposes of determining applicable rates.

F. "Default Capacity" means 11.1 percent of Nameplate Capacity for Hydroelectric QFs, 5 percent of Nameplate Capacity for Wind QFs and 7.8 percent of Nameplate Capacity for Solar QFs.

~~E.~~G. "Heavy Load Hours" means the weekday and Saturday hours ending 7 and through hour ending 22 inclusive, Pacific Prevailing Time, except NERC defined holidays. For purposes of this Tariff, Heavy Load Hours correspond to Peak hours as used on the ICE web site.

(continued)

ELECTRIC TARIFF

NorthWestern Energy

Original Revised Sheet No. 74.11
Canceling Revised Sheet No. 74.11

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

H. "Intermittent" means generation resources with variable generation output from hour to hour. Specifically, wind and solar PV are considered to be Intermittent resources.

~~F.~~I. "Light Load Hours" means those hours not included in the definition of Heavy Load Hours. For purposes of this Tariff, Light Load Hours correspond to Off-Peak hours as used on the ICE web site.

J. "Measured Capacity" means that level of generation, as measured on an integrated hour, that a Qualifying Facility exceeds 85 percent of the time during the highest 10 percent of On-Peak hours. Measured Capacity is an annual calculation determined upon the conclusion of a contract year.

K. "Network Upgrades" means additions, modifications, and upgrades to NorthWestern's transmission system required at or beyond the point at which the Small Generating Facility interconnects with the transmission system to accommodate the interconnection with the Small Generating Facility to NorthWestern's transmission system. Network Upgrades do not include Distribution Upgrades.

~~G.~~L. "Off-Peak Hours" means those hours in the year not included in the definition of On-Peak Hours.

~~H.~~M. "On-Peak Hours" means the Heavy Load hours for the months of January, February, July, August, and December.

N. ~~"RECs~~"Other QF" means QF facilities other than hydroelectric, wind or solar powered resources.

~~I.~~O. "REC" means renewable energy credit. One megawatt hour of renewable energy generation gives rise to one REC, and this REC embodies all environmental attributes of that renewable energy generation.

~~J. "Utility" means NorthWestern Energy or NWE.~~

~~L.~~P. "Regulating Reserve" is spinning reserve immediately responsive to Automatic Generation Control (AGC) to provide sufficient regulating margin to allow the Balancing Authority to meet NERC's Control Performance Criteria (BAL-001).

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	1st	Revised	Sheet No.	74.12
Canceling	Original	Revised	Sheet No.	74.12

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

~~M.~~Q. "Seller," for purposes of this schedule, is any individual, partnership, corporation, association, government agency, political subdivision, municipality or other entity that:

~~1.~~a. Operates a QF; and

~~3.~~b. Has entered into an Agreement(s) with the Utility stipulating the terms and conditions of the interconnection and separately the sale of electric power to the Utility.

~~I. "Interconnection Facilities" means the Transmission Provider's Interconnection Facilities and the QF Interconnection Customer's Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Small Generating Facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Small Generating Facility to the Transmission Provider's Transmission System. Interconnection Facilities are sole use facilities and shall not include Distribution Upgrades or Network Upgrades.~~

~~K.~~H. ~~"Network Upgrades" means additions, modifications, and upgrades to NorthWestern's transmission system required at or beyond the point at which the Small Generating Facility interconnects with the transmission system to accommodate the interconnection with the Small Generating Facility to NorthWestern's transmission system. Network Upgrades do not include Distribution Upgrades.~~

R. "Utility" means NorthWestern Energy.

~~N.~~S. "Wind Integration Services" means those services necessary to integrate wind generation into the Utility's electric transmission and/or distribution system(s) in a manner such that all operational and reliability criteria are met. Wind Integration Services include, but are not limited to, Regulating Reserves, imbalance service, and scheduling.

2) Net Billing Option: If Seller contracts for Net Billing and the Seller's consumption kWh exceeds its production kWh, Seller shall be billed for power supply for the consumption kWh in excess of the production kWh in accordance with the Utility's applicable rate schedule. If Seller's consumption kWh is less than its production kWh, Seller shall receive a power supply payment (credit) for the production kWh in excess of the consumption kWh at the Rates specified above.

~~3)~~ Disposition of RECs: QFs selecting Option 1 ~~rates whose project creates RECs must contractually address the disposition of RECs for the Agreement Term. A QF~~ Rates may ~~agree to convey all RECs to NWE, in which case NWE must adjust the rates at the time a state or federal law or regulation results~~

(continued)

ELECTRIC TARIFF

NorthWestern Energy

	1st	Revised	Sheet No.	74.13
Canceling	Original	Revised	Sheet No.	74.13

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

~~in actual costs to NWE for CO2 emissions. A QF may also~~ choose to retain all ~~RECs, in which case the rates are not subject to adjustment for future CO2 emission costs.~~

(continued)

ELECTRIC TARIFF

NorthWestern Energy

Canceling ~~2nd~~Original Revised Sheet No. 74.14
~~1st~~ Revised Sheet No. 74.14

Schedule No. QF-1

QUALIFYING FACILITY POWER PURCHASE

~~A QF that~~ of the project's environmental benefits, including RECs, or to transfer them to NorthWestern Energy. A QF which chooses to ~~contractually~~ retain ~~RECs may still separately attempt to negotiate for the sale of RECs to NWE or other interested parties at any time that an Agreement remains in effect. Any such negotiation occurs separate from the Power Purchase Agreement and does not create a reopener that refreshes the rates in the Agreement.~~

3) ~~QFs selecting~~its environmental benefits must take the applicable Option ~~2 rates need not convey RECs to NWE, but may still separately attempt to negotiate for the sale~~1(a)(i) Avoided Energy Rate. Option 1(a)(ii) Avoided Energy Rates are only available to QFs who transfer all of the QF project's environmental benefits, including RECs, to NorthWestern Energy for the life of ~~RECs to NWE or other interested entities at any time that an Agreement remains in effect~~the QF contract.

4) Wind Integration: Sellers of Wind Energy ~~selecting Options 1 or 2~~ must contractually agree to the provision of wind integration services for the term of the Agreement and may either self-supply sufficient within-hour regulating reserves under terms acceptable to NorthWestern or pay the Utility for these services according to the Wind Integration Tariff (WI-1). Payment to the Utility for selection of service through WI-1 will result in a deduction from the total monthly payment made to the QF to reflect the provision of integration services.

5) Contingency Reserves: QFs ~~selecting Option 1 or Option 2~~ must either self-supply contingency reserves, or purchase the needed reserves from ~~NWE under contract~~NorthWestern at the rate as specified according to the Contingency Reserves Tariff (CR-1). ~~Under either Option 1 or Option 2, if~~If the QF purchases reserves from ~~NWE under contract~~NorthWestern, the CR-1 rate for the appropriate resource type will be deducted from the total monthly payment made to the QF to reflect the provision of contingency reserves.

6) Hourly Metering: Sellers are required to install interval metering capability if necessary to support the Rate Option chosen.

SERVICE AND RATES SUBJECT TO COMMISSION JURISDICTION: All rates and service conditions under this Rate Schedule are governed by the rules and regulations of the Public Service Commission of Montana and are subject to revision as the Commission may duly authorize in the exercise of its jurisdiction.

~~(continued)~~

CERTIFICATE OF SERVICE

I hereby certify that the original and 10 copies of NorthWestern Energy's Application for Approval of Avoided Cost Tariff Schedule No. QF-1 in Docket No. D2016.5.39 have been hand-delivered to the Montana Public Service Commission and three copies have been hand-delivered to the Montana Consumer Counsel this date. It has also been e-filed on the Commission website and sent via UPS Next Day Air to the remainder of the attached service list which includes solar QF developers seeking interconnection for 3-megawatt facilities and QF developers on the service list in NorthWestern's last QF-1 filing in Docket No. D2014.1.5.

Date: May 3, 2016

Tracy Lowney Killoy

Tracy Lowney Killoy
Administrative Assistant
Regulatory Affairs

Docket Service List
Docket No. D2016.5.39

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

IN THE MATTER OF NorthWestern Energy's Application for Interim and Final Approval of Revised Tariff No. QF-1, Qualifying Facility Power Purchase	))))	REGULATORY DIVISION DOCKET NO. D2016.5.39

NOTICE OF APPLICATION FOR INTERIM RATE ADJUSTMENT

YOU ARE HEREBY NOTIFIED that NorthWestern Corporation, d/b/a NorthWestern Energy ("NorthWestern"), filed its biennial Application to establish current avoided cost rates for Qualifying Facilities ("QF") with nameplate capacity of three megawatts or less on May 3, 2016. These rates are established by the Montana Public Service Commission ("Commission"), and are set forth in Commission approved Tariff No. QF-1, Qualifying Facility Power Purchase, the subject of the filing in this docket. The last Commission-approved avoided cost rates were established when the forecasted market prices of natural gas and electricity were much higher than today. The following table sets forth the current Commission-approved avoided cost rates, and the new avoided cost rates proposed by NorthWestern:

Current Average Annual Rates for 25-Year Contracts		
Resource Type	Without Carbon	With Carbon
Non-Wind [1]	$0.06235	NA
Wind [1]	$0.05439	NA
Non-Wind (Solar) [2]	$0.06609	NA

[1] Annual average rate

[2] Option 1(a) Rate - modeled production, page 9, Exhibit__(JBB-2)

Proposed Average Annual Rates for 25-Year Contracts		
Resource Type	Without Carbon	With Carbon
Hydroelectric and Other QF	$0.02984	$0.03974
Wind [4]	$0.03002	$0.04116
Solar [5]	$0.03405	$0.04366

[3] 62% annual capacity factor, 11.1% capacity contribution

[4] 38% annual capacity factor, 5% capacity contribution

[5] Modeled solar PV production, pages 9-10, Exhibit__(JBB-2)

NorthWestern's Application asks the Commission to approve the new avoided cost rates on an interim basis, pending its issuance of a final order establishing new avoided cost rates for the QF-1 Tariff. NorthWestern submits that the interests of potential QFs would be fully protected during the period the interim rates are in effect, as the rates would be subject to adjustment back to the rate effective date, with interest, and that interim rates are necessary to protect the interests of NorthWestern's retail customers during the pendency of this docket. If NorthWestern enters into new contracts with QFs at the current higher QF-1 rates, then NorthWestern's retail customers will be paying more than the avoided cost for QF power for the term of those new contracts.

The interim request and supporting documents can be examined at NorthWestern's General Office, 11 East Park Street, Butte, Montana; at the office of the Montana Consumer Counsel ("MCC"), 111 North Last Chance Gulch, Suite 1B, Helena, Montana; or at the office of the Commission, 1701 Prospect Avenue, Helena, Montana. The MCC is available to assist in the representation of consumer interests in this matter, and its phone number is 406-444-2771. Any response which any person wishes to make on this interim request should be delivered to the Commission at the above address as soon as possible or mailed to the Commission at P.O. Box 202601, Helena, MT 59620-2601.

DATED MAY 3, 2016

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

IN THE MATTER OF NorthWestern Energy's Application for Approval of Avoided Cost Tariff for New Qualifying Facilities	))))	DOCKET NO. D2016.5.39

CERTIFICATE OF SERVICE
OF NOTICE OF APPLICATION FOR INTERIM RATE ADJUSTMENT
FOR QUALIFYING FACILITY (SCHEDULE QF-1) RATES

The undersigned certifies that a Notice of Application for Interim Rate Adjustment was this day served by mail upon the following:

Daily Newspapers

Montana Standard	Helena Independent Record
Missoulian	Billings Gazette
Great Falls Tribune	Livingston Enterprise
Bozeman Chronicle	Ravalli Republic
Daily Inter Lake	Havre Daily News

Associated Press Print and Broadcast Services

Television Stations

Billings	-	KTVQ and KULR
Butte	-	KXLF
Missoula	-	KECI and KPAX
Great Falls	-	KFBB and KRTV
Bozeman	-	KTVM
Helena	-	KTVH

DATED: May 3, 2016

NorthWestern Energy

By: Claudia Rapkoch

Claudia Rapkoch
11 East Park Street
Butte, Montana 59701

Department of Public Service Regulation
Montana Public Service Commission
Docket No. D2016.5.39
Avoided Cost Rate Filing – Schedule QF-1
NorthWestern Energy

PREFILED DIRECT TESTIMONY OF

JOHN D. HINES

ON BEHALF OF NORTHWESTERN ENERGY

TABLE OF CONTENTS

Witness Information

Q. Please state your name and business address.

A. My name is John D. Hines. My business address is 11 East Park Street, Butte, Montana 59701.

Q. By whom are you employed and in what capacity?

A. I am employed by NorthWestern Energy ("NorthWestern" or "Company") as Vice President – Supply.

Q. Please outline your areas of responsibility.

A. I am the NorthWestern officer responsible for overseeing the functional areas of electric and natural gas planning, generation and energy marketing. I am also responsible for the lands and permitting, and the environmental compliance functions for NorthWestern.

Q. Please summarize your educational and employment history.

A. I earned both a Bachelor's degree and a Master's degree in Economics from the University of Montana. I have over 25 years' experience in the energy sector including working as a consultant to public interest groups on energy issues and as an economist for the Northwest Planning and Conservation Council ("Council").

In 2002, Governor Judy Martz appointed me to serve as one of Montana's two representatives to the Council. While working as a Council member I served on the Council's Executive and Power Committees.

I joined NorthWestern in 2005 as Director of Energy Supply Planning, became the Chief Energy Supply Officer in 2008, and have served as Vice President - Supply since 2011.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide an overview of NorthWestern's filing, to explain the importance of correctly estimating Qualifying Facility ("QF") avoided costs in this docket, and to explain the equal importance of establishing new avoided costs immediately, through interim QF-1 tariff rates.

As discussed in my testimony below, the existing tariffed QF avoided cost rates are notably higher than present avoided costs, which is providing inappropriate incentives to potential QF developers, and thus likely fueling new QF power activities onto NorthWestern's system. This is occurring at the same time that NorthWestern's portfolio planning has

determined that intermittent generation with a low capacity value provides less benefit to the portfolio than high capacity value generation.

While NorthWestern has no choice but to take the QF power under current federal and state law and Montana Public Service Commission ("Commission" or "MPSC") rules and tariffs, retail customers should not be required to pay for such power at prices which do not represent NorthWestern's current avoided costs. Nor should QF projects be built if they are not sustainable under reasonable avoided cost estimates.

Overview of Filing

Q. Please first identify the other NorthWestern witnesses in this docket and the subjects they will address.

A. There are three NorthWestern witnesses in this case, other than myself: Mr. John Bushnell, who has primary responsibility for developing the avoided cost estimates in this filing; Mr. Luke Hansen, the NorthWestern employee with primary responsibility for the PowerSimm™ modeling used to develop the avoided energy costs; and Ms. Autumn Mueller, who is providing the information from the interconnection queue which informs the Commission of the very large number of interconnection requests NorthWestern has received in the last 17 months for solar generation facilities seeking 3-megawatt ("MW") standard contracts.

Q. Please provide a general overview of NorthWestern's filing in this docket.

A. The current avoided cost rates in NorthWestern's QF-1 Tariff, governing standard contracts for QFs 3 MW or less, are based upon the blended market – combined cycle method approved in Order No. 7199d in Docket No. D2012.1.3 and the subsequent compliance filing that NorthWestern submitted in August 2013. The current QF-1 Tariff rates have been in place for nearly three years and are far out of date. If NorthWestern is required to enter into additional 3-MW standard rate contracts with QFs under the current QF-1 rates, the outcome will be highly adverse for NorthWestern's customers.

Over the last five years, NorthWestern, with Commission approval, has continued to reduce its reliance upon third party purchases of electric power in favor of acquiring Company-owned resources. Spion Kop, a 40-MW wind farm, was developed under Commission Order No. 7159l in MPSC Docket No. D2011.5.41. The Company acquired 442 MW of hydroelectric generation from PPL Montana under Commission Order No. 7323k in MPSC Docket No. D2013.12.85. As the amount of Company-owned resources has increased, the amount and type (i.e., light load power) of avoidable resources has decreased.

Natural gas and electricity price forecasts are also of critical significance to the calculation of NorthWestern's avoided costs. Since the current QF-1 Tariff rates were established back in 2013, the market prices of both natural gas and electricity have plummeted dramatically. As explained in detail by Mr. Bushnell in his testimony ("Bushnell Direct Testimony"), forecasts of electricity and natural gas prices have declined significantly since the current QF-1 Tariff rates were established. The impact of applying updated natural gas and electricity price forecasts to the method approved in Docket No. D2012.1.3 for determining avoided costs would reduce current rates for QF-1 wind by over 40% and reduce current rates for QF-1 solar projects by over 35%. Since QF costs are passed directly to NorthWestern's customers, our Montana customers would be the nearly immediate beneficiaries of these lower rates.

The Commission has put a lot of time and effort into establishing wind specific avoided cost rates. That was a natural outgrowth of the fact that wind energy has been to date the predominate form of newly developed non-hydro renewable energy in Montana. Given the number of recent QF solar contracts NorthWestern has signed and the very large amount of interest by solar developers in exploring additional QF contracts, NorthWestern has also proposed in this docket solar specific avoided cost rates.

Exhibit__(JDH-1) is a map produced by the National Renewable Energy Laboratory which shows potential solar photovoltaic ("PV") generating capacity in the month of December. This limited winter generation potential for solar PV has significant negative impact on the value of solar to NorthWestern. Despite the very limited contribution solar would make to addressing NorthWestern's important winter peak needs, (see the Bushnell Direct Testimony which discusses the relatively small contribution that solar can provide to meeting the portfolio's capacity needs), NorthWestern has received a large number of interconnection requests for 3-MW solar QFs trying to capture the current very high avoided cost rates in the existing QF-1 Tariff.

In the decade between the establishment of the interconnection queue and November 30, 2014, NorthWestern received a total of 144 requests for proposed interconnection of generation facilities. In the past 17 months, NorthWestern has received 89 interconnection requests just for proposed 3-MW solar generation facilities. We also now have six fully executed interconnection agreements and five solar QF purchase power contracts, agreements NorthWestern was required to enter into at the QF-1 tariff set back in 2013. In addition, as Ms. Mueller discusses in her testimony, the 43 active solar interconnection requests, equating to almost 130 MW of incremental solar power, is likely to grossly understate

the number of solar projects that are currently being pushed forward to take advantage of the artificially high QF-1 Tariff currently in place.

The assumptions which underpin the analytics for this filing were developed consistent with NorthWestern's 2015 Electricity Supply Resource Procurement Plan ("2015 Plan") and incorporate the 2015 Plan's forecasts for natural gas and electric power prices. Using this approach, which more closely approximates current market conditions, results in significantly lower avoided cost tariffs. In addition to the lower natural gas and electricity forecasts, the proposed avoided costs also incorporate the 442 MW of hydroelectric generation that is in the electricity portfolio. The addition of the hydroelectric generation diminishes the need and thus the value of off-peak generation.

Q. Please briefly describe the manner in which NorthWestern's avoided costs were estimated in this filing.

A. The testimony and exhibits of Mr. Hansen and Mr. Bushnell lay out in detail the development of the avoided cost estimates NorthWestern is presenting in this filing. Avoided energy costs were estimated using PowerSimm™, consistent with the 2015 Plan. The testimony and exhibits of Luke Hansen describe the modeling work that went into the development of the avoided energy costs. The avoided costs of capacity were calculated using the costs of an internal combustion engine, and

distinct capacity contributions were calculated for intermittent wind, intermittent solar, and hydroelectric and other QF resources. The Bushnell Direct Testimony details the development of avoided capacity costs and the development of the avoided cost rates proposed in this filing.

Interim QF-1 Avoided Cost Tariff

Q. Why does NorthWestern propose that the Commission implement interim avoided cost tariffs?

A. Based upon the information currently available and presented by NorthWestern in this docket, the Commission should implement interim avoided cost tariffs in order to avoid irreparable harm to NorthWestern's customers. Specifically, NorthWestern advocates the implementation of interim avoided cost tariffs because:

- The proposed interim tariffs are needed to achieve customer indifference which is supposed to be the hallmark of avoided cost estimates;
- The current QF-1 Tariff is inducing a substantial number of QF developers, some with numerous projects, to seek QF contracts at these high rates;
- The standard QF-1 contract term covers about 2.5 decades and thus the effects on customers will be both irrevocable and long-term; and

- Absent interim tariffs, QF developers will have a substantial period of time to execute contracts at the current avoided cost rate given the time it will take to process this QF application to completion.

I believe that the Commission, NorthWestern, and most importantly NorthWestern's customers are at a critical crossroads with respect to Commission-established avoided costs, and the Commission's decisions in this docket will have a profound long-term financial impact on NorthWestern's customers.

The Critical Importance of Correctly Estimating NorthWestern's Avoided Costs

Q. Why is it critically important to correctly estimate NorthWestern's avoided costs in this docket?

A. Montana's "Mini-PURPA" contains a statutory preference for long-term contracts. Although there is no statutory definition of "long term", the Commission currently provides QF developers with the option of a 25-year standard offer contract. Even a modest overstatement of avoided costs can generate a significant ratepayer liability over the life of a 25-year contract. If the overstatement of avoided costs is significant, or if there are numerous QF-1 contracts that NorthWestern is required to sign at the current tariff disparity, NorthWestern's customers will be hit with a very large liability for unnecessary QF costs.

Q. You note above that natural gas and electricity price forecasts are critical to the calculation of NorthWestern's avoided costs, but aren't electricity and natural gas forecasts frequently wrong?

A. Forecasts are predictions of future outcomes which can later turn out to be inaccurate. However, the issue in this docket is not a forecast issue. In this instance we know inputs to the forecast have significantly changed. The issue is whether the Commission is going to allow the continuation of avoided cost rates which are obviously too high given the market information that is both known and available today. The existing current QF-1 Tariff, using 2013 natural gas and electricity forecasts as the basis for the tariff, is significantly out of touch with current market reality. Using this outdated data results in NorthWestern having to enter into new QF contracts and the fallout is a substantial over-payment by Montana electricity customers to new intermittent wind and solar QF developers.

Q. Why did you describe the liability from an overstatement of NorthWestern's avoided costs as a customer liability instead of a NorthWestern liability?

A. The payment of avoided costs under a Commission-mandated contract is a pass-through to NorthWestern's customers. It is not something that can be disallowed or reduced in a later Commission proceeding. If the Commission sets a policy course that is excessively generous to QF

developers, it does so at the expense of NorthWestern's customers, not NorthWestern.

Q. What is the basis for your assertion that a significant overstatement of NorthWestern's avoided costs will hit its customers with a very large liability for unnecessary QF costs?

