NorthWestern Energy
Delivering a Bright Future

August 15, 2016

Mr. Will Rosquist
Administrator, Regulatory Division
Montana Public Service Commission
1701 Prospect Avenue
PO Box 2022601
Helena, Montana 59620-2601

Re: Docket No. D2016.5.39
QF-1 Avoided Cost Rate Filing
Vote Solar Set 1 Data Requests (001-012)

Dear Mr. Rosquist:

Enclosed for filing is a copy of NorthWestern Energy's responses to the Vote Solar Set 1 Data Requests in Docket No. D2016.5.39. It has been hand delivered to the Montana Public Service Commission and the Montana Consumer Counsel this date. It has also been e-filed on the PSC website and sent via First Class Mail to attached service list.

Should you have questions please contact Joe Schwartzenberger at (406) 497-3362.

Sincerely,

Tracy Lowney Killoy

Tracy Lowney Killoy
Administrative Assistant

CERTIFICATE OF SERVICE

I hereby certify that a copy of NorthWestern Energy's responses to the Vote Solar Set 1 Data Requests in Docket No. D2016.5.39, the QF-1 Avoided Cost Rate Filing, has been hand-delivered to the Montana Public Service Commission and one copy has been hand-delivered to the Montana Consumer Counsel this date. It has also been e-filed on the Commission website and sent via First Class Mail to attached service list.

Date: August 15, 2016

Tracy Lowney Killoy
Administrative Assistant
Regulatory Affairs

Docket Service List
Docket No. D2016.5.39

Will Rosquist
Public Service Commission
1701 Prospect Ave
Helena MT 59620-2601

Jason Brown
Montana Consumer Counsel
PO Box 201703
Helena MT 59620-1703

John Alke
NorthWestern Energy
208 N Montana Ave Suite 205
Helena MT 59601

Tracy Lowney Killoy
NorthWestern Energy
11 E Park Street
Butte MT 59701

Joe Schwartzenberger
NorthWestern Energy
11 E Park Street
Butte MT 59701

Jenny K Harbine
Earthjustice
313 East Main St.
Bozeman MT 59715

Tom K Hopgood
Luxan & Murfitt, PLLP
P O Box 1144
Helena MT 59624

Al Brogan
NorthWestern Energy
208 N Montana Ave Suite 205
Helena MT 59601

Eric Christensen
Cairncross Hempelmann
524 Second Ave, Suite 500
Seattle WA 98104

Mike J Uda
Uda Law Firm, P.C.
7 West Sixth Avenue
Power Block West, Suite 4H
Helena MT 59601

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-001 Subject: Application Workpapers

Please provide all workpapers for NWE's testimony in Docket No. D2016.5.39, *Application for Approval of Avoided Cost Tariff Schedule QF-1.* Please include in these workpapers:

a. Mr. Bushnell's calculation that one single 3-MW solar project will cost consumers approximately $5.1 million in extra costs over the life of the project, as shown in Exh. JBB-2, page 9 of 10.

b. The hourly output of the six solar projects that Mr. Bushnell modeled, as referenced on page JBB-5. Also provide the System Advisor Model runs that Mr. Bushnell performed, with all input settings specified.

c. The details for the determination of the Avoided Cost of Capacity in Exh. JBB-2, page 9 of 10, including the derivation of the levelized 25-year capacity rate of $115.35/kW-year as referenced by Mr. Bushnell on page JBB-13.

d. All calculations of the capacity factors and default capacity contributions from hydro, wind, and solar resources, as well as all data used in these calculations, as referenced in Mr. Bushnell's revised testimony on page JBB-5.

e. The calculations of the TVPRR, LVLCR, and RCC shown in Exh. JBB-2, page 7 of 10.

Please provide Mr. Bushnell's and Mr. Hansen's workpapers in Excel format with all formulas intact.

RESPONSE:

a. See the folder labeled "VS-001a" on the attached CD.

b. The results of System Advisor Model (SAM) runs were exported to Excel using the "Send to Excel" option, copied into the Excel file provided in VS-001a, and then deleted. These runs may be recreated using the "DNV Simulation.sam" file and the weather files for Anaconda, Billings/Broadview, Townsend, Great Falls, Bozeman/Belgrade and Missoula. See the folder labeled "VS-001b" on the attached CD.