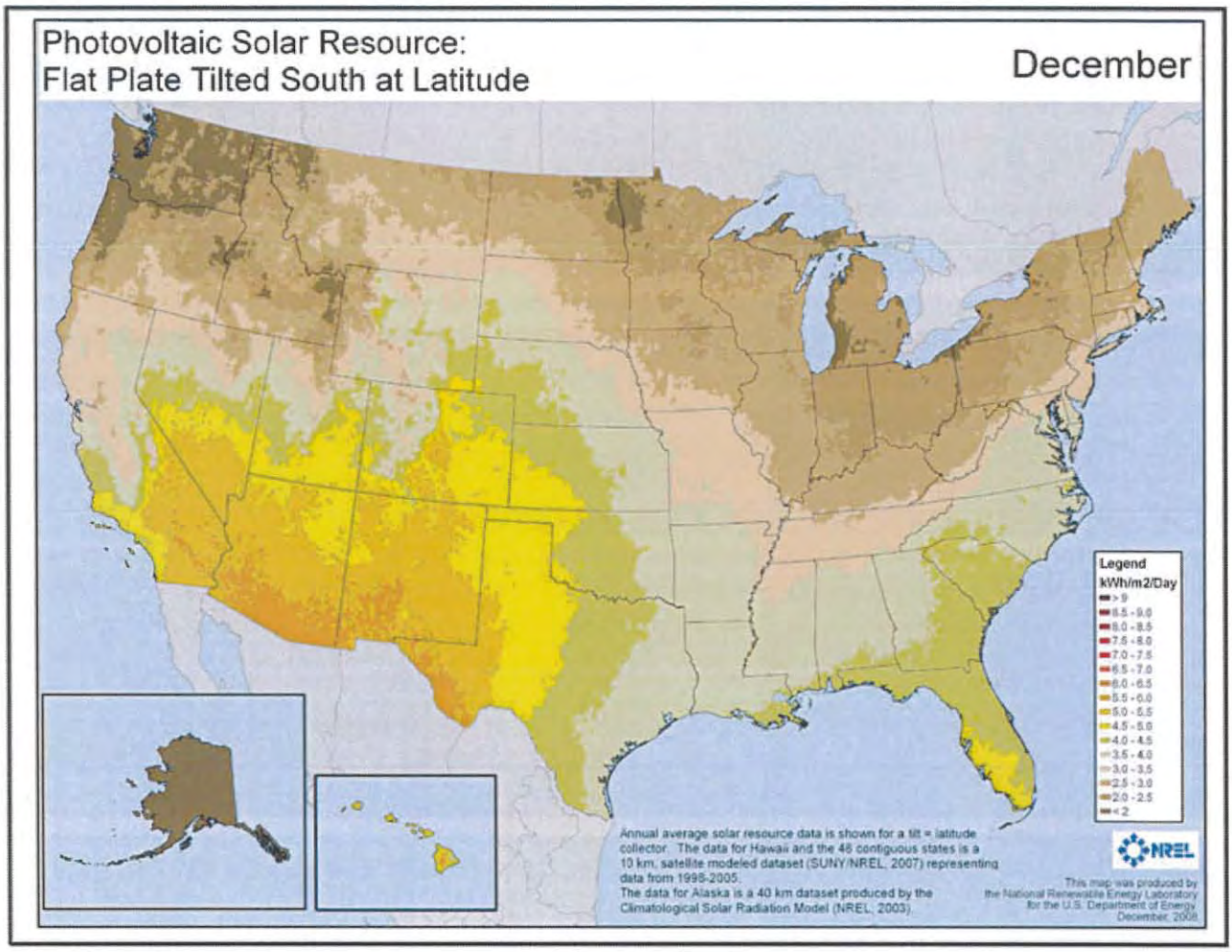
A. It has already happened, although under different circumstances. In the early 1980s, the Commission set high avoided cost rates for its jurisdictional utilities. When the Montana Power Company was acquired by NorthWestern in 2002, its Montana QF contracts were estimated to be out of market by more than a billion dollars (see Exhibit__(JDH-2)). The Competitive Transition Charge for Qualifying Facilities, the CTC-QF which is still in place today, was based upon a net present value of that liability of $366,486,738. Although there were more than a dozen QF contracts at the time, that very large liability was essentially driven by three QF contracts providing roughly 100 MW of nameplate generating capacity. While existing standard rate contracts are limited to 3 MW or less, NorthWestern currently has 43 active 3-MW solar PV projects in its interconnection queue, representing about 130 MW of potential solar QF power, six fully executed interconnection agreements reflecting 17 MW of QF solar power, and five solar contracts representing 14 MW already signed. It seems obvious that the current avoided cost rates in the QF-1 Tariff have created a solar gold rush which will be paid for by customers.

Q. Can you estimate the exposure NorthWestern's customers will face if the current avoided cost rates in the QF-1 Tariff are not reduced?

A. Yes. Mr. Bushnell testifies that only one single 3-MW solar project will cost consumers approximately $5.1 million in extra costs over the life of the project. If – while this docket is being processed and absent the interim rates being proposed by NorthWestern – 33 of these 3-MW projects move forward (100 MW total), the financial effects on customers of such a gold rush would be extremely detrimental. Using the rate differential between the existing QF-1 Tariff rate to NorthWestern's proposed QF-1 Tariff rate developed in the Bushnell Direct Testimony, NorthWestern calculates that for 100 MW of new solar QF-1 qualified projects, over the 25-year life of the contracts, customers would be required to pay almost $170 million of excess costs. This Commission has the ability to protect customer welfare by promptly implementing interim rates, rates which reflect the knowledge of markets that we have today. On the other hand, inaction by the Commission is likely to have large and significant financial effects on Montana customers.

Q. Does this conclude your testimony?

A. Yes, it does.


Photovoltaic Solar Resource:
Flat Plate Tilted South at Latitude
December
Legend
kWh/m2/Day
> 9
8.5 - 9.0
8.0 - 8.5
7.5 - 8.0
7.0 - 7.5
6.5 - 7.0
6.0 - 6.5
5.5 - 6.0
5.0 - 5.5
4.5 - 5.0
4.0 - 4.5
3.5 - 4.0
3.0 - 3.5
2.5 - 3.0
2.0 - 2.5
< 2
Annual average solar resource data is shown for a tilt = latitude collector. The data for Hawaii and the 48 contiguous states is a 10 km, satellite modeled dataset (SUNY/NREL, 2007) representing data from 1998-2005.
The data for Alaska is a 40 km dataset produced by the Climatological Solar Radiation Model (NREL, 2003).
NREL
This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy
December, 2008

Net Tier II CTC-QF Charges Estimates w/Proceeds Credit - 2002 to 2032

	Contract Years	Total Out of Market $	MPSC Share of QF Out-of-Market $ @ 93.0743%	Net QF Out-of Market $ after Proceeds	Retail Annual kWh Consumption	Average Annual CTC-QF kWh Charge (Col. H / Col. J)	Levelized Payments	Tax Effect of Levelized Payment: Taxable Difference	Additional Tax	Cummulative Tax Ratebase Adjustment	Revenue Requirement on Tax Ratebase
8	2002-2003	$23,965,517	$22,305,737	$18,545,858	6,977,211,588	$0.002658	$29,017,336	$10,471,478	$ 4,124,453	$ 4,124,453	484,623
9	2003-2004	$26,594,838	$24,752,959	$20,580,574	7,026,622,051	$0.002929	$29,017,336	$8,436,762	$ 3,323,030	$ 7,447,483	875,079
10	2004-2005	$28,328,496	$26,366,550	$21,922,176	7,076,526,620	$0.003098	$29,017,336	$7,095,160	$ 2,794,606	$ 10,242,090	1,203,446
11	2005-2006	$30,083,710	$28,000,202	$23,280,458	7,126,930,234	$0.003267	$29,017,336	$5,736,878	$ 2,259,613	$ 12,501,702	1,468,950
12	2006-2007	$31,973,224	$29,758,854	$24,742,670	7,177,837,884	$0.003447	$29,017,336	$4,274,666	$ 1,683,684	$ 14,185,387	1,666,783
13	2007-2008	$33,633,887	$31,304,505	$26,027,784	7,229,254,611	$0.003600	$29,017,336	$2,989,552	$ 1,177,510	$ 15,362,896	1,805,140
14	2008-2009	$35,437,391	$32,983,103	$27,423,436	7,281,185,505	$0.003766	$29,017,336	$1,593,900	$ 627,797	$ 15,990,694	1,878,907
15	2009-2010	$37,142,668	$34,570,278	$28,743,075	7,333,635,708	$0.003919	$29,017,336	$274,261	$ 108,025	$ 16,098,718	1,891,599
16	2010-2011	$38,713,308	$36,032,139	$29,958,523	7,386,610,413	$0.004058	$29,017,336	($941,187)	$ (370,710)	$ 15,728,009	1,848,041
17	2011-2012	$39,757,302	$37,003,830	$30,766,425	7,440,114,865	$0.004135	$29,017,336	($1,749,089)	$ (688,922)	$ 15,039,086	1,767,093
18	2012-2013	$41,429,806	$38,560,502	$32,060,702	7,494,154,361	$0.004278	$29,017,336	($3,043,366)	$ (1,198,706)	$ 13,840,381	1,626,245
19	2013-2014	$44,429,672	$41,352,606	$34,382,166	7,548,734,253	$0.004555	$29,017,336	($5,364,830)	$ (2,113,072)	$ 11,727,308	1,377,959
20	2014-2015	$47,159,234	$43,893,127	$36,494,454	7,603,859,943	$0.004799	$29,017,336	($7,477,118)	$ (2,945,050)	$ 8,782,258	1,031,915
21	2015-2016	$49,866,349	$46,412,755	$38,589,371	7,659,536,890	$0.005038	$29,017,336	($9,572,035)	$ (3,770,185)	$ 5,012,073	588,919
22	2016-2017	$52,880,598	$49,218,247	$40,921,966	7,715,770,607	$0.005304	$29,017,336	($11,904,630)	$ (4,688,936)	$ 323,137	37,969
23	2017-2018	$55,111,907	$51,295,022	$42,648,678	7,772,566,661	$0.005487	$29,017,336	($13,631,342)	$ (5,369,045)	$ (5,045,908)	(592,894)
24	2018-2019	$50,762,873	$47,247,189	$39,283,152	7,829,930,676	$0.005017	$29,017,336	($10,265,816)	$ (4,043,448)	$ (9,089,356)	(1,067,999)
25	2019-2020	$47,780,794	$44,471,640	$36,975,452	7,887,868,330	$0.004688	$29,017,336	($7,958,116)	$ (3,134,503)	$ (12,223,859)	(1,436,303)
26	2020-2021	$50,279,509	$46,797,301	$38,909,097	7,946,385,362	$0.004896	$29,017,336	($9,891,761)	$ (3,896,117)	$ (16,119,977)	(1,894,097)
27	2021-2022	$52,472,828	$48,838,717	$40,606,411	8,005,487,563	$0.005072	$29,017,336	($11,589,074)	$ (4,564,647)	$ (20,684,624)	(2,430,443)
28	2022-2023	$55,186,177	$51,364,148	$42,706,152	8,065,180,787	$0.005295	$29,017,336	($13,688,816)	$ (5,391,682)	$ (26,076,306)	(3,063,966)
29	2023-2024	$58,101,980	$54,078,011	$44,962,584	8,125,470,942	$0.005534	$29,017,336	($15,945,228)	$ (6,280,427)	$ (32,356,732)	(3,801,916)
30	2024-2025	$56,057,594	$52,175,213	$43,380,503	8,186,364,000	$0.005299	$29,017,336	($14,363,167)	$ (5,657,292)	$ (38,014,025)	(4,466,848)
31	2025-2026	$36,935,811	$34,377,748	$28,582,998	8,247,865,987	$0.003466	$29,017,336	$434,338	$ 171,075	$ (37,842,950)	(4,446,547)
32	2026-2027	$39,576,885	$36,835,722	$30,626,854	8,309,982,995	$0.003686	$29,017,336	($1,609,317)	$ (633,870)	$ (38,476,820)	(4,521,026)
33	2027-2028	$38,943,092	$36,246,011	$30,136,344	8,372,721,173	$0.003599	$29,017,336	($1,119,008)	$ (440,749)	$ (38,917,569)	(4,572,814)
34	2028-2029	$18,603,459	$17,315,039	$14,396,398	8,436,086,733	$0.001707	$29,017,336	$14,620,938	$ 5,758,822	$ (33,158,747)	(3,896,153)
35	2029-2030	($525)	($489)	($406)	8,500,085,948	($0.000000)		$406	$ 160	$ (33,158,587)	(3,896,134)
36	2030-2031	($539)	($502)	($417)	8,564,725,155	($0.000000)		$417	$ 164	$ (33,158,423)	(3,896,115)
37	2031-2032	($558)	($519)	($432)	8,630,010,755	($0.000000)		$432	$ 170	$ (33,158,253)	(3,896,095)
38	Totals	$1,121,207,086	$1,043,555,647	$867,652,787			$783,468,077	($84,184,710)	($33,158,253)		
39											
40	NPV @ 8.46% =	$393,757,179									
41											
42	MPSC Share NPV @ 8.46% =		$366,486,738	$304,711,340		NPV =	$304,711,340	NPV =	($0)	NPV =	$4,028,758
43	less Remaining Above Book Proceeds =		($61,775,398)					Tax Gross Up =	($0)		
44	Net QF Transition Costs =		$304,711,340								
45	Column H Recovery Factor =		83.14%		Net Taxable Diff between Nominal and Levelized =		($84,184,710)			Sum of NPVs=	$4,028,758
46						Net Tax Impact =	($33,158,253)			Levelized Tax Payment =	$373,508
47			Levelized Payment =	$29,017,336							
48			Levelized Tax Payment =	$373,508							
49			Total Levelized Payment =	$29,390,844							
50											
51			Levelized kWh Charge =	$0.003785							
52											
53											

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Exhibit__(JDH-2)
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Docket D97.7.90
Exhibit__(PRC-C), Page 1 of 4

Department of Public Service Regulation
Montana Public Service Commission
Docket No. D2016.5.39
Avoided Cost Rate Filing
NorthWestern Energy

PREFILED DIRECT TESTIMONY

OF JOHN B. BUSHNELL

ON BEHALF OF NORTHWESTERN ENERGY

TABLE OF CONTENTS

Witness Information

Q. Please state your name, employer, and business address.

A. My name is John B. Bushnell. I am employed by NorthWestern Energy ("NorthWestern"). My business address is 208 North Montana Avenue, Suite 205, Helena, Montana 59601.

Q. In what capacity are you employed?

A. I am employed as a Lead Supply Planner in the Energy Supply Planning Group.

Q. Please state your educational background and experience.

A. I graduated from Iowa State University in Ames, Iowa in 1979 with a Bachelor's degree in Farm Operation and from the University of Wisconsin-Madison in 1984 with a Bachelor's degree in Agricultural Economics. I attended Montana State University in 1984 through 1986 and completed coursework necessary to receive a Master's degree in Applied Economics. In 1986 I began working as a Rate Analyst for the Montana Public Service Commission ("MPSC" or "Commission") and have worked in the energy industry since that time. In addition to the MPSC, I have worked two years for the Washington Utilities and Transportation Commission, ten years for the Montana Consumer Counsel, and eight years for the Northwest Power and Conservation Council. I have

previously sponsored testimony before this Commission and the Washington Utilities and Transportation Commission.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to explain the development of the updated avoided capacity costs and the development of the proposed avoided cost rates included in NorthWestern's Qualifying Facility ("QF") Power Purchase Schedule No. QF-1 Tariff ("QF-1 Tariff").

Summary of Proposed Tariffs

Q. Please summarize NorthWestern's proposed QF-1 Tariff rate options.

A. The proposed QF-1 Tariff rate options submitted in this filing are based on NorthWestern's 2015 Electricity Supply Resource Procurement Plan ("2015 Plan") filed on March 31, 2016. In this filing, NorthWestern is making a number of changes to the QF-1 Tariff. QF-1 Tariff Option 1 rates are currently differentiated between Rate Options 1(a), 1(b), and 1(c). Option 1(a) is limited to long-term contracts for non-wind QF resources; Option 1(b) is a short-term rate and is open to all resource types, and Option 1(c) is limited to long-term contracts for QF wind resources.

NorthWestern proposes to withdraw QF-1 Tariff options 1(a), 1(b) and 1(c) and replace them with an avoided cost energy rate and an avoided cost capacity rate. Energy rates are differentiated into two rate options – one for QFs that elect to include the transfer of all the environmental attributes associated with the QF facility for the life of the contract, and a second rate option for those QFs that elect to retain their environmental attributes. Each of these two energy rate options are further differentiated by length of contract and resource type:

- Hydroelectric and Other QF resources;
- Intermittent QF wind resources; and
- Intermittent QF solar resources.

The avoided cost of capacity is calculated similar to previous QF-1 rate filings, but the proposed rate is based upon measured capacity contribution during peak load hours. The table below compares average calculated rates by resource type under current and proposed QF-1 rates (also page 8 of Exhibit__(JBB-2)).

Current Average Annual Rates for 25-Year Contracts		
Resource Type	Without Carbon	With Carbon
Non-Wind [1]	$0.06235	NA
Wind [1]	$0.05439	NA
Non-Wind (Solar) [2]	$0.06609	NA

[1] Annual average rate
[2] Option 1(a) Rate - modeled production, page 9, Exhibit__(JBB-2)

Proposed Average Annual Rates for 25-Year Contracts		
Resource Type	Without Carbon	With Carbon
Hydroelectric and Other QF	$0.02984	$0.03974
Wind [4]	$0.03002	$0.04116
Solar [5]	$0.03405	$0.04366

[4] 62% annual capacity factor, 11.1% capacity contribution
[4] 38% annual capacity factor, 5% capacity contribution
[5] Modeled solar PV production, pages 9-10, Exhibit__(JBB-2)

Q. Please explain your calculation of the current and proposed rates.

A. The average annual rates for the current Option 1(a) "Non-Wind" and Option 1 (c) "Wind" rates are calculated as an annual average rate. Solar photovoltaic ("PV") QF generation currently receives Option 1(a) rates, but solar PV production is heavily weighted to heavy load hours, so modeled solar production was used to calculate the average annual rate a solar PV QF would receive under the current Option 1(a) rates.

The average annual rate for proposed "Hydroelectric and Other QF" is calculated using a 62% annual capacity factor with an 11.1% capacity contribution; these values were derived by examining historical small hydroelectric production. The average annual rate for proposed "Wind" is calculated using a 38% annual capacity factor with a 5% capacity contribution. The average annual rate for proposed "Solar" was calculated using modeled solar PV production.

Q. Please explain how solar PV production was modeled for the average annual rate calculations.

A. Solar PV production was estimated using the indicative design for a 3-megawatt ("MW") solar PV project supplied by DNV-GL, and the National Renewable Energy Laboratory's ("NREL") System Advisor Model ("SAM"). Solar PV production was modeled for six separate sites in Montana. The

estimated production was then separated into On-Peak and Off-Peak and revenues were calculated at current rates. The average proposed rate was calculated using annual production and a capacity contribution of 7.8%.

Q. Does the average annual rate analysis also give an indication of how much a solar PV project would be over-compensated under contracts signed at current QF-1 rates compared to contracts signed at NorthWestern's proposed rates?

A. Yes. Using this analysis, a 3-MW solar PV project would be over-compensated by about $5.1 million over the 25-year life of a contract under the current QF-1 Tariff compared to the solar QF-1 rates proposed in this filing which are based on current estimates of avoided costs. The Prefiled Direct Testimony of Autumn Mueller discusses the number of interconnection requests submitted by solar PV QFs, and the Prefiled Direct Testimony of John Hines discusses the high exposure to our customers.

Q. Are there any other proposed changes to the QF-1 Tariff?

A. Yes. The QF-1 Tariff Option 2 rates currently consist of Option 2(a) and Option 2(b) which are both short- to long-term rate options. As explained below, NorthWestern proposes to eliminate rate Option 2(a).

Impact of Forecasts on Avoided Costs

Q. What is the basis for the electricity and natural gas price forecasts used to develop avoided cost rates?

A. As explained in the Prefiled Direct Testimony of Luke Hansen, the electricity and natural gas price forecasts are the same as those contained in the 2015 Plan.

Q. Have prices for electricity and natural gas changed since the current QF-1 Tariff was established?

A. Yes, both electricity and natural gas prices have declined significantly since the current QF-1 Tariff was approved in August of 2013. Forecasts of electricity and natural gas prices have also declined significantly.

Q. How does the decline in electricity and natural gas price forecasts affect the calculation of QF-1 Tariff avoided cost rates?

A. The calculation of avoided costs is highly dependent on price forecasts of electricity and natural gas. When the price forecasts decline, avoided costs decline as well. Exhibit__(JBB-1) illustrates the impact that price forecasts have on avoided costs and avoided cost rates.

Q. Please summarize the analysis presented in Exhibit__(JBB-1).

A. Page 1 of Exhibit__(JBB-1) shows the calculation of avoided cost rates using the blended market-combined cycle gas plant approach approved in

Docket No. D2012.1.3, using the electricity and natural gas price forecasts approved in the compliance filing required by Order No. 7199d in that docket. The compliance filing was approved on August 26, 2013, and QF-1 rates have not changed since that time.

Page 2 of Exhibit__(JBB-1) shows the same model and same calculations except for electricity and natural gas price forecasts, which are from the 2015 Plan. The 2015 Plan forecasts are also used to determine NorthWestern's avoided costs and avoided cost rates in this filing. Since the 2015 Plan forecast does not start until 2016, historical electricity prices were inserted into the model for the first three years. With these changes and all else held constant, rates decline by 40.4% for wind QFs and 35.2% for non-wind (hydroelectric, solar and other) QFs – when compared to current rates. Using the Docket No. D2012.1.3 methodology and the 2015 Plan forecasts reduces the average annual avoided cost rate for wind QFs from $0.05439/kilowatt-hour ("kWh") to $0.03244/kWh (a 40.4% drop) and the average annual avoided cost rate for non-wind QFs from $0.06235/kWh to $0.04040/kWh (a 35.2% drop).

Clearly, electricity and natural gas price forecasts are the single largest determinant of avoided cost, and it is just as clear that the current approved QF-1 Tariff rates are much too high largely because the price forecasts on which they are based do not reflect the current market.

Avoided Cost of Energy and Rates

Q. Explain how the avoided cost of energy rates are calculated.

A. The avoided cost of energy is calculated using PowerSimm™, and Mr. Hansen is the responsible witness for those calculations. Avoided energy costs are developed using PowerSimm™ for three categories of QF resources: hydroelectric QF resources, wind QF resources, and solar QF resources. The 25-year streams of avoided energy costs from PowerSimm™ provide the basis for developing levelized avoided cost rates for contracts ranging in length from one to 25 years. The development of levelized rates for the various contract lengths is a straightforward calculation of levelized Net Present Value ("NPV") by contract length and is contained on pages 2 and 3 in Exhibit__(JBB-2).

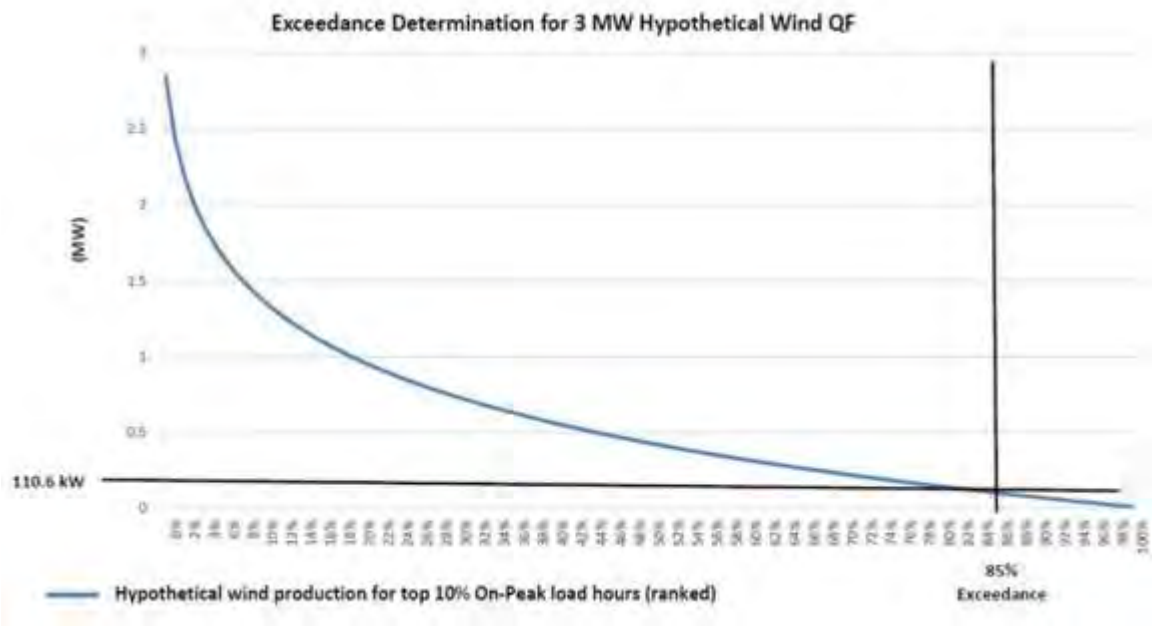
Avoided Cost of Capacity and Rates

Q. Explain how the avoided cost of capacity rates are calculated.

A. The avoided cost of capacity is calculated using the levelized capital cost of an Internal Combustion Engine ("ICE") generation unit to be built in 2019. The fixed operation and maintenance ("O&M") costs of an ICE are also included in the avoided cost of capacity calculation. These costs are levelized for contracts with durations of 1 to 25 years and are expressed as a $/kW-year rate and paid on the basis of capacity contribution. The capital costs and fixed O&M costs of the ICE are taken directly from the 2015 Plan.

Q. Explain how the capacity contribution is measured.

A. A QF facility will be paid for the level of capacity that is produced on a reliable basis during the top 10% of On-Peak load hours. The On-Peak period is defined in the QF-1 Tariff and averages about 2,038 hours per year. At the end of a contract year, the highest 10% of load hours in the On-Peak period are identified along with the QF facility's generation during those hours. The QF's generation for those hours is then ranked from high to low and the capacity contribution is selected as the generation value that is exceeded 85% of the time. A graphical example of the exceedance measure is shown below to illustrate the 85% exceedance capacity contribution for a hypothetical 3-MW QF wind facility. Production for the 3-MW facility during the identified peak load hours is ranked and the 85^{th} percentile, which is 110.6 kW, is the level of generation, or measured capacity, that would be used for determining the capacity payment for that QF, as explained below.



Q. Why was an 85% exceedance level selected?

A. The 85% exceedance level represents a level of reliability that is close to that of a Frame Combustion Turbine which has a 90% availability factor. Additionally, the 85% exceedance level is also consistent with my testimony in Docket No. D2012.1.3.

Q. Explain how the capacity payment is calculated.

A. The capacity payment is based upon a five-year average of capacity contribution to reduce the volatility in capacity payments. I propose two options, one of which must be selected by the QF developer at time of contract signing.

The first option is to accept payment for capacity as measured. For contract year one, the capacity contribution and capacity payment is based upon the measured 85% exceedance level for that year. For contract year two, the capacity payment is based upon the first two years' average of capacity contribution as measured. The averaging of measured capacity contribution continues in this manner until a five-year average is achieved. From that point forward, capacity payments are based upon a rolling five-year average (an average of the current year plus four previous years) for the remaining term of the contract. Using the example from the graph above, and assuming a 25- year contract term, the first year capacity payment to the hypothetical wind project under this option would be 110.6 kW times the levelized 25-year capacity rate of $115.35/kW-year, or $12,757.71.

The second option is available only for wind, solar, and hydroelectric QF facilities. QFs selecting this option begin the five-year rolling average using default capacity contributions. The default capacity contribution is 5% of nameplate capacity for QF wind facilities, 7.8% of nameplate capacity for QF solar facilities, and 11.1% of nameplate capacity for QF hydroelectric facilities. The first year of the contract, the payment is based upon four years of the appropriate default capacity contribution (listed above) and the measured capacity contribution for year one, using 85% exceedance. For contract year two, the payment would be based upon

the first two years of measured 85% exceedance and three years of the appropriate default capacity contribution. From that point forward, the default capacity contribution would continue to roll off and actual measurements would continue to roll on resulting in a rolling five-year average, as in the first option. Using the example from the graph above, the first year capacity payment to the hypothetical wind project under this option would be the average calculated as (4*5%*3,000 kW+ 110.6 kW)/5, or 142.12 kW times the levelized 25-year capacity rate of $115.35/kW-year, or $16,393.54.

Measured capacity contributions for both of the above options would be calculated within 60 days following the meter read after the anniversary of the QF's commercial operation date, and the annual capacity payment would be included in the QF's next billing cycle.

Q. How were the default capacity contributions derived?

A. Exceedance analysis was used with historic load and production data to arrive at the default capacity contributions. The capacity contributions for wind, solar, and hydroelectric were developed from historical data for wind and hydroelectric, and from modeled solar production data for solar QF resources. Opinions differ as to the capacity contribution of intermittent QF resources; therefore it is important to note that the use of the default

capacity values is simply an option available to QF developers; it is not a mandate.

QF-1 Tariff Option 2 Revisions

Q. What is NorthWestern's proposal regarding the QF-1 Tariff Option 2(a) rate?

A. NorthWestern proposes to remove Option 2(a) from the QF-1 Tariff. Option 2(a) became effective on July 31, 2007, and to date no QF has opted to take service under this rate. While there are publicly available postings of the peak prices provided in Option 2(b), the few developers that reviewed rate Option 2(a) are hesitant since there is no publicly available data against which to review transactions behind a rate solely applicable to NorthWestern. Additionally, this tariff offering requires monthly filings that use administrative resources that could be used more effectively.

Other QF-1 Tariff Revisions

Q. Other than the changes to Option 1 and Option 2(a) previously discussed, do you propose any other revisions to the QF-1 Tariff?

A. Yes. Several additional changes are being proposed to make the QF-1 Tariff more understandable. A definition for the term "Contract Length" has been added to provide clarity with respect to which Option 1 rates apply to a QF with a contract term not stated in whole years. Additionally,

several qualifiers in the tariff have been struck. The qualifiers distinguished QFs with Option 3 rates in their contracts from those with Option 1 or 2 rates in their contracts. Per Commission order, Option 3 is no longer offered; therefore, these qualifiers are no longer needed.

Q. Have you revised NorthWestern Schedule No. QF-1 Tariff to detail your proposed changes?

A. Yes. NorthWestern's proposed Schedule No. QF-1 Tariff is provided as Appendix 1 to NorthWestern's Application in this docket and a redlined version is provided as Appendix 2.

Q. Does this conclude your testimony?

A. Yes, it does.

Blended Market-Combined Cycle Plant Approach
Approved in Docket No. D2012.1.3

D2012.1.3 Compliance Filing Electricity and Natural Gas Price Forecasts

Year	Annual Capital	Fixed O&M 2.5%	Total fixed	Variable O&M 2.5%	Natural Gas Cost Forecast	Fuel Cost 6.843	Market Price	Total Cost
	($/Kw-yr)	($/kW-yr)	($/kW-yr)	($/kWh)	($/MMBtu)	($/kWh)	($/kWh)	($/kWh)
2012								-
2013							0.02920	0.02920
2014							0.02989	0.02989
2015							0.04232	0.04232
2016							0.04520	0.04520
2017							0.04861	0.04861
2018	150.12	12.41	162.53	0.00308	5.60	0.03831		0.06200
2019	150.12	12.72	162.85	0.00316	5.80	0.03970		0.06352
2020	150.12	13.04	163.16	0.00324	6.01	0.04115		0.06509
2021	150.12	13.37	163.49	0.00332	6.28	0.04300		0.06705
2022	150.12	13.70	163.82	0.00340	6.69	0.04578		0.06996
2023	150.12	14.04	164.17	0.00349	7.08	0.04846		0.07277
2024	150.12	14.40	164.52	0.00357	7.37	0.05041		0.07485
2025	150.12	14.76	164.88	0.00366	7.62	0.05214		0.07672
2026	150.12	15.12	165.25	0.00376	7.97	0.05457		0.07928
2027	150.12	15.50	165.62	0.00385	8.23	0.05631		0.08117
2028	150.12	15.89	166.01	0.00395	8.57	0.05862		0.08363
2029	150.12	16.29	166.41	0.00404	8.85	0.06055		0.08570
2030	150.12	16.69	166.82	0.00415	9.17	0.06272		0.08802
2031	150.12	17.11	167.23	0.00425	9.55	0.06538		0.09084
2032	150.12	17.54	167.66	0.00436	9.88	0.06764		0.09326
2033	150.12	17.98	168.10	0.00446	10.30	0.07047		0.09626
2034	150.12	18.43	168.55	0.00458	10.92	0.07476		0.10071
2035	150.12	18.89	169.01	0.00469	11.61	0.07942		0.10555
2036	150.12	19.36	169.48	0.00481	12.46	0.08524		0.11154
							2013-2016 3-year levelized cost:	0.04638
							2013-2036 24-year levelized cost:	0.06235

2011 RPP Inflation:	2.5%
2011 RPP ICC:	7.92%
On-Peak hours/year:	2038
Wind capacity value	5%

QF-1 Tariff Rates:	**D2012.1.3 Compliance Filing Forecasts**
Option 1(a): Long-term non-wind (19 mo. - 25 year contracts)	
Off-Peak Rate:	$0.05314 $/kWh
On Peak Rate:	$0.09273 $/kWh
Option 1(b): Short-term (1 mo. - 18 mo. contracts)	
All hours:	$0.04638 $/kWh
Option 1(c): Long-term wind (19 mo. - 25 year contracts)	
Off-Peak Rate:	$0.05314
On Peak Rate:	$0.05850

Annual Average Rate Change:	Option 1(a)	Option 1(c)
D2012.1.3 Rate:	$0.06235	$0.05439
Calculated Rate:	$0.06235	$0.05439
Change:	0.0%	0.0%

Blended Market-Combined Cycle Plant Approach
Approved in Docket No. D2012.1.3

2015 Resource Plan Electricity and Natural Gas Price Forecasts

Year	Annual Capital	Fixed O&M 2.5%	Total fixed	Variable O&M 2.5%	Natural Gas Cost Forecast	Fuel Cost 6.843	Market Price	Total Cost
	($/Kw-yr)	($/kW-yr)	($/kW-yr)	($/kWh)	($/MMBtu)	($/kWh)	($/kWh)	($/kWh)
2012								-
2013							0.02943	0.02943
2014							0.03074	0.03074
2015							0.02045	0.02045
2016							0.01711	0.01711
2017							0.01991	0.01991
2018	150.12	12.41	162.53	0.00308	2.84	0.01945		0.04315
2019	150.12	12.72	162.85	0.00316	3.00	0.02055		0.04437
2020	150.12	13.04	163.16	0.00324	3.14	0.02146		0.04539
2021	150.12	13.37	163.49	0.00332	3.24	0.02220		0.04626
2022	150.12	13.70	163.82	0.00340	3.36	0.02297		0.04715
2023	150.12	14.04	164.17	0.00349	3.47	0.02378		0.04809
2024	150.12	14.40	164.52	0.00357	3.60	0.02461		0.04906
2025	150.12	14.76	164.88	0.00366	3.72	0.02549		0.05006
2026	150.12	15.12	165.25	0.00376	3.86	0.02639		0.05111
2027	150.12	15.50	165.62	0.00385	4.00	0.02734		0.05220
2028	150.12	15.89	166.01	0.00395	4.14	0.02833		0.05333
2029	150.12	16.29	166.41	0.00404	4.29	0.02935		0.05450
2030	150.12	16.69	166.82	0.00415	4.45	0.03042		0.05573
2031	150.12	17.11	167.23	0.00425	4.61	0.03154		0.05700
2032	150.12	17.54	167.66	0.00436	4.78	0.03269		0.05832
2033	150.12	17.98	168.10	0.00446	4.95	0.03390		0.05969
2034	150.12	18.43	168.55	0.00458	5.14	0.03516		0.06112
2035	150.12	18.89	169.01	0.00469	5.33	0.03647		0.06260
2036	150.12	19.36	169.48	0.00481	5.53	0.03784		0.06414
							2013-2016 3-year levelized cost:	0.03199
							2013-2036 24-year levelized cost:	0.04040

2011 RPP Inflation:	2.5%
2011 RPP ICC:	7.92%
On-Peak hours/year:	2038
Wind capacity value	5%

QF-1 Tariff Rates:	**2015 RPP Forecasts**
Option 1(a): Long-term non-wind (19 mo. - 25 year contracts)	
Off-Peak Rate:	$0.03119 $/kWh
On Peak Rate:	$0.07078 $/kWh
Option 1(b): Short-term (1 mo. - 18 mo. contracts)	
All hours:	$0.03199 $/kWh
Option 1(c): Long-term wind (19 mo. - 25 year contracts)	
Off-Peak Rate:	$0.03119
On Peak Rate:	$0.03655

Annual Average Rate Change:	Option 1(a)	Option 1(c)
D2012.1.3 Rate:	$0.06235	$0.05439
Calculated Rate:	$0.04040	$0.03244
Change:	-35.2%	-40.4%

Avoided Cost Energy Rates
Without Transfer of Environmental Benefits

Length of Contract	Hydroelectric and Other QF	Wind QF	Solar QF
(years)	($/kWh)	($/kWh)	($/kWh)
1	$0.01672	$0.01694	$0.01854
2	$0.01731	$0.01744	$0.01917
3	$0.01782	$0.01786	$0.01980
4	$0.01825	$0.01832	$0.02031
5	$0.01895	$0.01898	$0.02114
6	$0.01957	$0.01957	$0.02185
7	$0.02014	$0.02012	$0.02248
8	$0.02035	$0.02035	$0.02272
9	$0.02064	$0.02068	$0.02301
10	$0.02106	$0.02121	$0.02340
11	$0.02148	$0.02167	$0.02380
12	$0.02189	$0.02209	$0.02426
13	$0.02232	$0.02256	$0.02470
14	$0.02275	$0.02302	$0.02515
15	$0.02317	$0.02346	$0.02559
16	$0.02358	$0.02389	$0.02601
17	$0.02399	$0.02432	$0.02644
18	$0.02442	$0.02477	$0.02689
19	$0.02483	$0.02521	$0.02734
20	$0.02526	$0.02567	$0.02779
21	$0.02569	$0.02612	$0.02823
22	$0.02614	$0.02661	$0.02868
23	$0.02659	$0.02710	$0.02913
24	$0.02703	$0.02770	$0.02971
25	$0.02746	$0.02829	$0.03027

Avoided Cost Energy Rates
With Transfer of Environmental Benefits

Length of Contract	Hydroelectric and Other QF	Wind QF	Solar QF
(years)	($/kWh)	($/kWh)	($/kWh)
1	$0.01672	$0.01694	$0.01854
2	$0.01731	$0.01744	$0.01917
3	$0.01782	$0.01786	$0.01980
4	$0.01825	$0.01832	$0.02031
5	$0.02027	$0.02062	$0.02243
6	$0.02177	$0.02231	$0.02404
7	$0.02298	$0.02367	$0.02527
8	$0.02383	$0.02475	$0.02596
9	$0.02459	$0.02574	$0.02662
10	$0.02546	$0.02683	$0.02746
11	$0.02629	$0.02781	$0.02823
12	$0.02716	$0.02877	$0.02913
13	$0.02797	$0.02965	$0.02998
14	$0.02886	$0.03058	$0.03094
15	$0.02977	$0.03149	$0.03188
16	$0.03063	$0.03237	$0.03277
17	$0.03148	$0.03323	$0.03364
18	$0.03229	$0.03405	$0.03447
19	$0.03307	$0.03485	$0.03528
20	$0.03385	$0.03564	$0.03608
21	$0.03459	$0.03641	$0.03684
22	$0.03531	$0.03715	$0.03758
23	$0.03601	$0.03786	$0.03830
24	$0.03670	$0.03866	$0.03910
25	$0.03736	$0.03943	$0.03988

Avoided Cost
Capacity Rates

Length of Contract	All QF Resources
(years)	($/kW-Year)
1	$0.00
2	$9.29
3	$17.98
4	$26.11
5	$33.72
6	$40.85
7	$47.51
8	$53.75
9	$59.59
10	$65.05
11	$70.16
12	$74.95
13	$79.43
14	$83.62
15	$87.55
16	$91.22
17	$94.66
18	$97.88
19	$100.89
20	$103.72
21	$106.36
22	$108.83
23	$111.15
24	$113.32
25	$115.35

Avoided Cost of Energy - Without Transfer of Environmental Benefits

Hydroelectric and Other QF Resources				Intermittent Wind				Intermittent Solar			
Year	Avoided Cost of Energy ($/MWh)	Contract Length (years)	Levelized Energy Rate By Contract Length ($/kWh)	Year	Avoided Cost of Energy ($/kWh)	Contract Length (years)	Levelized Energy Rate By Contract Length ($/kWh)	Year	Avoided Cost of Energy ($/kWh)	Contract Length (years)	Levelized Energy Rate By Contract Length ($/kWh)
2018	$0.01672	1	$0.01672	2018	$0.01694	1	$0.01694	2018	$0.01854	1	$0.01854
2019	$0.01793	2	$0.01731	2019	$0.01798	2	$0.01744	2019	$0.01985	2	$0.01917
2020	$0.01898	3	$0.01782	2020	$0.01880	3	$0.01786	2020	$0.02118	3	$0.01980
2021	$0.01972	4	$0.01825	2021	$0.01991	4	$0.01832	2021	$0.02207	4	$0.02031
2022	$0.02229	5	$0.01895	2022	$0.02211	5	$0.01898	2022	$0.02508	5	$0.02114
2023	$0.02334	6	$0.01957	2023	$0.02321	6	$0.01957	2023	$0.02627	6	$0.02185
2024	$0.02453	7	$0.02014	2024	$0.02434	7	$0.02012	2024	$0.02729	7	$0.02248
2025	$0.02232	8	$0.02035	2025	$0.02240	8	$0.02035	2025	$0.02496	8	$0.02272
2026	$0.02381	9	$0.02064	2026	$0.02439	9	$0.02068	2026	$0.02612	9	$0.02301
2027	$0.02650	10	$0.02106	2027	$0.02799	10	$0.02121	2027	$0.02851	10	$0.02340
2028	$0.02758	11	$0.02148	2028	$0.02845	11	$0.02167	2028	$0.02970	11	$0.02380
2029	$0.02890	12	$0.02189	2029	$0.02917	12	$0.02209	2029	$0.03202	12	$0.02426
2030	$0.03067	13	$0.02232	2030	$0.03157	13	$0.02256	2030	$0.03317	13	$0.02470
2031	$0.03191	14	$0.02275	2031	$0.03295	14	$0.02302	2031	$0.03474	14	$0.02515
2032	$0.03341	15	$0.02317	2032	$0.03430	15	$0.02346	2032	$0.03630	15	$0.02559
2033	$0.03459	16	$0.02358	2033	$0.03548	16	$0.02389	2033	$0.03743	16	$0.02601
2034	$0.03628	17	$0.02399	2034	$0.03704	17	$0.02432	2034	$0.03931	17	$0.02644
2035	$0.03844	18	$0.02442	2035	$0.03964	18	$0.02477	2035	$0.04179	18	$0.02689
2036	$0.04002	19	$0.02483	2036	$0.04126	19	$0.02521	2036	$0.04363	19	$0.02734
2037	$0.04258	20	$0.02526	2037	$0.04406	20	$0.02567	2037	$0.04573	20	$0.02779
2038	$0.04448	21	$0.02569	2038	$0.04586	21	$0.02612	2038	$0.04767	21	$0.02823
2039	$0.04807	22	$0.02614	2039	$0.05059	22	$0.02661	2039	$0.05052	22	$0.02868
2040	$0.05004	23	$0.02659	2040	$0.05249	23	$0.02710	2040	$0.05272	23	$0.02913
2041	$0.05231	24	$0.02703	2041	$0.06249	24	$0.02770	2041	$0.06297	24	$0.02971
2042	$0.05422	25	$0.02746	2042	$0.06500	25	$0.02829	2042	$0.06544	25	$0.03027

Avoided Cost of Energy - With Transfer of Environmental Benefits

Hydroelectric and Other QF Resources				Intermittent Wind				Intermittent Solar			
Year	Avoided Cost of Energy ($/MWh)	Contract Length (years)	Levelized Energy Rate By Contract Length ($/kWh)	Year	Avoided Cost of Energy ($/kWh)	Contract Length (years)	Levelized Energy Rate By Contract Length ($/kWh)	Year	Avoided Cost of Energy ($/kWh)	Contract Length (years)	Levelized Energy Rate By Contract Length ($/kWh)
2018	$0.01672	1	$0.01672	2018	$0.01694	1	$0.01694	2018	$0.01854	1	$0.01854
2019	$0.01793	2	$0.01731	2019	$0.01798	2	$0.01744	2019	$0.01985	2	$0.01917
2020	$0.01898	3	$0.01782	2020	$0.01880	3	$0.01786	2020	$0.02118	3	$0.01980
2021	$0.01972	4	$0.01825	2021	$0.01991	4	$0.01832	2021	$0.02207	4	$0.02031
2022	$0.02984	5	$0.02027	2022	$0.03151	5	$0.02062	2022	$0.03252	5	$0.02243
2023	$0.03103	6	$0.02177	2023	$0.03277	6	$0.02231	2023	$0.03393	6	$0.02404
2024	$0.03226	7	$0.02298	2024	$0.03402	7	$0.02367	2024	$0.03476	7	$0.02527
2025	$0.03167	8	$0.02383	2025	$0.03484	8	$0.02475	2025	$0.03232	8	$0.02596
2026	$0.03303	9	$0.02459	2026	$0.03656	9	$0.02574	2026	$0.03393	9	$0.02662
2027	$0.03659	10	$0.02546	2027	$0.04082	10	$0.02683	2027	$0.03815	10	$0.02746
2028	$0.03855	11	$0.02629	2028	$0.04239	11	$0.02781	2028	$0.03969	11	$0.02823
2029	$0.04187	12	$0.02716	2029	$0.04497	12	$0.02877	2029	$0.04434	12	$0.02913
2030	$0.04346	13	$0.02797	2030	$0.04656	13	$0.02965	2030	$0.04621	13	$0.02998
2031	$0.04827	14	$0.02886	2031	$0.05056	14	$0.03058	2031	$0.05168	14	$0.03094
2032	$0.05167	15	$0.02977	2032	$0.05359	15	$0.03149	2032	$0.05458	15	$0.03188
2033	$0.05394	16	$0.03063	2033	$0.05613	16	$0.03237	2033	$0.05699	16	$0.03277
2034	$0.05674	17	$0.03148	2034	$0.05881	17	$0.03323	2034	$0.05949	17	$0.03364
2035	$0.05906	18	$0.03229	2035	$0.06119	18	$0.03405	2035	$0.06194	18	$0.03447
2036	$0.06181	19	$0.03307	2036	$0.06420	19	$0.03485	2036	$0.06503	19	$0.03528
2037	$0.06482	20	$0.03385	2037	$0.06744	20	$0.03564	2037	$0.06790	20	$0.03608
2038	$0.06754	21	$0.03459	2038	$0.07007	21	$0.03641	2038	$0.07066	21	$0.03684
2039	$0.06995	22	$0.03531	2039	$0.07269	22	$0.03715	2039	$0.07320	22	$0.03758
2040	$0.07290	23	$0.03601	2040	$0.07542	23	$0.03786	2040	$0.07615	23	$0.03830
2041	$0.07608	24	$0.03670	2041	$0.08446	24	$0.03866	2041	$0.08498	24	$0.03910
2042	$0.07891	25	$0.03736	2042	$0.08774	25	$0.03943	2042	$0.08837	25	$0.03988

Avoided Cost of Capacity

Year	Annual Capital ($/kW-yr)	Fixed O&M 2.0% ($/kW-yr)	Avoided Capacity ($/kW-yr)	Year (years)	Levelized Capacity Rate By Contract Length ($/kW-yr)
2018	-	-	-	1	0.00
2019	139.99	11.37	151.36	2	9.29
2020	139.99	11.59	151.58	3	17.98
2021	139.99	11.82	151.82	4	26.11
2022	139.99	12.06	152.05	5	33.72
2023	139.99	12.30	152.29	6	40.85
2024	139.99	12.55	152.54	7	47.51
2025	139.99	12.80	152.79	8	53.75
2026	139.99	13.06	153.05	9	59.59
2027	139.99	13.32	153.31	10	65.05
2028	139.99	13.58	153.57	11	70.16
2029	139.99	13.85	153.85	12	74.95
2030	139.99	14.13	154.12	13	79.43
2031	139.99	14.41	154.41	14	83.62
2032	139.99	14.70	154.69	15	87.55
2033	139.99	15.00	154.99	16	91.22
2034	139.99	15.30	155.29	17	94.66
2035	139.99	15.60	155.59	18	97.88
2036	139.99	15.91	155.91	19	100.89
2037	139.99	16.23	156.22	20	103.72
2038	139.99	16.56	156.55	21	106.36
2039	139.99	16.89	156.88	22	108.83
2040	139.99	17.23	157.22	23	111.15
2041	139.99	17.57	157.56	24	113.32
2042	139.99	17.92	157.91	25	115.35

NorthWestern Energy 2015 Resource Procurement Plan
Resource Cost Summary
(2015$)

Resource Description	*Fuel Source*	*Technology*	*Nameplate Capacity (MW)*	*Net Capacity @ 3,500 feet (MW)*	*Capital Cost $ / kW*	*Fixed O&M $ / kW-yr*	*Variable O&M $ / MWh*	*Heat Rate Btu / kWh*
Geothermal	Coal							
Hydro New Small	Coal							
Hydro Pumped Storage	Coal							
CCCT (1x1)	Natural Gas	GE 7FA.05 ACC1	338	308	$1,400	$9.75	$2.50	6,528
SCCT - Small Aeroderivative	Natural Gas	PW FT8	60	53	$917	$6.05	$4.60	10,500
SCCT - Large Aeroderivative	Natural Gas	GE LMS100	110	93	$1,087	$17.06	$3.47	8,867
SCCT - Frame	Natural Gas	GE 7EA	90	79	$997	$11.73	$3.20	11,286
Internal Combustion - Recips	Natural Gas	Wartsila 18V50SG	18	18	$1,280	$10.50	$5.14	8,314
Solar PV2	Solar		25	25	$3,176	$43.00	$0.00	n/a
Wind3	Wind		25	25	$1,980	$37.50	$0.00	n/a
Hydro - Montana Small Scale	Water		15	15	$1,600	$0.00	$7.50	n/a
Battery		lithium ion	18	18	$600	$9.60	$1.82	n/a

1 ACC = Air Cooled Condenser
2 Solar fixed O&M is priced in $/kWdc.
3 Based on build-transfer bids received in NWE's 2015 CREP RFP

ANNUAL NOMINAL LEVELIZED RESOURCE FIXED COSTS
$/KW INSTALLED

Resource	MW	Life	TPVRR Factor	LVLCR Factor	Carrying Charge	2015$ Capital/kW	Annual Nominal Levelized Cost: Inflation = 2.0% 2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Combined Cycle (natural gas)1	307.7	30	1,250	0.08084	10.10%	$ 1,400	$ 144	$ 147	$ 150	$ 153	$ 156	$ 159	$ 162	$ 166	$ 169	$ 172	$ 176
Small Aeroderivative (natural gas)	53	30	1,250	0.08084	10.10%	$ 917	$ 94	$ 96	$ 98	$ 100	$ 102	$ 104	$ 106	$ 109	$ 111	$ 113	$ 115
Large Aeroderivative (natural gas)	93.2	30	1,250	0.08084	10.10%	$ 1,087	$ 112	$ 114	$ 117	$ 119	$ 121	$ 124	$ 126	$ 129	$ 131	$ 134	$ 137
Frame Turbine (natural gas)	79.2	30	1,250	0.08084	10.10%	$ 997	$ 103	$ 105	$ 107	$ 109	$ 111	$ 113	$ 116	$ 118	$ 120	$ 123	$ 125
IC - Recip Engine (natural gas)	18.4	30	1,250	0.08084	10.10%	$ 1,280	$ 132	$ 135	$ 137	$ 140	$ 143	$ 146	$ 149	$ 152	$ 155	$ 158	$ 161
Solar PV2	25	30	1,250	0.08084	10.10%	$ 3,176	$ 311	$ 300	$ 296	$ 294	$ 293	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292
Wind3	25	30	1,250	0.08084	10.10%	$ 1,980	$ 199	$ 198	$ 197	$ 196	$ 195	$ 194	$ 193	$ 192	$ 191	$ 190	$ 189
Hydro - Montana Small Scale	15	40	1,246	0.07528	9.38%	$ 1,600	$ 153	$ 156	$ 159	$ 163	$ 166	$ 169	$ 172	$ 176	$ 179	$ 183	$ 187
Battery	18	7	1,118	0.18575	20.77%	$ 654	$ 60	$ 56	$ 53	$ 50	$ 47	$ 44	$ 41	$ 39	$ 37	$ 34	$ 32

1 ACC = Air Cooled Condenser
2 Solar is priced in $/kWdc.
3 Based on build-transfer bids received in NWE's 2015 CREP RFP

Resource Carrying Charges:

Marginal Cost of Capital: 7.03%

Resource Life	TPVRR	LVLCR	RCC
20	$1,213	0.09462	11.48%
30	$1,250	0.08084	10.10%
40	$1,246	0.07528	9.38%

WACC:

	Allocation	Cost / Return	Weighted Cost
Debt Capital	52%	4.3%	2.23%
Equity Capital	48%	10.0%	4.80%
WACC			7.03%

TPVRR = Total Present Value of Revenue Requirement

LVLCR = Levelized Cost Recovery Factor = Uniform Cost Recovery Factor
(i*(1+i)^n / (1+i)^n - 1)

RCC = Resource Carrying Charge

Comparison of Average Annual Rates

Current Average Annual Rates for 25-Year Contracts		
Resource Type	Without Carbon	With Carbon
Non-Wind [1]	$0.06235	NA
Wind [1]	$0.05439	NA
Non-Wind (Solar) [2]	$0.06609	NA

[1] Annual average rate

[2] Option 1(a) Rate - modeled production, page 9, Exhibit__(JBB-2)

Proposed Average Annual Rates for 25-Year Contracts		
Resource Type	Without Carbon	With Carbon
Hydroelectric and Other QF [3]	$0.02984	$0.03974
Wind [4]	$0.03002	$0.04116
Solar [5]	$0.03405	$0.04366

[3] 62% annual capacity factor, 11.1% capacity contribution

[4] 38% annual capacity factor, 5% capacity contribution

[5] Modeled solar PV production, pages 9-10, Exhibit__(JBB-2)

Calculation of Overpayments to Solar PV Projects

Without Environmental Benefits

	Anaconda	Billings Broadview	Townsend	Great Falls	Bozeman Belgrade	Missoula	Average
NREL System Advisory Model - Production							
On Peak Production (kWh)	2,455,668	2,281,279	2,427,902	2,317,410	2,215,771	2,299,676	
Off Peak Production (kWh)	4,998,079	4,669,833	4,887,533	4,841,221	4,734,521	4,659,905	
Annual Production	7,453,747	6,951,112	7,315,435	7,158,631	6,950,292	6,959,581	7,131,466
Solar PV Revenues at Current QF-1 Option 1(a) Rates							
On Peak Rate ($/kWh)	$0.09273	$0.09273	$0.09273	$0.09273	$0.09273	$0.09273	
Off Peak Rate ($/kWh)	$0.05314	$0.05314	$0.05314	$0.05314	$0.05314	$0.05314	
On Peak Revenues	$227,714	$211,543	$225,139	$214,893	$205,468	$213,249	
Off Peak Revenues	$265,598	$248,155	$259,724	$257,262	$251,592	$247,627	
Total Revenues	$493,312	$459,698	$484,863	$472,156	$457,061	$460,876	$471,328
Ave. Rate	$0.06618	$0.06613	$0.06628	$0.06596	$0.06576	$0.06622	**$0.06609**
Proposed Solar Rates and Revenues							
Energy Rate ($/kWh)	$0.03027	$0.03027	$0.03027	$0.03027	$0.03027	$0.03027	
Energy Revenues	$225,625	$210,410	$221,438	$216,692	$210,385	$210,667	
Capadity Rate ($/kW-year)	$115.35	$115.35	$115.35	$115.35	$115.35	$115.35	
7.8% Capacity Contr. (kW)	234	234	234	234	234	234	
Capacity Revenues	$26,992	$26,992	$26,992	$26,992	$26,992	$26,992	
Total Revenues	$252,617	$237,402	$248,430	$243,684	$237,377	$237,658	$242,861
Ave. Rate	$0.03389	$0.03415	$0.03396	$0.03404	$0.03415	$0.03415	**$0.03405**

Difference in Revenues over Life of 25-Year Contract - Including Degradation of Energy Revenues due to Solar Degradation

Contract Year	Solar Degradation (0.75%/Yr)	Anaconda ($)	Broadview ($)	Townsend ($)	Great Falls ($)	Belgrade ($)	Missoula ($)	Average ($)
1	100.00%	$240,695	$222,296	$236,433	$228,472	$219,684	$223,218	
2	99.25%	$238,688	$220,426	$234,457	$226,556	$217,834	$221,341	
3	98.50%	$236,680	$218,557	$232,481	$224,640	$215,984	$219,465	
4	97.75%	$234,672	$216,687	$230,506	$222,724	$214,133	$217,588	
5	97.00%	$232,665	$214,817	$228,530	$220,808	$212,283	$215,712	
6	96.25%	$230,657	$212,948	$226,554	$218,892	$210,433	$213,835	
7	95.50%	$228,649	$211,078	$224,579	$216,976	$208,583	$211,958	
8	94.75%	$226,642	$209,208	$222,603	$215,060	$206,733	$210,082	
9	94.00%	$224,634	$207,339	$220,627	$213,144	$204,883	$208,205	
10	93.25%	$222,626	$205,469	$218,652	$211,228	$203,033	$206,329	
11	92.50%	$220,619	$203,599	$216,676	$209,312	$201,183	$204,452	
12	91.75%	$218,611	$201,730	$214,700	$207,396	$199,333	$202,576	
13	91.00%	$216,603	$199,860	$212,725	$205,480	$197,483	$200,699	
14	90.25%	$214,596	$197,990	$210,749	$203,564	$195,633	$198,822	
15	89.50%	$212,588	$196,121	$208,773	$201,649	$193,783	$196,946	
16	88.75%	$210,580	$194,251	$206,797	$199,733	$191,933	$195,069	
17	88.00%	$208,573	$192,381	$204,822	$197,817	$190,083	$193,193	
18	87.25%	$206,565	$190,512	$202,846	$195,901	$188,233	$191,316	
19	86.50%	$204,557	$188,642	$200,870	$193,985	$186,382	$189,440	
20	85.75%	$202,550	$186,772	$198,895	$192,069	$184,532	$187,563	
21	85.00%	$200,542	$184,903	$196,919	$190,153	$182,682	$185,686	
22	84.25%	$198,534	$183,033	$194,943	$188,237	$180,832	$183,810	
23	83.50%	$196,527	$181,163	$192,968	$186,321	$178,982	$181,933	
24	82.75%	$194,519	$179,294	$190,992	$184,405	$177,132	$180,057	
25	82.00%	$192,512	$177,424	$189,016	$182,489	$175,282	$178,180	
	Total Overpay:	**$5,415,084**	**$4,996,499**	**$5,318,113**	**$5,137,012**	**$4,937,071**	**$5,017,475**	**$5,136,876**
	NPV Overpay:	**$2,596,115**	**$2,396,110**	**$2,549,781**	**$2,463,249**	**$2,367,715**	**$2,406,133**	**$2,463,184**

No. Solar PV Projects	**33**	**33**	**33**	**33**	**33**	**33**	**33**
Grand Total Overpay:	**$178,697,765**	**$164,884,474**	**$175,497,730**	**$169,521,395**	**$162,923,353**	**$165,576,683**	**$169,516,900**
Grand Total NPV:	**$85,671,796**	**$79,071,637**	**$84,142,780**	**$81,287,215**	**$78,134,590**	**$79,402,383**	**$81,285,067**

Calculation of Average Annual Rate Solar PV Projects

With Environmental Benefits

	Anaconda	Billings Broadview	Townsend	Great Falls	Bozeman Belgrade	Missoula	Average
NREL System Advisory Model - Production							
On Peak Production (kWh)	2,455,668	2,281,279	2,427,902	2,317,410	2,215,771	2,299,676	
Off Peak Production (kWh)	4,998,079	4,669,833	4,887,533	4,841,221	4,734,521	4,659,905	
Annual Production	7,453,747	6,951,112	7,315,435	7,158,631	6,950,292	6,959,581	7,131,466
Solar PV Revenues at Current QF-1 Option 1(a) Rates							
On Peak Rate ($/kWh)	$0.09273	$0.09273	$0.09273	$0.09273	$0.09273	$0.09273	
Off Peak Rate ($/kWh)	$0.05314	$0.05314	$0.05314	$0.05314	$0.05314	$0.05314	
On Peak Revenues	$227,714	$211,543	$225,139	$214,893	$205,468	$213,249	
Off Peak Revenues	$265,598	$248,155	$259,724	$257,262	$251,592	$247,627	
Total Revenues	$493,312	$459,698	$484,863	$472,156	$457,061	$460,876	$471,328
Ave. Rate	$0.06618	$0.06613	$0.06628	$0.06596	$0.06576	$0.06622	**$0.06609**
Proposed Solar Rates and Revenues							
Energy Rate ($/kWh)	$0.03988	$0.03988	$0.03988	$0.03988	$0.03988	$0.03988	
Energy Revenues	$297,255	$277,210	$291,740	$285,486	$277,178	$277,548	
Capadity Rate ($/kW-year)	$115.35	$115.35	$115.35	$115.35	$115.35	$115.35	
7.8% Capacity Contr. (kW)	234	234	234	234	234	234	
Capacity Revenues	$26,992	$26,992	$26,992	$26,992	$26,992	$26,992	
Total Revenues	$324,247	$304,202	$318,731	$312,478	$304,170	$304,540	$311,395
Ave. Rate	$0.04350	$0.04376	$0.04357	$0.04365	$0.04376	$0.04376	**$0.04366**

Department of Public Service Regulation
Montana Public Service Commission
Docket No. D2016.5.39
Avoided Cost Rate Filing
NorthWestern Energy

PREFILED DIRECT TESTIMONY

OF LUKE P. HANSEN

ON BEHALF OF NORTHWESTERN ENERGY

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Witness Information

Q. Please state your name and business address.

A. My name is Luke P. Hansen, and my business address is 11 East Park Street, Butte, Montana 59701.

Q. By whom are you employed and in what capacity?

A. I am employed by NorthWestern Energy ("NorthWestern") as an analyst in Energy Supply.

Q. Please summarize your educational and employment experiences.

A. I graduated from Montana Tech in 2003 with a Bachelor of Science degree in Business and Information Technology. Prior to joining NorthWestern, I was a supervisor of Gas Supply at Cascade Natural Gas. I joined NorthWestern in November 2013 as an Energy Supply Analyst. In this position, I am directly involved in the development of the Electricity Supply Resource Procurement Plan ("Plan"), the Montana Renewable Portfolio Standard ("RPS") Compliance filing, and other regulatory matters. I am the NorthWestern employee who is trained and responsible for utilizing the PowerSimm™ software necessary to model NorthWestern's electric supply portfolio and perform specific calculations including avoided costs.

Purpose of Testimony

Q. What is the purpose of your testimony in this docket?

A. The purpose of my testimony is to detail the energy rates that were calculated for wind, solar, and hydro Qualifying Facility ("QF") resources using the PowerSimm™ model capabilities. The energy rates calculated for hydro QFs would also apply to all other non-wind/non-solar QFs as discussed in the testimony of John Bushnell.

NorthWestern's Current Avoided Cost for Energy

Q. Has NorthWestern specifically conducted current energy avoided cost calculations for this QF-1 Tariff filing?

A. Yes.

Q. What are the long-term purchase prices of energy that NorthWestern can avoid by purchasing the outputs of various types of QF projects under the QF-1 Tariff?

A. The costs for energy, exclusive of wind integration costs and capacity value necessary to make firm energy deliveries, that NorthWestern can avoid by purchasing the output of various types of QF projects under the QF-1 Tariff, are detailed in Table 1 below:

Table 1

Resource	Levelized energy rate without carbon price adder ($/MWh)	Levelized energy rate with carbon price adder ($/MWh)
Wind	$ 28.29	$ 39.43
Solar	$ 30.27	$ 39.88
Hydro/Other	$ 27.46	$ 37.36

All of these are 25-year levelized avoided cost energy rates. Exhibit__(LPH-1) details the calculations of the avoided energy cost for a wind, a solar, and a hydro QF project using the PowerSimm™ modeling.

Q. Do these rates reflect the total avoided costs?

A. No. The energy rates proposed above do not include any deduction for wind or solar integration costs or any appropriate addition in value to properly account for contribution to capacity at time of peak loads. The total avoided costs are presented in the Prefiled Direct Testimony of John Bushnell.

Q. How did NorthWestern determine the levelized avoided costs for energy?

A. NorthWestern calculated the 25-year levelized avoided cost energy rates by modeling wind, solar, and hydro QF resources using the PowerSimm™ software. PowerSimm™ models the effect of changes to NorthWestern's energy supply portfolio and allows for analysis of potential additional resources. As further described below, PowerSimm™ first simulates the

hourly dispatch of each type of QF energy production, then separate models are run that include each type of QF energy production in NorthWestern's supply portfolio. Each of NorthWestern's supply portfolios including wind, solar, and hydro QF resources is then compared to the supply portfolio without the QF energy production. Only after this comparison is made can the value of each type of QF resource be properly calculated.

As described above, separate portfolio models were created for a wind resource, a solar resource, and a hydro resource. Each of the portfolios was independently analyzed against the portfolio without the QF resource. The portfolio without the QF resource is NorthWestern's RPS Compliance portfolio, which is the Economically Optimal Portfolio "EOP" that was identified in the 2015 Plan plus enough renewable resources to maintain RPS compliance through the proposed maximum contract term of 25 years.

Each type of a QF project's avoided cost energy rate is dependent on when the project estimates that it will be producing electricity that is delivered to NorthWestern's supply portfolio. For example, if the QF produces and delivers energy when NorthWestern's supply portfolio is short (i.e., when economic generation is less than load), the QF receives the market purchase price for electricity that NorthWestern would

otherwise have purchased. Alternatively, if the QF produces and delivers energy when NorthWestern's supply portfolio is long (i.e., when economic generation is greater than load) and the market price is higher than the variable cost of highest avoidable resource during that given hour, it receives the variable cost of that avoidable resource because that is the marginal resource to serve NorthWestern's load. Finally, if the QF produces and delivers energy when NorthWestern's supply portfolio is long and the market price is lower than the variable cost of the avoidable resource, it receives nothing. Table 2 below summarizes the different conditions under which a QF project could produce energy and the avoided cost energy rate that would be paid by NorthWestern under each scenario.

Table 2

Condition	Condition Definition	Avoided Cost energy rate paid for QF generation
Short	Economic generation is less than load.	The QF-1 avoided cost energy rate is market purchase price.
Long - 1	Economic generation is greater than load and market price is greater than avoidable resource with the highest variable cost.	The QF-1 avoided cost energy rate is the marginal cost of the unit to serve load which is the avoidable resource with the highest variable cost.
Long - 2	Economic generation is greater than load and market price is less than variable cost of the avoidable resource.	The QF-1 avoided cost energy rate is zero.

Determining whether the QF's estimated production offsets market purchases or offsets generation is accomplished by comparing a model of NorthWestern's supply portfolio without each type of QF energy production to a model of the supply portfolio with each type of the QF energy production using the PowerSimm™ model. The PowerSimm™ modeling output shows the market purchases and offset generation for the portfolios with and without each type of QF. A comparison of the two portfolios determines, by hour, if the QF project's estimated production offsets market purchases when NorthWestern's supply portfolio is short or offsets generation when the portfolio is long. The QF project's production that offsets purchases is multiplied by the corresponding market purchase price to determine the amount paid to the project. Production that offsets generation is multiplied by the corresponding avoidable resource with the highest variable cost during times when the market sales price is higher than the avoidable resource with the highest variable cost to determine the amount paid to the QF project. Production from the QF project during times that the portfolio is long and the market sales price is lower than the variable cost of the avoidable resource receives no value.

For each year, the total annual payment is divided by the total annual production to determine each type of QF project's total annual energy rate. The net present value of these annual rates is then calculated and

levelized over the 25 years for each type of QF project to determine the proposed energy rate.

Q. Did NorthWestern use the same market forecasts that were used in the 2015 Plan?

A. Yes. NorthWestern used the same forecasts that were used in the 2015 Plan. Table 3 below details the mean natural gas and heavy load, light load, and around the clock electricity forecasts that were used in the 2015 Plan.

Table 3

Mean Electricity & Natural Gas Price Forecasts Montana Delivery (includes base case carbon cost for electricity)				
Year	HL - On Peak ($/MWh - Nominal)	LL - Off Peak ($/MWh - Nominal)	Around the Clock ($/MWh - Nominal)	Natural Gas ($/MMBTu - Nominal)
2016	$19.38	$14.19	$17.10	$2.28
2017	$22.27	$16.91	$19.91	$2.63
2018	$24.18	$18.66	$21.75	$2.84
2019	$25.73	$19.85	$23.14	$3.00
2020	$27.34	$21.30	$24.68	$3.14
2021	$28.60	$22.31	$25.83	$3.24
2022	$41.91	$35.36	$39.03	$3.36
2023	$43.78	$36.95	$40.77	$3.47
2024	$45.72	$38.60	$42.59	$3.60
2025	$47.74	$40.33	$44.48	$3.72
2026	$49.85	$42.13	$46.45	$3.86
2027	$52.04	$44.01	$48.51	$4.00
2028	$54.33	$45.96	$50.65	$4.14
2029	$56.71	$47.99	$52.88	$4.29
2030	$59.19	$50.11	$55.19	$4.45
2031	$61.77	$52.31	$57.61	$4.61
2032	$64.46	$54.61	$60.12	$4.78
2033	$67.26	$57.00	$62.75	$4.95
2034	$70.18	$59.49	$65.48	$5.14
2035	$73.21	$62.08	$68.32	$5.33
20-Year Lev	$40.43	$33.32	$37.30	$3.52

Q. Does this conclude your testimony?

A. Yes, it does.

WACC 7.03% nominal, annual

Summary: NPV and Annualized $/MWh of Energy Avoided Costs, WITHOUT Carbon Price Impact

NPV Of Energy Costs	$	328.78	$/MWh
Levelized Payment	$	28.29	$/MWh

Summary Table: Annual Wind QF Generation and Energy Avoided Costs WITHOUT Carbon Price Impacts

Year	Generation (MWh)	Offset Generation (MWh)	Offset Purchases (MWh)	Average Offset Generation Price ($/MWh)	Average Offset Purchase Price ($/MWh)	Total Offset Generation Energy Avoided Cost ($)	Total Energy Avoided Cost of Purchases ($)	Total Energy Avoided Cost ($)	Average Energy Avoided Cost ($/MWh)
2018	39,471	23,414	16,057	$ 12.15	$ 23.92	$ 284,553	$ 384,052	$ 668,606	$ 16.94
2019	39,465	23,479	15,985	$ 13.22	$ 24.96	$ 310,433	$ 399,031	$ 709,464	$ 17.98
2020	39,471	23,769	15,702	$ 13.68	$ 26.56	$ 325,072	$ 416,992	$ 742,063	$ 18.80
2021	39,471	23,946	15,525	$ 14.64	$ 28.04	$ 350,564	$ 435,336	$ 785,900	$ 19.91
2022	39,471	21,679	17,792	$ 15.11	$ 30.64	$ 327,635	$ 545,080	$ 872,715	$ 22.11
2023	39,471	21,701	17,770	$ 16.09	$ 31.91	$ 349,248	$ 567,049	$ 916,297	$ 23.21
2024	39,471	20,864	18,607	$ 16.04	$ 33.65	$ 334,571	$ 626,213	$ 960,784	$ 24.34
2025	39,471	28,986	10,485	$ 18.28	$ 33.77	$ 529,870	$ 354,113	$ 883,984	$ 22.40
2026	39,471	28,815	10,656	$ 20.35	$ 35.29	$ 586,475	$ 376,041	$ 962,515	$ 24.39
2027	39,471	24,854	14,617	$ 22.71	$ 36.96	$ 564,549	$ 540,224	$ 1,104,772	$ 27.99
2028	39,471	26,608	12,863	$ 23.88	$ 37.89	$ 635,488	$ 487,379	$ 1,122,867	$ 28.45
2029	39,471	27,225	12,246	$ 25.41	$ 37.55	$ 691,664	$ 459,764	$ 1,151,428	$ 29.17
2030	39,471	27,635	11,836	$ 28.18	$ 39.48	$ 778,751	$ 467,346	$ 1,246,097	$ 31.57
2031	39,471	26,923	12,548	$ 29.20	$ 40.99	$ 786,203	$ 514,304	$ 1,300,507	$ 32.95
2032	39,471	26,793	12,679	$ 30.31	$ 42.73	$ 812,110	$ 541,816	$ 1,353,926	$ 34.30
2033	39,471	26,855	12,616	$ 31.16	$ 44.67	$ 836,895	$ 563,612	$ 1,400,507	$ 35.48
2034	39,425	26,573	12,852	$ 32.66	$ 46.10	$ 867,886	$ 592,486	$ 1,460,372	$ 37.04
2035	39,471	26,322	13,150	$ 35.34	$ 48.26	$ 930,080	$ 634,577	$ 1,564,657	$ 39.64
2036	39,471	25,825	13,646	$ 36.35	$ 50.56	$ 938,752	$ 689,959	$ 1,628,712	$ 41.26
2037	39,471	25,885	13,586	$ 39.57	$ 52.62	$ 1,024,241	$ 714,902	$ 1,739,142	$ 44.06
2038	39,471	25,901	13,570	$ 41.20	$ 54.75	$ 1,067,194	$ 743,014	$ 1,810,209	$ 45.86
2039	39,471	26,199	13,272	$ 47.17	$ 57.35	$ 1,235,840	$ 761,131	$ 1,996,970	$ 50.59
2040	39,471	26,586	12,885	$ 49.23	$ 59.23	$ 1,308,843	$ 763,161	$ 2,072,004	$ 52.49
2041	39,289	7,231	32,058	$ 40.83	$ 67.38	$ 295,252	$ 2,159,920	$ 2,455,172	$ 62.49
2042	39,288	7,258	32,030	$ 40.50	$ 70.55	$ 293,944	$ 2,259,656	$ 2,553,600	$ 65.00

WACC 7.03% nominal, annual

Summary: NPV and Annualized $/MWh of Energy Avoided Costs, WITH Carbon Price Impact

NPV Of Energy Costs $ 458.26 $/MWh
Levelized Payment $ 39.43 $/MWh

Summary Table: Annual Wind QF Generation and Energy Avoided Costs WITH Carbon Price Impacts

Year	Generation (MWh)	Offset Generation (MWh)	Offset Purchases (MWh)	Average Offset Generation Price ($/MWh)	Average Offset Purchase Price ($/MWh)	Total Offset Generation Energy Avoided Cost ($)	Total Energy Avoided Cost of Purchases ($)	Total Energy Avoided Cost ($)	Average Energy Avoided Cost ($/MWh)
2018	39,471	23,414	16,057	$ 12.15	$ 23.92	$ 284,553	$ 384,052	$ 668,606	$ 16.94
2019	39,465	23,479	15,985	$ 13.22	$ 24.96	$ 310,433	$ 399,031	$ 709,464	$ 17.98
2020	39,471	23,769	15,702	$ 13.68	$ 26.56	$ 325,072	$ 416,992	$ 742,063	$ 18.80
2021	39,471	23,946	15,525	$ 14.64	$ 28.04	$ 350,564	$ 435,336	$ 785,900	$ 19.91
2022	39,471	21,679	17,792	$ 24.03	$ 40.64	$ 520,874	$ 722,999	$ 1,243,873	$ 31.51
2023	39,471	21,701	17,770	$ 24.95	$ 42.33	$ 541,429	$ 752,124	$ 1,293,554	$ 32.77
2024	39,471	20,864	18,607	$ 24.66	$ 44.50	$ 514,610	$ 828,004	$ 1,342,614	$ 34.02
2025	39,471	28,986	10,485	$ 31.14	$ 45.07	$ 902,714	$ 472,545	$ 1,375,259	$ 34.84
2026	39,471	28,815	10,656	$ 32.67	$ 47.06	$ 941,494	$ 501,404	$ 1,442,899	$ 36.56
2027	39,471	24,854	14,617	$ 35.88	$ 49.21	$ 891,851	$ 719,356	$ 1,611,207	$ 40.82
2028	39,471	26,608	12,863	$ 38.39	$ 50.66	$ 1,021,565	$ 651,687	$ 1,673,252	$ 42.39
2029	39,471	27,225	12,246	$ 42.33	$ 50.84	$ 1,152,508	$ 622,570	$ 1,775,078	$ 44.97
2030	39,471	27,635	11,836	$ 43.66	$ 53.33	$ 1,206,550	$ 631,222	$ 1,837,771	$ 46.56
2031	39,471	26,923	12,548	$ 48.30	$ 55.41	$ 1,300,390	$ 695,250	$ 1,995,640	$ 50.56
2032	39,471	26,793	12,679	$ 51.62	$ 57.75	$ 1,383,134	$ 732,184	$ 2,115,318	$ 53.59
2033	39,471	26,855	12,616	$ 54.17	$ 60.31	$ 1,454,765	$ 760,932	$ 2,215,697	$ 56.13
2034	39,425	26,573	12,852	$ 57.08	$ 62.39	$ 1,516,677	$ 801,848	$ 2,318,525	$ 58.81
2035	39,471	26,322	13,150	$ 59.17	$ 65.22	$ 1,557,457	$ 857,659	$ 2,415,116	$ 61.19
2036	39,471	25,825	13,646	$ 62.06	$ 68.23	$ 1,602,829	$ 931,084	$ 2,533,912	$ 64.20
2037	39,471	25,885	13,586	$ 65.55	$ 71.03	$ 1,696,697	$ 965,081	$ 2,661,778	$ 67.44
2038	39,471	25,901	13,570	$ 68.06	$ 73.92	$ 1,762,839	$ 1,003,087	$ 2,765,925	$ 70.07
2039	39,471	26,199	13,272	$ 70.35	$ 77.31	$ 1,843,123	$ 1,026,047	$ 2,869,170	$ 72.69
2040	39,471	26,586	12,885	$ 73.19	$ 80.02	$ 1,945,895	$ 1,031,032	$ 2,976,927	$ 75.42
2041	39,289	7,231	32,058	$ 64.19	$ 89.03	$ 464,213	$ 2,854,132	$ 3,318,345	$ 84.46
2042	39,288	7,258	32,030	$ 64.12	$ 93.10	$ 465,384	$ 2,981,942	$ 3,447,326	$ 87.74

WACC 7.03% nominal, annual

Summary: NPV and Annualized $/MWh of Energy Avoided Costs, WITHOUT Carbon Price Impact

NPV Of Energy Costs	$ 351.82	$/MWh
Levelized Payment	$ 30.27	$/MWh

Summary Table: Annual Solar QF Generation and Energy Avoided Costs WITHOUT Carbon Price Impacts

Year	Generation (MWh)	Offset Generation (MWh)	Offset Purchases (MWh)	Average Offset Generation Price ($/MWh)	Average Offset Purchase Price ($/MWh)	Total Offset Generation Energy Avoided Cost ($)	Total Energy Avoided Cost of Purchases ($)	Total Energy Avoided Cost ($)	Average Energy Avoided Cost ($/MWh)
2018	19,947	8,109	11,838	$ 12.13	$ 22.93	$ 98,337.18	$ 271,488.43	$ 369,825.61	$ 18.54
2019	19,800	7,713	12,087	$ 13.46	$ 23.92	$ 103,795.98	$ 289,151.90	$ 392,947.88	$ 19.85
2020	19,652	7,739	11,913	$ 14.63	$ 25.44	$ 113,201.59	$ 303,072.42	$ 416,274.01	$ 21.18
2021	19,503	8,095	11,408	$ 15.17	$ 26.96	$ 122,773.06	$ 307,582.45	$ 430,355.51	$ 22.07
2022	19,359	6,566	12,793	$ 16.63	$ 29.43	$ 109,168.32	$ 376,446.52	$ 485,614.84	$ 25.08
2023	19,212	6,430	12,782	$ 17.41	$ 30.72	$ 111,907.17	$ 392,718.36	$ 504,625.52	$ 26.27
2024	19,068	6,313	12,755	$ 16.77	$ 32.50	$ 105,869.24	$ 414,543.45	$ 520,412.69	$ 27.29
2025	18,925	11,772	7,153	$ 20.66	$ 32.04	$ 243,198.55	$ 229,207.50	$ 472,406.04	$ 24.96
2026	18,784	11,611	7,173	$ 21.50	$ 33.59	$ 249,602.51	$ 240,952.70	$ 490,555.21	$ 26.12
2027	18,643	10,497	8,146	$ 23.11	$ 35.46	$ 242,539.74	$ 288,885.91	$ 531,425.65	$ 28.51
2028	18,502	10,937	7,565	$ 25.34	$ 36.01	$ 277,167.19	$ 272,408.28	$ 549,575.47	$ 29.70
2029	18,363	9,425	8,938	$ 27.85	$ 36.41	$ 262,509.92	$ 325,438.95	$ 587,948.88	$ 32.02
2030	18,227	9,667	8,560	$ 28.64	$ 38.28	$ 276,864.58	$ 327,669.98	$ 604,534.57	$ 33.17
2031	18,090	9,199	8,891	$ 29.91	$ 39.75	$ 275,096.66	$ 353,402.02	$ 628,498.68	$ 34.74
2032	17,953	9,059	8,894	$ 31.01	$ 41.69	$ 280,901.32	$ 370,729.78	$ 651,631.11	$ 36.30
2033	17,820	9,086	8,734	$ 31.77	$ 43.32	$ 288,685.81	$ 378,345.17	$ 667,030.98	$ 37.43
2034	17,686	8,699	8,987	$ 33.36	$ 45.08	$ 290,177.68	$ 405,110.31	$ 695,288.00	$ 39.31
2035	17,554	8,497	9,057	$ 36.10	$ 47.12	$ 306,772.10	$ 426,771.63	$ 733,543.73	$ 41.79
2036	17,422	8,241	9,181	$ 37.12	$ 49.47	$ 305,902.77	$ 454,235.37	$ 760,138.14	$ 43.63
2037	17,290	8,125	9,165	$ 38.98	$ 51.71	$ 316,712.79	$ 473,945.53	$ 790,658.33	$ 45.73
2038	17,161	7,976	9,185	$ 40.38	$ 54.01	$ 322,096.55	$ 496,036.01	$ 818,132.56	$ 47.67
2039	17,034	8,117	8,917	$ 44.23	$ 56.25	$ 359,052.33	$ 501,561.07	$ 860,613.40	$ 50.52
2040	16,905	8,025	8,880	$ 46.50	$ 58.33	$ 373,168.86	$ 517,980.11	$ 891,148.97	$ 52.72
2041	16,776	1,050	15,725	$ 28.90	$ 65.25	$ 30,356.93	$ 1,026,092.66	$ 1,056,449.59	$ 62.97
2042	16,653	1,131	15,522	$ 27.24	$ 68.22	$ 30,798.80	$ 1,058,983.82	$ 1,089,782.62	$ 65.44

WACC 7.03% nominal, annual

Summary: NPV and Annualized $/MWh of Energy Avoided Costs, WITH Carbon Price Impact

NPV Of Energy Costs $ 463.45 $/MWh
Levelized Payment $ 39.88 $/MWh

Summary Table: Annual Solar QF Generation and Energy Avoided Costs WITH Carbon Price Impacts

Year	Generation (MWh)	Offset Generation (MWh)	Offset Purchases (MWh)	Average Offset Generation Price ($/MWh)	Average Offset Purchase Price ($/MWh)	Total Offset Generation Energy Avoided Cost ($)	Total Energy Avoided Cost of Purchases ($)	Total Energy Avoided Cost ($)	Average Energy Avoided Cost ($/MWh)
2018	19,947	8,109	11,838	$ 12.13	$ 22.93	$ 98,337.18	$ 271,488.43	$ 369,825.61	$ 18.54
2019	19,800	7,713	12,087	$ 13.46	$ 23.92	$ 103,795.98	$ 289,151.90	$ 392,947.88	$ 19.85
2020	19,652	7,739	11,913	$ 14.63	$ 25.44	$ 113,201.59	$ 303,072.42	$ 416,274.01	$ 21.18
2021	19,503	8,095	11,408	$ 15.17	$ 26.96	$ 122,773.06	$ 307,582.45	$ 430,355.51	$ 22.07
2022	19,359	6,566	12,793	$ 19.05	$ 39.43	$ 125,088.19	$ 504,374.83	$ 629,463.02	$ 32.52
2023	19,212	6,430	12,782	$ 19.60	$ 41.14	$ 126,003.63	$ 525,846.19	$ 651,849.82	$ 33.93
2024	19,068	6,313	12,755	$ 17.41	$ 43.34	$ 109,882.41	$ 552,874.58	$ 662,756.99	$ 34.76
2025	18,925	11,772	7,153	$ 25.63	$ 43.34	$ 301,673.12	$ 309,997.21	$ 611,670.33	$ 32.32
2026	18,784	11,611	7,173	$ 26.88	$ 45.36	$ 312,050.15	$ 325,342.20	$ 637,392.34	$ 33.93
2027	18,643	10,497	8,146	$ 30.72	$ 47.72	$ 322,498.38	$ 388,712.35	$ 711,210.73	$ 38.15
2028	18,502	10,937	7,565	$ 33.40	$ 48.78	$ 365,295.87	$ 369,043.80	$ 734,339.67	$ 39.69
2029	18,363	9,425	8,938	$ 39.24	$ 49.70	$ 369,858.15	$ 444,273.56	$ 814,131.71	$ 44.34
2030	18,227	9,667	8,560	$ 40.97	$ 52.12	$ 396,065.99	$ 446,184.88	$ 842,250.87	$ 46.21
2031	18,090	9,199	8,891	$ 49.28	$ 54.17	$ 453,330.20	$ 481,611.57	$ 934,941.78	$ 51.68
2032	17,953	9,059	8,894	$ 52.49	$ 56.70	$ 475,546.93	$ 504,266.03	$ 979,812.96	$ 54.58
2033	17,820	9,086	8,734	$ 55.10	$ 58.96	$ 500,585.13	$ 514,951.10	$ 1,015,536.23	$ 56.99
2034	17,686	8,699	8,987	$ 57.56	$ 61.37	$ 500,689.64	$ 551,513.61	$ 1,052,203.25	$ 59.49
2035	17,554	8,497	9,057	$ 59.65	$ 64.09	$ 506,868.24	$ 580,423.11	$ 1,087,291.35	$ 61.94
2036	17,422	8,241	9,181	$ 62.67	$ 67.14	$ 516,398.62	$ 616,469.27	$ 1,132,867.89	$ 65.03
2037	17,290	8,125	9,165	$ 65.38	$ 70.13	$ 531,244.22	$ 642,714.10	$ 1,173,958.32	$ 67.90
2038	17,161	7,976	9,185	$ 67.76	$ 73.17	$ 540,494.41	$ 672,058.96	$ 1,212,553.37	$ 70.66
2039	17,034	8,117	8,917	$ 69.90	$ 76.21	$ 567,362.62	$ 679,535.94	$ 1,246,898.55	$ 73.20
2040	16,905	8,025	8,880	$ 72.86	$ 79.12	$ 584,663.45	$ 702,597.99	$ 1,287,261.44	$ 76.15
2041	16,776	1,050	15,725	$ 56.10	$ 86.91	$ 58,933.30	$ 1,366,627.19	$ 1,425,560.49	$ 84.98
2042	16,653	1,131	15,522	$ 55.42	$ 90.77	$ 62,655.15	$ 1,409,013.66	$ 1,471,668.81	$ 88.37

WACC 7.03% nominal, annual

Summary: NPV and Annualized $/MWh of Energy Avoided Costs, WITHOUT Carbon Price Impact

NPV Of Energy Costs $ 319.13 $/MWh
Levelized Payment $ 27.46 $/MWh

Summary Table: Annual Hydro QF Generation and Energy Avoided Costs WITHOUT Carbon Price Impacts

Year	Generation (MWh)	Offset Generation (MWh)	Offset Purchases (MWh)	Average Offset Generation Price ($/MWh)	Average Offset Purchase Price ($/MWh)	Total Offset Generation Energy Avoided Cost ($)	Total Energy Avoided Cost of Purchases ($)	Total Energy Avoided Cost ($)	Average Energy Avoided Cost ($/MWh)
2018	54,754	28,320	26,435	$ 11.33	$ 22.50	$ 320,870	$ 594,697	$ 915,567	$ 16.72
2019	54,754	27,508	27,246	$ 12.52	$ 23.39	$ 344,451	$ 637,348	$ 981,800	$ 17.93
2020	54,754	27,733	27,021	$ 13.21	$ 24.90	$ 366,218	$ 672,749	$ 1,038,967	$ 18.98
2021	54,754	28,634	26,120	$ 13.73	$ 26.29	$ 393,082	$ 686,756	$ 1,079,838	$ 19.72
2022	54,755	24,916	29,839	$ 14.59	$ 28.73	$ 363,433	$ 857,228	$ 1,220,661	$ 22.29
2023	54,753	24,843	29,910	$ 15.25	$ 30.05	$ 378,837	$ 898,921	$ 1,277,757	$ 23.34
2024	54,755	23,494	31,261	$ 14.82	$ 31.83	$ 348,239	$ 994,986	$ 1,343,225	$ 24.53
2025	54,754	36,527	18,228	$ 17.86	$ 31.25	$ 652,391	$ 569,673	$ 1,222,064	$ 22.32
2026	54,754	36,645	18,109	$ 19.43	$ 32.67	$ 711,965	$ 591,654	$ 1,303,619	$ 23.81
2027	54,753	33,584	21,170	$ 21.43	$ 34.55	$ 719,649	$ 731,438	$ 1,451,087	$ 26.50
2028	54,755	34,007	20,747	$ 22.88	$ 35.27	$ 778,137	$ 731,777	$ 1,509,913	$ 27.58
2029	54,754	32,470	22,285	$ 24.67	$ 35.06	$ 800,988	$ 781,304	$ 1,582,292	$ 28.90
2030	54,753	33,095	21,658	$ 26.65	$ 36.82	$ 881,874	$ 797,416	$ 1,679,291	$ 30.67
2031	54,754	32,383	22,371	$ 27.63	$ 38.10	$ 894,574	$ 852,445	$ 1,747,020	$ 31.91
2032	54,754	31,728	23,026	$ 28.76	$ 39.83	$ 912,414	$ 917,059	$ 1,829,473	$ 33.41
2033	54,755	31,924	22,831	$ 29.50	$ 41.69	$ 941,868	$ 951,826	$ 1,893,694	$ 34.59
2034	54,754	31,040	23,714	$ 31.11	$ 43.05	$ 965,501	$ 1,020,981	$ 1,986,482	$ 36.28
2035	54,755	30,559	24,196	$ 33.17	$ 45.10	$ 1,013,706	$ 1,091,181	$ 2,104,887	$ 38.44
2036	54,754	30,282	24,472	$ 34.05	$ 47.42	$ 1,030,953	$ 1,160,485	$ 2,191,437	$ 40.02
2037	54,754	29,922	24,832	$ 36.95	$ 49.35	$ 1,105,764	$ 1,225,407	$ 2,331,171	$ 42.58
2038	54,754	29,393	25,361	$ 38.28	$ 51.66	$ 1,125,319	$ 1,310,104	$ 2,435,423	$ 44.48
2039	54,754	30,382	24,372	$ 43.53	$ 53.74	$ 1,322,526	$ 1,309,625	$ 2,632,151	$ 48.07
2040	54,754	29,943	24,810	$ 45.16	$ 55.94	$ 1,352,286	$ 1,387,816	$ 2,740,102	$ 50.04
2041	54,755	29,397	25,358	$ 47.18	$ 58.25	$ 1,386,807	$ 1,477,178	$ 2,863,985	$ 52.31
2042	54,748	29,450	25,298	$ 48.03	$ 61.43	$ 1,414,404	$ 1,554,092	$ 2,968,496	$ 54.22

WACC 7.03% nominal, annual

Summary: NPV and Annualized $/MWh of Energy Avoided Costs, WITH Carbon Price Impact

NPV Of Energy Costs $ 434.25 $/MWh
Levelized Payment $ 37.36 $/MWh

Summary Table: Annual Hydro QF Generation and Energy Avoided Costs WITH Carbon Price Impacts

Year	Generation (MWh)	Offset Generation (MWh)	Offset Purchases (MWh)	Average Offset Generation Price ($/MWh)	Average Offset Purchase Price ($/MWh)	Total Offset Generation Energy Avoided Cost ($)	Total Energy Avoided Cost of Purchases ($)	Total Energy Avoided Cost ($)	Average Energy Avoided Cost ($/MWh)
2018	54,754	28,320	26,435	$ 11.33	$ 22.50	$ 320,869.60	$ 594,697.45	$ 915,567.05	$ 16.72
2019	54,754	27,508	27,246	$ 12.52	$ 23.39	$ 344,451.48	$ 637,348.25	$ 981,799.73	$ 17.93
2020	54,754	27,733	27,021	$ 13.21	$ 24.90	$ 366,217.65	$ 672,749.46	$ 1,038,967.11	$ 18.98
2021	54,754	28,634	26,120	$ 13.73	$ 26.29	$ 393,081.89	$ 686,755.95	$ 1,079,837.85	$ 19.72
2022	54,755	24,916	29,839	$ 19.19	$ 38.73	$ 478,040.64	$ 1,155,618.45	$ 1,633,659.10	$ 29.84
2023	54,753	24,843	29,910	$ 19.66	$ 40.47	$ 488,483.02	$ 1,210,431.43	$ 1,698,914.44	$ 31.03
2024	54,755	23,494	31,261	$ 18.41	$ 42.67	$ 432,479.06	$ 1,334,013.72	$ 1,766,492.78	$ 32.26
2025	54,754	36,527	18,228	$ 26.24	$ 42.55	$ 958,401.33	$ 775,553.91	$ 1,733,955.24	$ 31.67
2026	54,754	36,645	18,109	$ 27.39	$ 44.44	$ 1,003,592.69	$ 804,704.95	$ 1,808,297.64	$ 33.03
2027	54,753	33,584	21,170	$ 30.14	$ 46.81	$ 1,012,337.91	$ 990,873.20	$ 2,003,211.11	$ 36.59
2028	54,755	34,007	20,747	$ 32.75	$ 48.04	$ 1,113,900.80	$ 996,796.25	$ 2,110,697.04	$ 38.55
2029	54,754	32,470	22,285	$ 37.42	$ 48.36	$ 1,215,149.08	$ 1,077,577.64	$ 2,292,726.72	$ 41.87
2030	54,753	33,095	21,658	$ 38.74	$ 50.66	$ 1,282,043.12	$ 1,097,273.91	$ 2,379,317.03	$ 43.46
2031	54,754	32,383	22,371	$ 45.32	$ 52.52	$ 1,467,698.57	$ 1,175,041.77	$ 2,642,740.34	$ 48.27
2032	54,754	31,728	23,026	$ 49.37	$ 54.84	$ 1,566,571.72	$ 1,262,790.13	$ 2,829,361.84	$ 51.67
2033	54,755	31,924	22,831	$ 51.52	$ 57.33	$ 1,644,715.16	$ 1,308,900.60	$ 2,953,615.77	$ 53.94
2034	54,754	31,040	23,714	$ 54.75	$ 59.34	$ 1,699,446.82	$ 1,407,284.28	$ 3,106,731.10	$ 56.74
2035	54,755	30,559	24,196	$ 56.68	$ 62.06	$ 1,732,127.90	$ 1,501,658.48	$ 3,233,786.38	$ 59.06
2036	54,754	30,282	24,472	$ 59.16	$ 65.09	$ 1,791,554.22	$ 1,592,900.16	$ 3,384,454.38	$ 61.81
2037	54,754	29,922	24,832	$ 62.38	$ 67.76	$ 1,866,682.40	$ 1,682,667.42	$ 3,549,349.81	$ 64.82
2038	54,754	29,393	25,361	$ 64.71	$ 70.82	$ 1,902,160.63	$ 1,796,150.45	$ 3,698,311.08	$ 67.54
2039	54,754	30,382	24,372	$ 66.94	$ 73.70	$ 2,033,677.55	$ 1,796,086.52	$ 3,829,764.07	$ 69.95
2040	54,754	29,943	24,810	$ 69.73	$ 76.73	$ 2,087,903.82	$ 1,903,625.54	$ 3,991,529.37	$ 72.90
2041	54,755	29,397	25,358	$ 72.78	$ 79.91	$ 2,139,456.70	$ 2,026,301.55	$ 4,165,758.25	$ 76.08
2042	54,748	29,450	25,298	$ 74.55	$ 83.98	$ 2,195,478.19	$ 2,124,560.26	$ 4,320,038.45	$ 78.91

Department of Public Service Regulation
Montana Public Service Commission
Docket No. D2016.5.39
Avoided Cost Rate Filing
NorthWestern Energy

PREFILED DIRECT TESTIMONY

OF AUTUMN M. MUELLER

ON BEHALF OF NORTHWESTERN ENERGY

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Exhibit

Witness Information

Q. Please state your name and business address.

A. My name is Autumn M. Mueller, and my business address is 11 East Park Street, Butte, Montana 59701.

Q. By whom are you employed and in what capacity?

A. I am employed by NorthWestern Energy ("NorthWestern") as the Coordinator of Generation and Transmission Interconnection in the Regional Planning Department.

Q. Please summarize your educational and employment experiences.

A. I studied Business and Information Technology at Montana Tech. Additionally, I went through an Electric and Gas Transmission System Operations apprenticeship with NorthWestern where I received a North American Reliability Corporation System Operations Certification and a Montana Department of Transportation Gas Operations Certification.

I have worked in the utility industry for 19 years. I started working for Montana Power Company ("MPC") in 1996 as a Customer Service Representative in the Customer Care Department. In 1998, I was promoted to the Supervisor of Customer Care. In 2002, I accepted a position in the System Operations Control Center as a Transmission System Operator. I was in this position during the acquisition of MPC by

NorthWestern, working as both an Electric and Gas Transmission System Operator. In 2009, I accepted my current position as the Coordinator of Generation and Transmission Interconnection. In this position, I oversee the interconnection process for all customers seeking interconnection to NorthWestern's system.

Purpose of Testimony

Q. What is the purpose of your testimony in this docket?

A. The purpose of my testimony is threefold. First, I briefly explain the development of NorthWestern's interconnection queue, which is publicly available on the Internet at http://www.oasis.oati.com/NWMT/NWMTdocs/GenConnect7.html. Second, I describe and explain the process NorthWestern must follow once it receives an application for interconnection. Third, and most importantly, I describe the large number of interconnection requests NorthWestern has recently received for 3-megawatt ("MW") solar generating facilities seeking standard rate contracts under Montana Public Service Commission-established avoided costs, and the large number of additional requests I expect to receive in the near future.

Development of the Interconnection Queue

Q. Please explain the origins and development of the queue.

A. On July 23, 2003, the Federal Energy Regulatory Commission ("FERC") issued FERC Order 2003, Standardization of Generator Interconnection Agreements and Procedures. Order 2003 required public utilities that own, control, or operate facilities for transmitting electric energy in interstate commerce to file open access transmission tariffs containing standard generator interconnection procedures and agreements for customers seeking interconnection to NorthWestern's system. NorthWestern began processing all requests for interconnection under these FERC-required procedures.

Among the many requirements of FERC Order 2003 is a requirement for interconnection requests to be posted publicly, along with a list of details that must be included with each request. All interconnection requests that NorthWestern receives are posted in accordance with these requirements and available on our OASIS website for the public to view.

On May 12, 2005, FERC issued FERC Order 2006, Standardization of Small Generator Interconnection Agreements and Procedures. This order required that public utilities file open access transmission tariffs containing standard generator interconnection procedures and agreements for customers seeking to interconnect projects having a capacity of less than 20 MW to NorthWestern's system. NorthWestern began processing requests for all projects 20 MW and less under these procedures.

NorthWestern has received requests for interconnection from many developers since the inception of Orders 2003 and 2006 with various types of generation including wind, water, and natural gas, the majority of the requests being wind. Over the first 11 years of compliance with Orders 2003 and 2006, NorthWestern processed 144 new interconnection requests, an average of around 13 new requests per year. On December 3, 2014, NorthWestern received its first interconnection request for a solar facility. This was project number 174[1] in NorthWestern's interconnection queue, a 6-MW solar facility, the only request NorthWestern had received for a solar QF larger than 3 MW. This was the beginning of a large rush of 3-MW solar interconnection requests. As of April 29, 2016, NorthWestern's interconnection queue is on project number 275; the vast majority of these 102 additional requests have been for 3-MW solar facilities.

The Interconnection Process

Q. Please describe the interconnection process including the required studies, costs, and timelines.

A. For purposes of this discussion, I will provide an overview of the process followed for Small Generator Interconnection requests.

1. Prior to submitting a formal interconnection request, customers have the option to request a pre-application report. Interconnection

[1] The first interconnection request that was processed under the FERC Order 2003 established procedures was project #29.

customers can submit a pre-application request, along with a $300 fee, and receive a report that provides information about the line or substation to which they are seeking potential interconnection.

2. A formal interconnection application is received, reviewed, and processed. The application is submitted with a deposit which is applied towards the first study that is done for the project. Interconnection customers pay all actual costs of work associated with the interconnection request. This includes all study and administrative costs. A deposit is collected with each study. If the costs exceed the deposit amount, the interconnection customer is invoiced for the additional costs. If the deposit is not exceeded, a refund of the unspent funds is issued to the interconnection customer.
3. An interconnection request progresses through three levels of study:
    - Feasibility Study – A high-level look at the system is performed and a high-level, non-binding estimate of interconnection costs is provided to the customer. The customer has the option to bypass this study and go directly to the System Impact Study. The deposit required for this feasibility study is $1,000. The study work is generally completed within 30 business days.
    - System Impact Study – A detailed study is performed to determine what upgrades will be needed to interconnect the project. A report is provided to the customer that includes the upgrades needed and a non-binding good faith estimate of costs for interconnection. The

deposit required for this study is $5,000. The study work is generally completed within 45 business days.

- Facilities Study – This study specifies the estimated cost of equipment, engineering, procurement, and construction work needed to implement the upgrades identified in the System Impact Study. The deposit required for this study is $10,000. The study work is generally completed in 45 business days.

4. Upon completion of study work, the interconnection customer is issued a draft Small Generator Interconnection Agreement. NorthWestern works with the customer to establish a milestone schedule for construction of the project. The agreement is executed by the parties.
5. Once the Small Generator Interconnection Agreement is executed, the project advances to construction.

Interconnection Requests

Q. Please provide the number of interconnection requests that NorthWestern has received for 3-MW solar facilities since December of 2014, and describe the status of those requests.

A. As shown in my Exhibit__(AMM-1), NorthWestern received 102 interconnection requests between December 1, 2014, and April 29, 2016. All but 13 of those requests were for solar facilities of 3 MW or less. Of the 89 interconnection requests in the queue for 3-MW solar facilities:

1. Forty of the requests have been withdrawn;

2. Six have progressed to fully executed interconnection agreements, and the projects are proceeding to construction with an August 31, 2016 Commercial Operation Date;
3. Forty-three are active requests at various stages of study.

Q. Do the solar interconnection requests in NorthWestern's queue adequately quantify NorthWestern's exposure to solar QFs under the current QF-1 tariff?

A. No they do not. The information in the interconnection queue only reflects the 3-MW solar QF projects for which formal requests for interconnection have been made. It does not reflect the projects which have requested pre-application reports, but have not yet applied for interconnection. Nor does it reflect the potential projects we know about from the conversations we are having with QF developers. NorthWestern has provided 75 pre-application reports to developers of 3-MW solar QFs who have not yet responded with formal interconnection requests. Additionally, we have recently provided substation information at 20 locations for another solar QF developer who has not yet requested pre-application reports.

Q. What kind of estimates can you provide regarding the amount of solar generation that is being incented by the current QF-1 avoided costs?

A. NorthWestern has 43 active solar requests in the queue totaling 127.5 MW, and six executed interconnection agreements with a combined output of 17 MW, totaling 144.5 MW actual solar requests active in the queue. Additionally, if the 75 projects that have been issued pre-application reports request interconnection and the 20 requests from the new developer are received, we could potentially have 285 MW more in the queue in the near future. We are receiving several new requests each week and do not anticipate that this will slow down.

I have had some discussions with the different developers regarding their overall plans. They have all indicated that they are planning to move forward with multiple interconnections in Montana. Two of the developers we work with reviewed their business model with us and explained that they plan to bring on 10 new projects per year. Their plan is to hire a third party for group Operations and Maintenance on the projects, and they require at least 10 projects to make that plan cost effective. One developer indicated that the rate for QF power under the current QF-1 rate is so attractive, they would have moved forward with Montana projects even if the production tax credits had expired at the end of the year. Since the production tax credits have been extended out to 2020, we anticipate we will receive many more requests for interconnecting 3-MW solar facilities.

Q. Does this conclude your testimony?

A. Yes, it does.

UPDATED: 4/28/2016

NorthWestern Energy

INTERCONNECTION QUEUE

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
4 - Judith Gap		April 9, 2001	Wheatland County, Montana	Broadview - Judith Gap 230 kV Line	Network Resource		February 15, 2006	Wind	188	188	In-Service	System Impact Study Facilities Study	
5 - Hardin		April 19, 2001	Big Horn County, Montana	Hardin Auto Substation	Network Resource		April 14, 2006	Base Load - Coal Fired	109	109	In-Service	System Impact Study Facilities Study	
6 - Thompson Falls Co-Gen		May 14, 2001	Sanders County, Montana	Thompson Falls - Kerr 115 kV "B" Line	Network Resource			Base Load - Bio Mass & Coal Fired	12	12	In-Service	System Impact Study Facilities Study	
7		May 25, 2001	Cascade County, Montana	Great Falls 230 kV Switchyard	Network Resource	X		Gas Fired	280	280	Withdrawn	Feasibility Study System Impact Study Facilities Study	Large Generator Interconnecton Agreement was cancelled at customer's request.
11 - Two Dot Wind		August 10, 2001	Wheatland County, Montana	Two Dot Substation Distribution	Energy Resource		March 8, 2004	Wind	0.455	0.455	In-Service		
14		August 28, 2001	Yellowstone County, Montana	Broadview Substation	Energy Resource		May 31, 2009	Base Load - Coal Fired	700	700	Withdrawn	Feasibility Study System Impact Study Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
17		January 7, 2002	Glacier County, Montana	Conrad Auto - Cut Bank 115 kV Line	Network Resource			Wind	75	75	Withdrawn	System Impact Study Facilities Study	Large Generator Interconnection Agreement was not Returned
20		March 15, 2002	Rosebud County, Montana	Costrip Switchyard	Energy Resource		April 1, 2013	Base Load - Coal Fired	500	500	Withdrawn	Feasibility Study System Impact Study	Revised In-Service Date at Interconnection Customer's request. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
21		July 2, 2002	Jefferson County, Montana	Golden Sunlight Substation	Network Resource			Wind	75	75	Withdrawn	Feasibility Study System Impact Study Facilities Study	Large Generator Interconnection Agreement was not Returned
23 - Horseshoe Bend		August 15, 2002	Cascade County, Montana	Great Falls NW - Holter 100 kV Line	Energy Resource		February 27, 2006	Wind	9	9	In-Service	Feasibility Study System Impact Study Facilities Study	
24		February 4, 2003	Carbon County, Montana	Bridger Auto Substation	Network Resource Energy Resource			Wind	100	100	Withdrawn	Feasibility Study	Interconnection Request Withdrawn
25 - Two Dot Wind #2		February 14, 2003	Meagher County, Montana	Martinsdale Substation Distribution	Energy Resource		November 1, 2004	Wind	0.715	0.715	In-Service		
27 - Basin Creek		February 25, 2003	Silver Bow County, Montana	MHD Substation	Network Resource		May 23, 2006	Peaking - Gas Fired	53	53	In-Service	Feasibility Study System Impact Study Facilities Study	In-Service Date Revised
28		April 4, 2003	Gallatin County, Montana	Jack Rabbit Substation Distribution	Energy Resource			Fuel Cell	0.5	0.5	Withdrawn		
29		September 15, 2003	Missoula County, Montana	Reserve St. Substation Distribution	Energy Resource			Methane Gas	0.99	0.99	Withdrawn		System Impact Study Agreement not returned.
30		January 26, 2004	Stillwater County, Montana	Columbus Rapelje - Big timber 161 kV Line	Energy Resource			Wind	50.4	50.4	Withdrawn	Feasibility Study	Interconnection Request Withdrawn
31 - WKN Montana II		May 11, 2004	Stillwater County, Montana	Wilsall - Shorey Road 230 kV Line	Network Resource		December 31, 2011	Wind	396	396	Withdrawn	Feasibility Study System Impact Study System Impact Re-Study Facility Study	Revised In-Service Date at Interconnection Customer's request. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. In accordance with the LGIP/OATT, the project in-service date has been adjusted to 12/31/12.
32 - Southern Montana		July 1, 2004	Cascade County, Montana	Great Falls 230 kV Switchyard	Network Resource		October 31, 2011	Base Load - Coal Fired	268	268	In-Service Pending	Feasibility Study System Impact Study System Impact Study Revised System Impact Study Revised System Impact Study Revised Facility Study	Large Generator Interconnecton Agreement executed. In accordance with the LGIP/OATT, the project in-service date has been adjusted to 10/31/11. Project to be amended to a 46 MW gas-fired generation facility.
33 - Martinsdale #1		November 3, 2004	Wheatland County, Montana	Martinsdale Substation	Network Resource		December 31, 2007	Wind	52.5	52.5	Withdrawn	Feasibility Study System Impact Study Facility Study	Output size reduced from 75 MW to 52.5 MW. In-Service Date Revised. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. In accordance with the LGIP/OATT, the project in-service date has been adjusted to 10/31/13
34 - Sheep Valley Ranch		January 26, 2005	Wheatland County, Montana	Two Dot Substation Distribution	Energy Resource		August 16, 2006	Wind	0.39	0.39	In-Service	Feasibility Study	Output size reduced from 3 MW to 0.5 MW
35 - Martinsdale 2		February 3, 2005	Wheatland County, Montana	Martinsdale Substation Distribution	Energy Resource		September 13, 2006	Wind	2	2	In-Service	Feasibility Study	Output size reduced from 5 MW to 2 MW
36		July 15, 2005	Rosebud County, Montana	Colstrip 500 kV Switchyard	Network Resource Energy Resource		June 1, 2006	Base Load - Coal Fired	56	56	Withdrawn	Feasibility Study System Impact Study	
37		July 15, 2005	Rosebud County, Montana	Colstrip 230 kV Switchyard	Network Resource Energy Resource		October 1, 2006	Base Load - Coal Fired	32	32	Withdrawn	Feasibility System Impact Study	
38 - Martinsdale #2		August 1, 2005	Wheatland County, Montana	Martinsdale Substation	Energy Resource		December 31, 2007	Wind	81.9	81.9	Withdrawn	Feasibility Study	Output reduced from 82.5 MW to 81.9 MW with approved wind turbine change. In-Service Date Revised. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this In accordance with the LGIP/OATT, the project in-service date has been adjusted to 10/31/13
39		August 12, 2005	Yellowstone County, Montana	Billings Steam Plant Switchyard	Network Resource		Upon completion of interconnection process.	Base Load - Coal Fired	22	22	Withdrawn	Feasibility Study System Impact Study System Impact Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
40 - Rolling Thunder		August 29, 2005	Hand County, South Dakota	St. Lawrence - Highmore 69 kV Line	Network Resource		Requested revised date	Wind	50	50	In-Service	System Impact Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
41		November 1, 2005	Jefferson County, Montana	Golden Sunlight Substation	Network Resource Energy Resource			Wind	100	100	Withdrawn	Feasibility Study	
42		February 1, 2006	Meagher County, Montana	Distribution feeder to Martinsdale Substation	Network Resource			Wind	7.5	7.5	Withdrawn		
43		March 13, 2006	Lake County, Montana	Kerr Switchyard	Network Resource Energy Resource		Upon completion of interconnection process.	Hydro	14	14	Withdrawn	Feasibility System Impact Study	Interconnection Request withdrawn.
44		April 10, 2006	Pondera County, Montana	South Cut Bank to Conrad Auto 115 kV	Network Resource		October 15, 2008	Wind	104	104	Withdrawn	Feasibility System Impact Study System Impact Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
45		May 5, 2006	Jefferson County, Montana	Golden Sunlight Substation Distribution	Network Resource Energy Resource			Wind	60	60	Withdrawn	Feasibility System Impact Study	
46 - Gordon Butte		June 5, 2006	Meagher County, Montana	100 kV line between Loweth and Two Dot at Groveland.	Energy Resource		September 1, 2007	Wind	10	10	In-Service	Feasibility System Impact Study System Impact Re-Study System Impact Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
47 - Kenfield Wind		June 8, 2006	Liberty County, Montana	69 kV line at Chester	Energy Resource		December 31, 2010	Wind	20	20	Withdrawn	Feasibility System Impact Study System Impact Re-Study System Impact Re-Study Facility Study Facility Study Restudy	Output size increased to 20 MW from 19.5 MW. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now December 2013. Project has been amended to a 10 MW project with an Energy Resource designation.
48		June 12, 2006	Teton County, Montana	Choteau 69 kV Substation				Wind	18.9	18.9	Withdrawn	Feasibility	System Impact Study Agreement not returned.
49 - Rainbow		June 16, 2006	Cascade County, Montana	Rainbow Switchyard	Network Resource		December 31, 2011	Hydro	23	23	In-Service	Feasibility System Impact Study System Impact Re-Study System Impact Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
50		June 29, 2006	Teton County, Montana	Dutton 69 kV Substation	Network Resource		December 1, 2010	Wind	18.9	18.9	Withdrawn	Feasibility System Impact Study	Facility Study Agreement not returned. Interconnection Request withdrawn.
51		August 21, 2006	Teton County, Montana	Fairfield Substation	Network Resource		December 31, 2009	Hydro	15	15	Withdrawn	System Impact Study System Impact Re-Study	Customer granted extension to provide site control.
52		September 18, 2006	Sweet Grass, Montana	161 kV line between Big Timber and Clyde Park Substations	Energy Resource			Wind	80	80	Withdrawn	Feasibility	
53 - Montgomery		December 6, 2006	Cascade County, Montana	Great Falls 230 kV Switchyard	Energy Resource		July 1, 2007	Gas Fired	277	277	Withdrawn	Feasibility System Impact Study System Impact Re-Study Facility Study	Reduced MW to 277 MW from 290 MW at Customer's Request. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Pursuant to Section 4.4.5 of LGIP, Project provided written notification, Commercial Operation Date is now 8/1/2010 for Simple Cycle & 8/1/2012 for Combined Cycle. No material modification. Project has been withdrawn from Interconnection queue.
54 - Chafin Beaver Creek		February 23, 2007	Sweet Grass and Stillwater County, Montana	230 kV line from Wilsall to Shorey Road	Network		December 31, 2008	Wind	100	100	Withdrawn	Feasibility System Impact Study System Impact Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. In accordance with the LGIP/OATT, final designation was selected prior the the execution of the Facility Study Agreement - Network Resource. Project provided written notification, Commercial Operation Date should be 12/31/12.
55		March 5, 2007	Pondera County, Montana	Conrad 230 kV Substation	Energy Resource Network Resource			Wind	250	250	Withdrawn		
56		March 5, 2007	Glacier County, Montana	Cut Bank 115 kV Substation	Energy Resource Network Resource		October 1, 2008	Wind	110	110	Withdrawn	Feasibility	Interconnection Request withdrawn.
57		March 8, 2007	Madison County, Montana	Bradley Creek Substation	Energy Resource		December 31, 2008	Wind	85	85	Withdrawn	Feasibility System Impact Study System Impact Re-Study	Output reduced from 149 MW to 85 MW per Section 4.4.1 of the LGIP. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. Pursuant to Section 4.4.5 of LGIP, Project provided written notification, Commercial Operation Date is now 1/1/16 and Point of Interconnection is 1 Miles South of Bradley Creek on the 161kV Line between Bradley Creek and Ennis. No material modification.
58		March 9, 2007	Madison County, Montana	100 kV line approximately 2.2 miles north of Bradley Creek Substation.	Network Resource		September 30, 2008	Wind	10	10	Withdrawn	Feasibility System Impact Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
59		April 17, 2007	Need more information	Need more information	Network Resource		October 1, 2007	Hydro	2.2	2.2	Withdrawn		Requested information not returned by due date.
60 - Sagebrush Energy		April 27, 2007	Madison County, Montana	100 kV line approximately 1.5 miles north of Bradley Creek Substation.	Energy Resource		December 31, 2008	Wind	20	20	Withdrawn	Feasibility System Impact Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 31, 2013
61-Flint Creek Hydro		May 24, 2007	Granite County, Montana	25 kV line between Phillipsburg and Anaconda,	Network Resource		April 30, 2011	Hydro	2	2	In-Service	System Impact Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Pursuant to Section 4.4.5 of LGIP, Project provided written notification, Commercial Operation Date is now 4/1/11. No material modification.

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
62 - Turnbull #1		May 25, 2007	Teton County, Montana	69 kV line between Fairfield and Bole	Energy Resource		June 1, 2009	Hydro	11.5	11.5	In-Service	System Impact Study System Impact Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. In accordance with FERC Order 2006, project to be studied as Energy Resource. In accordance with the LGIP/OATT, the project in-service date has been adjusted to 5/1/11
63 - Sumatra		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Signed SGIA	Feasibility Feasibility Re-Study System Impact Study System Impact Re-Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
65 - Sumatra		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Signed SGIA	Feasibility Feasibility Re-Study System Impact Study System Impact Re-Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
66 - Sumatra		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Signed SGIA	Feasibility Feasibility Re-Study System Impact Study System Impact Re-Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
67 - Sumatra		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Signed SGIA	Feasibility Feasibility Re-Study System Impact Study System Impact Re-Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
68 - Sumatra		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Signed SGIA	Feasibility Feasibility Re-Study System Impact Study System Impact Re-Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
69 - Sumatra		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Signed SGIA	Feasibility Feasibility Re-Study System Impact Study System Impact Re-Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
70		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Withdrawn	Feasibility Feasibility Re-Study	
71		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Withdrawn	Feasibility Feasibility Re-Study	
72		June 11, 2007	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2008	Wind	5	5	Withdrawn	Feasibility Feasibility Re-Study	
73 - NaturEner		July 13, 2007	Glacier County, Montana	Cut Bank 115 kV Substation between Cut Bank & Shelby	Network Resource		November 30, 2008	Wind	100	100	In-Service	Feasibility System Impact Study System Impact Re-Study System Impact Re-Study Rev2 Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
74		September 11, 2007	Silver Bow County, Montana	ASMI 161 kV Substation	Network Resource		July 1, 2010	Gas Fired	280	280	Withdrawn	Feasibility System Impact Study Facility Study	Project clarified project output was 280 MW not 250 MW per scoping meeting. Output reduced from 280 MW to 230 MW per Section 4.4.1 of the LGIP.
75		September 17, 2007	Madison County, Montana	161 kV line approx 5 miles north of the Bradley Creek Substation	Energy Resource		December 31, 2008	Wind	75.6	75.6	Withdrawn	Feasibility Feasibility Re-Study System Impact Study	Pursuant to Section 4.4.5 of LGIP, Project provided written notification, Commercial Operation Date is now 1/1/16 . No material modification.
76		September 17, 2007	Madison County, Montana	100 kV line approx 5 miles north of the Bradley Creek Substation	Energy Resource		December 31, 2008	Wind	75.6	75.6	Withdrawn	Feasibility Feasibility Re-Study System Impact Study	Pursuant to Section 4.4.5 of LGIP, Project provided written notification, Commercial Operation Date is now 1/1/16. No material modification.
77 - Mill Creek Generating Station		December 6, 2007	Deer Lodge County, Montana	Millcreek Substation 230kV Switchyard	Network Resource	Yes	July 12, 2010	Gas Fired	213	213	In-Service	Feasibility System Impact Study Facility Study	Project clarified project output was 213 MW not 203 MW per scoping meeting. In accordance with the LGIP/OATT, final designation was selected prior the the execution of the Facility Study Agreement - Network Resource. Project provided written notification, Commercial Operation Date is now December 24, 2010.
78 - NaturEner		December 11, 2007	Glacier County, Montana	115kV between Cut Bank & Conrad	Energy Rescource		November 30, 2008	Wind	100	100	In-Service	System Impact Study Facility Study	
79		January 17, 2008	Sweet Grass and Stillwater County, Montana	230kV Bus at Broadview 500kV:230kV Station	Network Resource		December 31, 2013	Wind	200	200	Withdrawn	Feasibility Study	Project clarified Point of Interconnection was the 230kV Bus at Broadview 500kV:230kV station not 230 kV line from Wilsall to Shorey Road per scoping meeting.
80		February 28, 2008	Sweet Grass County	Lower Duck Creek Sub	Network Resource		September 18, 2009	Wind	80	80	Withdrawn	Feasibility Study System Impact Study	In accordance with the LGIP/OATT, final designation was selected prior the the execution of the Facility Study Agreement - Network Resource. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
81		March 11, 2008	Cascade County, Montana	Near Rainbow Switchyard	Network Resource		May, 2011	Hydro	12	12	Withdrawn	System Impact Study System Impact Study Re-Study	In accordance with the LGIP/OATT, final designation was selected prior the the execution of the Facility Study Agreement - Network Resource. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
82		March 11, 2008	Cascade County, Montana	Near Rainbow Switchyard	Network Resource Energy Resource		February, 2010	Hydro	Effeciency Improvement	Effeciency Improvement	Withdrawn	System Impact Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
83		March 11, 2008	Cascade County, Montana	Near Rainbow Switchyard	Network Resource Energy Resource		2018	Hydro	52	52	Withdrawn	System Impact Study	
84		March 17, 2008	Choteau County, Montana	69kV between Big Sandy & Loma Substation	Network Resource		June 30, 2009	Wind	20	20	Withdrawn	System Impact Study	
85		March 17, 2008	Wheatland County, Montana	Near Shawmut	Network Resource		May 1, 2011	Wind	10	10	Withdrawn	Feasibility Study	In-Service Date clarified at the Scoping Meeting.
86		April 14, 2008	Glacier County, Montana	Near Glacier	Network Resource		December 31, 2008	Wind	10	10	Withdrawn	System Impact Study System Impact Re-Study	
87 - NaturEner		April 18, 2008	Glacier County, Montana	Cut Bank 115 kV Substation between Cut Bank & Shelby	Energy Resource		November 30, 2008	Wind	100	100	In-Service	System Impact Study Facility Study	
88 - Sagebrush Energy 1		April 22, 2008	Park County, Montana	Near Livingston City Substation	Energy Resource		December 31, 2009	Wind	20	20	Withdrawn	Feasibility Study System Impact Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 31, 2015
89 - Gordon Butte 2		April 24, 2008	Meagher County, Montana	100 kV line between Loweth and Two Dot at Groveland.	Network Resource		July 31, 2009	Wind	20	20	Withdrawn	Feasibility Study System Impact Study System Impact Study Re-Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now November 1, 2013
90		May 5, 2008	Golden Valley County, Montana	Harlowton to Broadview 100kV Line	Network Resource		December 31, 2011	Wind	80	80	Withdrawn	System Impact Study	
91		May 5, 2008	Golden Valley County, Montana	Judith Gap - Broadview 230kV Line	Network Resource		December 31, 2013	Wind	280	280	Withdrawn	Feasibility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
92		May 21, 2008	Cascade County, Montana	South of Manchester, Montana	Network Resource		January 31, 2010	Wind	10	10	Withdrawn	Feasibility Study	In-Service Date clarified at the Scoping Meeting. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
93		June 11, 2008	Yellowstone County, Montana	230kV Bus at Broadview 500kV:230kV Station	Network Resource Energy Resource		December 31, 2010	Wind	450	450	Withdrawn	Feasibility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
94		July 16, 2008	Cascade County, Montana	Great Falls 230 kV Switchyard	Network Resource Energy Resource		June 1, 2010	Gas-Fired	128	128	Withdrawn	Feasibility Study Revised System Impace Study Revised System Impact Study	Project clarified Generating Facility Type as Gas-Fired not Wind per scoping meeting. Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
95		July 18, 2008	Glacier County, Montana	115kV between Cut Bank & Conrad	Energy Rescource		November 30, 2008	Wind	5	5	In-Service	System Impact Study Facility Study - NA Signed LGIA Ammendment to Project #78	The Facility Study not required for this project. The 5MW Request is in addition to Project #78. This project is an ERIS Designation, therefore, see Project #78 Facility Study.
96		August 15, 2008	Judith Basin County, Montana	230kV Line from Judith Gap Auto to Great Falls.	Network Resource Energy Resource		December 31, 2013	Wind	304.5	304.5	Withdrawn	Feasibility Study System Impact Study	
97		August 26, 2008	Judith Basin County, Montana	230kV Line from Judith Gap Auto to Great Falls.	Energy Resource		December 1, 2010	Wind	150	150	Withdrawn	Feasibility Study	
98		September 11, 2008	Cascade County, Montana	Great Falls 230 kV Switchyard	Energy Resource		December 1, 2010	Wind	150	150	Withdrawn		
99		September 16, 2008	Meagher County, Montana	Near Ringling	Energy Resource		December 31, 2013	Wind	200	200	Withdrawn	Feasibility Study System Impact Study Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
100		September 30, 2008	Cascade County, Montana	Near Rainbow Switchyard	Network Resource Energy Resource		November, 2011	Hydro	Effeciency Improvement	Effeciency Improvement	Withdrawn	System Impact Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
101		October 7, 2008	Meagher County, Montana	Near Ringling	Energy Resource		December 31, 2013	Wind	800	800	Withdrawn	Feasibility Study System Impact Study Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.
102		January 6, 2009	Teton County, Montana	Dutton 69 kV Substation	Energy Resource		December 1, 2010	Wind	18.9	18.9	Withdrawn	System Impact Study Facility Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now November 2012.
103 - Southern Montana		February 10, 2009	Cascade County, Montana	Great Falls 230 kV Switchyard	Energy Resource		May 1, 2011	Gas Fired	120	120	Withdrawn	Feasibility Study System Impact Study Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site.Project provided written notification, Commercial Operation Date is now July 2013.
104 - Sumatra		March 16, 2009	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2010	Wind	5	5	Signed SGIA	System Impact Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
105 - Sumatra		March 16, 2009	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2010	Wind	5	5	Signed SGIA	System Impact Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
106 - Sumatra		March 16, 2009	Rosebud County, Montana	69 kV line near Sumatra Substation	Network Resource		December 31, 2010	Wind	5	5	Signed SGIA	System Impact Study Facilities Study Revised Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. These studies are available and posted on this site. Project provided written notification, Commercial Operation Date is now October 2014.
107		May 29, 2009	Clark County, South Dakota	Clark Junction Substation	Network Resource Energy Resource		January 1, 2015	Wind	99	99	Withdrawn		
108 - Turnbull #2		July 13, 2009	Teton County, Montana	69 kV line between Fairfield and Bole	Energy Resource		April 1, 2011	Hydro	1.5	1.5	In Service		

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
109		July 14, 2009	Bon Homme County, South Dakota	Tripp Junction Substation	Network Resource Energy Resource		July 30, 2011	Wind	150	150	Withdrawn		Project has been transferred to Western's Interconnection Queue, Pursuant to Western's OATT and LGIP.
110 - Oak Tree Energy		October 20, 2009	Clark County, South Dakota	Clark Junction Substation	Energy Resource		December, 2012	Wind	19.5	19.5	In Service	Feasibility Study System Impact Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate.
111		October 21, 2009	Wheatland County, Montana	230kV line near Judith Gap South & Broadview Sub	Energy Resource		August 1, 2012	Wind	200	200	Withdrawn	Feasibility Study	
112		October 29, 2009	Sweet Grass County, Montana	161 kv line NE of Greycliff, MT	Network Resource Energy Resource		December 21, 2011	Wind	80	80	Withdrawn	Feasibility Study System Impact Study	
113		December 28, 2009	Cascade County, Montana	SW of Great Falls, MT	Network Resource Energy Resource		October 1, 2011	Wind	40	40	Withdrawn		
114 - Two Dot Wind		March 3, 2010	Wheatland County, Montana	100kV line between Martinsdale and Two Dot Sub	Energy Resource		June 30, 2011	Wind	10	10	Withdrawn	Feasibility Study System Impact Study Facilities Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. Project provided written notification, Commercial Operation Date is now November 15, 2012.
115 - Jawbone Wind		March 16, 2010	Wheatland County, Montana	230kV line near Judith Gap South & Big Timber	Energy Resource		October 1, 2014	Wind	460	460	Withdrawn		Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate.
116 - Mammoth Hydro		March 22, 2010	Yellowstone National Park	Mammoth Hot Springs	Network Resource		January 1, 2011	Hydro	225 kw	225 kw	In-Service		Pursuant to Section 2 of the SGIP, this is a fast track project, therefore studies were not required.
117		April 5, 2010	Golden Valley County, Montana	Barber Express Sub	Network Resource		November 30, 2010	Wind	20	20	Withdrawn		
118 - Musselshell Wind		May 5, 2010	Golden Valley County, Montana	100kV line between Harlowton Sub and Broadview Switchyard	Energy Resource		June 30, 2011	Wind	18.4	18.4	In Service	SIS Study	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the SGIP/OATT, but the project's queue position is still active and appropriate. Project size has been reducted from 18.4 MW to 10 MW. Project provided written notification, Commercial Operation Date is now November 15, 2012.
119		July 13, 2010	Ashland, Montana	Tongue River Sub at Ashland	Energy Resource		January 15, 2013	Biomass	36	25	Withdrawn		
120		August 16, 2010	Geyser, Montana	69kV line West of Geyser	Network Resource		November 30, 2011	Wind	10	10	Withdrawn		
121		August 16, 2010	Geyser, Montana	69kV line West of Geyser	Network Resource		November 30, 2011	Wind	10	10	Withdrawn		
122		September 7, 2010	Geyser, Montana	Fergus Electric's 69kV line West of Geyser	Energy Resource		November 30, 2011	Wind	10	10	Withdrawn	Feasibility Study	
123		September 20, 2010	Beaverhead County, Montana	161kV line near Clark Canyon Dam	Energy Resource		December 31, 2012	Hydro	4.7	4.7	Withdrawn		
124		September 21, 2010	Cascade County, Montana	100kV line between Belt and Monarch	Energy Resource		December 31, 2011	Wind	24	24	Withdrawn		
125		October 4, 2010	Geyser, Montana	100kV line West of Geyser	Energy Resource		November 30, 2011	Wind	10	10	Withdrawn	Feasibility Study	
126 - Spion Kop Wind		October 12, 2010	Geyser, Montana	100kV line West of Geyser	Network Resource Energy Resource	Yes	November 30, 2011	Wind	24	24	In Service	System Impact	Reduced project size from 25 MW to 24 MW. Project provided written notification, Commercial Operation Date is now October 1, 2012.
127 - Fairfield Wind		October 18, 2010	Teton County, Montana	69kV line East of Bole Substation	Energy Resource		July 15, 2011	Wind	19.5	19.5	Withdrawn		Reduced project size from 19.5 MW to 10 MW. Project provided written notification, Commercial Operation Date is now December 31, 2012.
128		November 12, 2010	Sweet Grass County, Montana	230kV line NE of Greycliff, MT	Network Resource Energy Resource		December 31, 2013	Wind	125	125	Withdrawn		
129-Lower South Fork Hydro		December 3, 2010	Dry Creek, MT	Dry Creek, MT	Energy Resource		April 1, 2011	Hydro	455 kw	455 kw	In Service		Pursuant to Section 2 of the SGIP, this is a fast track project, therefore studies were not required.
130		December 8, 2010	Billings, MT	100kV line near existing Hillcrest Tap	Energy Resource		June 30, 2012	Steam	10	10	Withdrawn		
131		February 24, 2011	Deer Lodge County, Montana	Millcreek Substation 230kV Switchyard	Energy Resource	Yes	July 29, 2011	Flywheel	1 MW	1 MW	Withdrawn		Pursuant to Section 2 of the SGIP, this is a fast track project, therefore studies were not required.
132		March 18, 2011	Teton County, Montana	69kV line East of Bole Substation	Energy Resource		May 1, 2012	Wind	10 MW	10 MW	Withdrawn		
133 - Fairfield Wind		March 18, 2011	Teton County, Montana	69kV line East of Bole Substation	Energy Resource		May 1, 2012	Wind	10 MW	10 MW	In-Service		
134 - Greenfield Wind		March 18, 2011	Teton County, Montana	69kV line East of Bole Substation	Energy Resource		May 1, 2012	Wind	10 MW	10 MW	Signed LGIA	System Impact Study, Facilities Study	Project #134 (10MW) is combined with Project #153 (15MW), revised combined LGIA is 25MW.
135 - Spion Kop Wind		March 24, 2011	Geyser, Montana	100kV line West of Geyser	Network Resource	Yes	December 31, 2012	Wind	16 MW	16 MW	In Service		Project provided written notification, Commercial Operation Date is now October 1, 2012.
136 - Exergy Wind		April 6, 2011	Anaconda, Montana	Mill Creek Substation 100kV	Energy Resource		December 31, 2012	Wind	20 MW	20 MW	Withdrawn		
137 - Mountain View Wind		April 13, 2011	Stillwater County, Montana	Columbus Rapelje Auto Substation	Energy Resource		December 31, 2012	Wind	10 MW	10 MW	Withdrawn		
138 - Beacon Power		April 19, 2011	Deer Lodge County, Montana	Millcreek Substation 230kV Switchyard	Energy Resource	Yes	July 29, 2011	Flywheel	1 MW	1 MW	Withdrawn		Pursuant to Section 2 of the SGIP, this is a fast track project, therefore studies were not required.
139 - Musselshell Wind		May 9, 2011	Golden Valley County, Montana	100kV line between Harlowton Sub and Broadview Switchyard	Energy Resource		June 30, 2011	Wind	10 MW	10 MW	In Service		Project provided written notification, Commercial Operation Date is now November 15, 2012.
140 - NaturEner		May 27, 2011	Glacier County, Montana	6 to 9 miles SSE of Cut Bank, MT	Energy Resource		December 31, 2011	Wind	45	45	Withdrawn	System Impact Study, Facilities Study	
141 - Judith Gap Wind 2		June 16, 2011	Wheatland County, Montana	230 kV Interconnection to NWE existing Judith Gap Switchyard	Energy Resource		November 1, 2012	Wind	9.87	9.87	Withdrawn		
142 - Judith Gap Wind 3		June 16, 2011	Wheatland County, Montana	230 kV Interconnection to NWE existing Judith Gap Switchyard	Energy Resource		November 1, 2012	Wind	9.87	9.87	Signed SGIA		
143		June 16, 2011	Wheatland County, Montana	100 kV line between Belt and Monarch	Energy Resource		November 1, 2012	Wind	9.87	9.87	Withdrawn		
144		June 16, 2011	Wheatland County, Montana	69kV between Armington and Stockett	Energy Resource		November 1, 2012	Wind	9.87	9.87	Withdrawn		
145		July 18, 2011	Stillwater County, Montana	10 miles north of Columbus, MT	Energy Resource Network Resource		December 31, 2013	Wind	200	200	Withdrawn		
146 - Kelly Hills		July 22, 2011	Sweet Grass County, Montana	8 miles west of Big Timber	Energy Resource		December 31, 2013	Wind	20	20	Withdrawn	System Impact Study, Facilities Study	
147		August 5, 2011	Stillwater County, Montana	10 miles north of Columbus, MT	Energy Resource Network Resource		December 31, 2013	Wind	200	200	Withdrawn		
148 - Lonetree Wind		January 16, 2012	Stillwater County, Montana	10 miles north of Columbus, MT	Energy Resource		December 31, 2014	Wind	80	80	Signed LGIA	System Impact Study, Facilities Study	
149		March 9, 2012	Wheatland County, Montana	5.6 Miles ESE of Martinsdale on NWE's 100kV line	Energy Resource		October 31, 2012	Wind	10	10	Withdrawn	Feasibility Study System Impact Study Facilities Study	

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
150		March 22, 2012	Big Horn County, Montana	NWE's 69kV line near Toluca Siding	Energy Resource		December 31, 2014	Wind	20	20	Withdrawn	Feasibility Study	
151 - New Colony Wind		April 3, 2012	Wheatland County, Montana	Adjacent to Martinsdale Sub	Energy Resource		October 31, 2013	Wind	20	20	Signed LGIA	Feasibility Study System Impact Study Facilities Study Revised Facilities Study	Project #151 (20MW) is combined with Project #156 (5MW), revised combined LGIA is 25MW.
152- Two Dot Wind		August 1, 2012	Wheatland County, Montana	100kV line between Martinsdale and Two Dot Sub	Energy Resource		December 30, 2013	Wind	10	10	In Service	System Impact Study Facilities Study	
153 - Greenfield Wind Two		August 7, 2012	Teton County, Montana	69kV line East of Bole Substation	Energy Resource		December 30, 2012	Wind	15	15	Signed LGIA	System Impact Study Facilities Study	Project #153 (15MW) is combined with Project #134 (10MW), revised combined LGIA is 25MW.
154		August 22, 2012	Madison County, Montana	100 kV line approximately 1.5 miles north of Bradley Creek Substation.	Energy Resource		December 31, 2013	Wind	18	18	Withdrawn	System Impact Study	
155		August 24, 2012	Valley County, Montana	NWE's Glasgow AFB Substation	Energy Resource		October 1, 2013	Wind	20	20	Withdrawn		
156 - New Colony Wind 2		August 31, 2012	Wheatland County, Montana	Adjacent to Martinsdale Sub	Energy Resource		October 31, 2013	Wind	5	5	Signed LGIA	System Impact Study	Project #156 (5MW) is combined with Project #151 (20MW), revised combined LGIA is 25MW.
157-Crazy Mountain Wind		September 12, 2012	Sweet Grass County, Montana	NWE's 50kV line between Livingston and Big Timber	Energy Resource		December 31, 2012	Wind	20	20	Withdrawn	System Impact Study Facilities Study	This project is combined with Project #168 (5MW), combined total of 25MW LGIA.
158 - Big Otter Wind Energy		September 14, 2012	Cascade County, Montana	100kV line between Belt and Monarch	Network Resource Energy Resource		December 31, 2013	Wind	24.3	24.3	Signed LGIA	System Impact Study Facilities Study	
159		September 25, 2012	Big Horn County, Montana	Hardin Auto 115kV Substation	Energy Resource		August 1, 2014	Solar	20	20	Withdrawn	Feasibility	
160-GreyCliff Wind		October 2, 2012	Sweet Grass County, Montana	NWE's 161kV line in Sweet Grass County	Energy Resource		December 31, 2013	Wind	20	20	Withdrawn	System Impact	Interconnection Request withdrawn.
161-Kenfield Wind II		October 22, 2012	Liberty County, Montana	NWE's 69kV line 1 mile east of Chester, MT	Energy Resource		December 31, 2013	Wind	10	10	Withdrawn	System Impact	
162 - Gordon Butte 3		April 8, 2013	Meagher County, Montana	100 kV line between Loweth and Two Dot at Groveland.	Energy Resource		April 8, 2013	Wind	1	1	In Service		Pursuant to Section 2 of the SGIP, this is a fast track project, therefore studies were not required.
163		July 23, 2013	Rosebud and Custer County, Montana	9 miles North of the Colstrip Substation	Energy Resource Network Resource		December 1, 2016	Wind	301	301	Withdrawn		
164	1	September 30, 2013	Rosebud and Custer County, Montana	9 miles North of the Colstrip Substation	Energy Resource		December 1, 2016	Wind	301	301	Active	Feasibility Study System Impact Study System Inpact Study-Revised	Certain studies in the interconnection process for this project have been delayed due to customer requests or at NorthWestern's request, in accordance with the LGIP/OATT, but the project's queue position is still active and appropriate.
165 - B&H Wind		October 3, 2013	Bon Homme County, South Dakota	Tripp Junction Substation			June 15, 2014	Wind	130	130	In Service		
166-LSI		October 17, 2013	LSI Water Treatment Plant in Alpena, SD	LSI Water Treatment Plant in Alpena, SD				Biogas	450 kw	450 kw	In Service		Pursuant to Section 2 of the SGIP, this is a fast track project, therefore studies were not required.
167		November 27, 2013	Spokane Bench 12.47 kV Distribution System	Spokane Bench 12.47 kV Distribution system near Canyon Ferry Dam	Energy Resource		April 1, 2016	Hydro	9.8 MW	9.8 MW	Withdrawn	Feasibility Study System Impact Study	Interconnection Request withdrawn.
168		December 17, 2013	Sweet Grass County, Montana	NWE's 50kV line between Livingston and Big Timber	Energy Resource		December 31, 2014	Wind	5 MW	5 MW	Withdrawn	System Impact Study Facilities Study	The 5MW Request is in addition to Project #157. This project is combined with Project #157 (20MW), combined total of 25MW LGIA.
169		April 18, 2014	Big Horn County, Montana	Yellowtail Substation	Energy Resource		December 31, 2017	Hydro	10 MW	10 MW	Withdrawn	Feasibility Study	Interconnection Request withdrawn.
170		July 9, 2014	Big Horn County, Montana	NWE's 230 kV Line-15 miles East of the South Huntley Substation, and 10 miles West of the Crossover Substation	Energy Resource Network Resource		April 16, 2016	Wind & Gas Fired	62.5 MW	62.5 MW	Withdrawn		Interconnection Request withdrawn.
171		July 14, 2014	Geyser, Montana	NWE's Spion Kop 100 kV Switchyard	Energy Resource Network Resource		December 31, 2015	Wind	25 MW	25 MW	Withdrawn		Interconnection Request withdrawn.
172 - Greycliff Wind Prime		August 26, 2014	Sweet Grass County, Montana	NWE's 161kV line in Sweet Grass County	Energy Resource		December 15, 2015	Wind	20 MW	20 MW	Signed LGIA	System Impact Study Facilities Study	Project #172 (20MW) is combined with Project #202 (5MW), revised combined LGIA is 25MW.
173		September 26, 2014	Fort Harrison, Montana	Secondary side of existing NWE transformer feeding the Training Support Facility	Energy Resource		November 1, 2014	Gas Fired	60 kW	60 kW	Withdrawn		Interconnection Request withdrawn.
174		December 3, 2014	Lewis and Clark County	HWY 12, East, East Helena, MT	Energy Resource		December 31, 2015	Solar	6 MW	6 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
175		December 3, 2014	Lewis and Clark County	HWY 12, East, East Helena, MT	Energy Resource		December 31, 2015	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Project #175 was combined with Project #174 to become one 6 MW Project, per Customers request.
176		December 29, 2014	Meagher County, Montana	3 Miles West of Martinsdale, MT	Energy Resource		June 1, 2019	Pumped Hydro	600 MW	600 MW	Withdrawn	Feasibility Study	Interconnection Request withdrawn.
177-Kerr Hydroelectric Increase		January 13, 2015	Lake County, Montana	Kerr Switchyard	Energy Resource Network Resource	Yes	June 30, 2015	Hydro	14 MW	14 MW	In Service	System Impact Study	
178-Magpie Solar		January 15, 2015	Golden Valley County, Montana	Lavina Substation, Lavina, MT	Energy Resource		December 31, 2016	Solar	3 MW	3 MW	Signed SGIA	Feasibility Study System Impact Study Facilities Study	In-service date 8/31/2016
179- Green Meadow Solar		January 28, 2015	Lewis and Clark County	Green Meadow Drive, Helena, MT	Energy Resource		June 30, 2015	Solar	3 MW	3 MW	Signed SGIA	System Impact Study Facilities Study Facilities Study-Revised	In-service date 8/31/2016
180		January 28, 2015	Yellowstone County, Montana	Mosdal Road, Broadview, MT	Energy Resource		June 30, 2015	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
181		February 9, 2015	Lewis and Clark County	Green Meadow Drive, Helena, MT	Energy Resource		June 30, 2015	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
182		February 9, 2015	Yellowstone County, Montana	Mosdal Road, Broadview, MT	Energy Resource		June 30, 2015	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
183		February 9, 2015	Yellowstone County, Montana	Mosdal Road, Broadview, MT	Energy Resource		June 30, 2015	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
184-Deer Creek Road Solar 1		February 20, 2015	Missoula County, Montana	Bonner Substation, Missoula	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Signed SGIA	System Impact Study System Impact-Re-Study Facilities Study	Project #185 & #186 combined with Project #184. After Material Modification review, Customer requested project to return to original 3 MW project. In-service date 8/31/2016
185		February 20, 2015	Missoula County, Montana	Bonner Substation, Missoula	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Project #185 & #186 combined with Project #184
186		February 20, 2015	Missoula County, Montana	Bonner Substation, Missoula	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Project #185 & #186 combined with Project #184
187		February 20, 2015	Lewis and Clark County	Helena Valley Substation, Helena	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
188		February 20, 2015	Lewis and Clark County	Helena Valley Substation, Helena	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
189		February 20, 2015	Lewis and Clark County	Helena Valley Substation, Helena	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
190		February 23, 2015	Deer Lodge County, Montana	Anaconda City Substation, Ananconda	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
191		February 23, 2015	Deer Lodge County, Montana	Anaconda City Substation, Ananconda	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.

Project Number	Queue Position	Date Interconnection Request Received	Location	Interconnect Point	Type of Interconnection Service Requested	NorthWestern Energy Affiliate	In-Service Date	Generating Facility Type	Summer Output (MW)	Winter Output (MW)	Status	Studies Available	Comments
192		February 23, 2015	Deer Lodge County, Montana	Anaconda City Substation, Ananconda	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
193-South Mills Solar 1		February 23, 2015	Big Horn County, Montana	Hardin Substation, Hardin	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Signed SGIA	System Impact Study System Impact-Re-Study Facilities Study	Project #194 & #195 combined with Project #193. After Material Modification review, Customer requested project to return to original 3 MW project. In-service date 8/31/2016
194		February 23, 2015	Big Horn County, Montana	Hardin Substation, Hardin	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Project #194 & #195 combined with Project #193
195		February 23, 2015	Big Horn County, Montana	Hardin Substation, Hardin	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Project #194 & #195 combined with Project #193
196		February 23, 2015	Silver Bow County, Montana	Feely Hill Substation, Butte	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
197		February 23, 2015	Silver Bow County, Montana	Feely Hill Substation, Butte	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
198		February 23, 2015	Silver Bow County, Montana	Feely Hill Substation, Butte	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
199-Ragen Ranch Solar 1		February 27, 2015	Broadwater County, Montana	Townsend Substation, Townsend	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Signed SGIA	System Impact Study Facilities Study	In-service date 8/31/2016
200		February 27, 2015	Broadwater County, Montana	Townsend Substation, Townsend	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
201		February 27, 2015	Broadwater County, Montana	Townsend Substation, Townsend	Energy Resource		April 1, 2016	Solar	3 MW	3 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
202 - Greycliff Wind Prime		April 7, 2015	Sweet Grass County, Montana	NWE's 161kV line in Sweet Grass County	Energy Resource		April 1, 2016	Wind	5 MW	5 MW	Signed LGIA	System Impact Study	Project #202 (5MW) is combined with Project #172 (20MW), revised combined LGIA is 25MW.
203-River Bend Solar		April 24, 2015	Stillwater County, Montana	Reed Point Substation, Reed Point	Energy Resource		April 1, 2016	Solar	2 MW	2 MW	Signed SGIA	System Impact Study Facilities Study	In-service date 8/31/2016
204 - Great Divide Solar		May 1, 2015	Lewis and Clark County	Canyon Creek Substation, Canyon Creek	Energy Resource		September 30, 2016	Solar	3 MW	3 MW	Active	Feasibility Study System Impact Facilities Study	
205	2	July 8, 2015	Kimball, South Dakota	Brule County Substation, SD	Energy Resource		December 1, 2016	Wind	20 MW	20 MW	Active	System Impact Study	
206	3	July 8, 2015	Mitchell, South Dakota	Davidson County Substation, SD	Energy Resource		December 1, 2016	Wind	20 MW	20 MW	Active	System Impact Study	
207	4	July 20, 2015	Yellowstone County, Montana	NWE Broadview 230kV Substation	Energy Resource		December 1, 2018	Wind	250 MW	250 MW	Active	Feasibility Study System Impact Study	
208	5	July 23, 2015	White Lake, South Dakota	White Lake Substation, SD	Energy Resource		December 1, 2016	Wind	20 MW	20 MW	Active	System Impact Study System Impact Study-Revised	
209	6	August 5, 2015	Sweet Grass County, Montana	NWE's 50 kV line between Livingston and Big Timber	Energy Resource		December 31, 2016	Wind	25 MW	25 MW	Active	System Impact Study Facilities Study	
210		August 13, 2015	Geyser, Montana	NWE's Spion Kop 100 kV Switchyard	Energy Resource	Yes	December 31, 2016	Wind	25 MW	25 MW	Withdrawn	System Impact Study	Interconnection Request withdrawn.
211	7	September 17, 2015	Cascade County, Montana	Riverside Substation, Great Falls, MT	Energy Resource		July 31, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
212		November 16, 2015	Cascade County, Montana	Vaughn Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
213		November 16, 2015	Cascade County, Montana	Portage Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
214		November 16, 2015	Judith Basin County, Montana	Windham Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
215	8	November 16, 2015	Lewis and Clark County	Landers Fork Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
216	9	November 16, 2015	Silver Bow County, Montana	Divide Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
217		November 16, 2015	Silver Bow County, Montana	South Butte Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
218		November 16, 2015	Judith Basin County, Montana	Windham Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
219	10	November 16, 2015	Lewis and Clark County	Helena Valley Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
220		November 16, 2015	Cascade County, Montana	Raynesford Pump Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
221	11	November 16, 2015	Lewis and Clark County	Canyon Creek Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
222	12	November 16, 2015	Cascade County, Montana	Great Falls Riverview Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
223	13	November 16, 2015	Cascade County, Montana	Southwest Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
224		November 23, 2015	Cascade County, Montana	Great Falls Northwest Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
225	14	November 23, 2015	Cascade County, Montana	Great Falls Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
226	15	November 23, 2015	Madison County, Montana	Sheridan City Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
227		November 23, 2015	Judith Basin County, Montana	Moccasin Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
228		November 23, 2015	Judith Basin County, Montana	Moccasin Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
229		November 23, 2015	Silver Bow County, Montana	Fairmont Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
230		November 23, 2015	Cascade County, Montana	Stockett Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
231	16	November 23, 2015	Cascade County, Montana	Ulm Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
232	17	November 23, 2015	Cascade County, Montana	Vaughn Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
233	18	December 7, 2015	Cascade County, Montana	Southwest Substation	Energy Resource		October 1, 2016	Solar	3 MW	3 MW	Active	System Impact Study	
234	19	December 29, 2015	Rosebud & Custer Counties, Montana	Colstrip 500 kV Bus	Energy Resource Network Resource		September 1, 2018	Wind	750 MW	750 MW	Active		
235	20	December 29, 2015	Cascade County, Montana	Ulm Substation	Energy Resource		December 1, 2016	Solar	3 MW	3 MW	Active		
236	21	December 29, 2015	Silver Bow County, Montana	Industrial Park Substation	Energy Resource		December 1, 2016	Solar	3 MW	3 MW	Active		
237		December 29, 2015	Judith Basin County, Montana	Stanford City Substation	Energy Resource		December 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
238		December 29, 2015	Judith Basin County, Montana	Geyser Substation	Energy Resource		December 1, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
239	22	December 29, 2015	Judith Basin County, Montana	Stanford City Substation	Energy Resource		December 1, 2016	Solar	3 MW	3 MW	Active		
240	23	December 29, 2015	Gallatin County, Montana	Riverside Substation, Bozeman, MT	Energy Resource		December 1, 2016	Solar	3 MW	3 MW	Active		
241	24	February 3, 2016	Liberty County, Montana	Chester Substation, Chester, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Active		
242	25	February 3, 2016	Cascade County, Montana	Great Falls Southside Subsation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
243	26	February 16, 2016	Chouteau County, Montana	Fort Benton Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
244	27	February 18, 2016	Stillwater County, Montana	Wilsall - Shorey Road 230 kV Line	Energy Resource Network Resource		December 31, 2018	Wind	396 MW	396 MW	Active		
245		February 24, 2016	Carbon County, Montana	Bridger City Substation	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
246	28	February 29, 2016	Cascade County, Montana	Treasure State	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
247	29	February 29, 2016	Pondera County, Montana	Conrad Pump	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
248	30	February 29, 2016	Carbon County, Montana	Fromberg Substation, Fromberg, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Active		
249	31	February 29, 2016	Liberty County, Montana	Chester Substation, Chester, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Active		
250	32	February 29, 2016	Chouteau County, Montana	Loma Substation, Loma, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Active		
251	33	February 29, 2016	Phillips County, Montana	Malta City Substation, Malta, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Active		
252		February 29, 2016	Hill County, Montana	Gildford Substation, Havre, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
253	34	February 29, 2016	Wheatland County, Montana	Harlowton Substation, Harlowton, MT	Energy Resource		November 1, 2016	Solar	2.5 MW	2.5 MW	Active		
254	35	February 29, 2016	Cascade County, Montana	Treasure State	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
255		February 29, 2016	Chouteau County, Montana	Geraldine Substation, Geraldine, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
256		February 29, 2016	Park County, Montana	Downer Substation, Livingston, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
257	36	February 29, 2016	Chouteau County, Montana	Big Sandy Substation, Big Sandy, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Active		
258		February 29, 2016	Phillips County, Montana	Malta East Rural, Saco, MT	Energy Resource		November 30, 2016	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
259	37	March 8, 2016	Cascade County, Montana	Great Falls Northwest Substation	Energy Resource		March 1, 2017	Solar	3 MW	3 MW	Active		
260	38	March 8, 2016	Wheatland County, Montana	Judith Gap Substation	Energy Resource		March 1, 2017	Solar	3 MW	3 MW	Active		
261	39	March 14, 2016	Wheatland County, Montana	Two Dot Substation Distribution	Energy Resource		December 1, 2017	Wind	3 MW	3 MW	Active		
262	40	March 21, 2016	Cascade County, Montana	Ulm Substation	Energy Resource		March 1, 2017	Solar	3 MW	3 MW	Active		
263	41	March 21, 2016	Teton County, Montana	Choteau Substation	Energy Resource		March 1, 2017	Solar	3 MW	3 MW	Active		
264	42	March 21, 2016	Chouteau County, Montana	Geraldine Substation, Geraldine, MT	Energy Resource		March 1, 2017	Solar	2 MW	2 MW	Active		
265	43	March 23, 2016	Cascade County, Montana	Great Falls Northwest Substation	Energy Resource		May 31, 2017	Solar	3 MW	3 MW	Active		
266	44	March 23, 2016	Carbon County, Montana	Bridger City Substation	Energy Resource		May 31, 2017	Solar	3 MW	3 MW	Active		
267	45	March 23, 2016	Hill County, Montana	Havre City Substation	Energy Resource		May 31, 2017	Solar	3 MW	3 MW	Active		
268		March 23, 2016	Hill County, Montana	Rudyard Substation	Energy Resource		May 31, 2017	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.

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269	46	March 29, 2016	Madison County, Montana	Twin Bridges Substation	Energy Resource		August 1, 2017	Solar	3 MW	3 MW	Active		
270		March 29, 2016	Pondera County, Montana	Conrad City Substation	Energy Resource		August 1, 2017	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
271		March 29, 2016	Madison County, Montana	Harrison-Pony Substation	Energy Resource		August 1, 2017	Solar	3 MW	3 MW	Withdrawn		Interconnection Request withdrawn.
272	47	April 15, 2016	Judith Basin County, Montana	Stanford City Substation	Energy Resource		November 1, 2016	Solar	3 MW	3 MW	Active		
273	48	April 19, 2016	Fergus County, Montana	Moore Substation	Energy Resource		July 1, 2017	Solar	3 MW	3 MW	Active		
274	49	April 19, 2016	Cascade County, Montana	Great Falls Rverview Substation	Energy Resource		July 1, 2017	Solar	3 MW	3 MW	Active		
275	50	April 25, 2016	Sweet Grass County, Montana	NWE's 50 kV line between Livingston and Big Timber	Energy Resource		September 30, 2017	Wind	20 MW	20 MW	Active		