VS-001 cont'd

c. See the folder labeled "VS-001c" on the attached CD. The file is a copy of the work papers contained in John Bushnell's supplemental testimony – except that formula reference errors in column G of Tab "Lev Capacity" have been corrected. PSC staff (Will Rosquist) discovered this error during informal discovery on the NorthWestern's filing. The effect of this error is to increase the 25-year levelized capacity payment from $115.35/kW-year to $141.18/kW-year. This change will be reflected in John Bushnell's rebuttal testimony.

d. For Wind: The 38 percent annual capacity factor and 5 percent capacity contribution are legacy numbers that have been accepted for purposes of setting wind QF rates in previous QF-1 proceedings.

For Hydro: See the folder labeled "VS-001d" on the attached CD.

For Solar: See the folder labeled "VS-001d" on the attached CD. Mr. Bushnell could not validate the solar production data for this response – the likely cause is believed to be that the initial analysis was based upon a solar resource definition that was later updated in SAM. When recalculated using the solar resource definition provided in response to VS-001b, and four years of Anaconda data, the 85% exceedance level increases from 7.8% to 9.6%. This change will be reflected in John Bushnell's rebuttal testimony.

e. See the folder labeled "VS-001e" on the attached CD.

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-002 Subject: 2015 Electricity Supply Resource Procurement Plan Workpapers

Please provide all workpapers for NWE's *2015 Electricity Supply Resource Procurement Plan* (Plan), including in particular the forecasts for natural gas and electric power prices used in the Plan, as referenced by Mr. Hines' testimony at page JDH-8.

RESPONSE:

See the "VS-002" folder on the CD attached to Data Request VS-001.

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-003 Subject: Current Avoided Costs (Hines Testimony)

Concerning NWE's currently effective avoided cost prices, as discussed on page JDH-5 of Mr. Hine's testimony, please provide:

a. Order No. 7199d in Docket No. D2012.1.3,

b. the subsequent compliance filing that NWE submitted in August 2013,

c. the complete workpapers associated with that compliance filing, showing the calculations that NWE used to develop those avoided cost prices, and

d. NWE's complete testimony in Docket No. D2012.1.3.

RESPONSE:

a. The complete docket is available on the Montana Public Service Commission website at the following link: http://psc.mt.gov/Docs/ElectronicDocuments/getDocumentsInfo.asp?docketId=10055&do=false

b. See the response to part a, above.

c. See the "VS-003" folder on the CD attached to Data Request VS-001.

d. See the response to part a, above.

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-004 Subject: Past QF Costs (Exhibit JDH-2)

Please provide a working Excel version of the spreadsheet "Net Tier II CTC – QF Charges Estimates w/Proceeds Credit" attached as Exh. JDH-2 to Mr. Hines' testimony, as well as the full filing from which it was taken.

RESPONSE:

NorthWestern no longer has a working Excel version of the spreadsheet page provided as Exhibit__(JDH-2). That document was originally provided in Docket No. D97.7.90 as page 1 of 4 of Exhibit__(PRC-C) accompanying the Prefiled 2001 Tier II Testimony of Patrick R. Corcoran.

Docket No. D97.7.90 can be found on the Montana Public Service Commission website at the following link:
http://psc.mt.gov/Docs/ElectronicDocuments/getDocumentsInfo.asp?docketId=1214&do=false

The aforementioned exhibit starts on page 159 of 375 of the 2001 TIER II FILING filed on October 29, 2001.

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-005 Subject: Capacity Contribution of Wind and Solar (Bushnell Testimony)

Concerning the proposed method to calculate the capacity contribution of wind and solar resources (Bushnell testimony, at p. JBB-10):

a. Please provide references to any other jurisdiction that uses an 85% exceedance value in the highest 10% of load hours in the on-peak period to set the capacity value of solar or wind resources.

b. Please provide references to all documents, sources, or reports that Mr. Bushnell reviewed or consulted in deciding to choose this method for establishing the capacity contribution of wind and solar resources.

c. Mr. Bushnell states that "Opinions differ as to the capacity contribution of intermittent QF resources" (p. JBB-13). Please provide his understanding of what those differences of opinion are.

d. Was Mr. Bushnell's testimony in Docket No. D2012.1.3 concerning the use of 85% exceedance to determine capacity contribution (as referenced on page JBB-11) adopted by the Commission?

RESPONSE:

a. The On-Peak period in the QF-1 Tariff is defined to be the heavy load hours for January, February, July, August, and December. This definition, to Mr. Bushnell's knowledge, is unique to Montana QF-1 Tariffs. Mr. Bushnell knows of no other jurisdiction that uses an 85% exceedance value in the highest 10% of load hours in the on-peak period to set the capacity value of solar or wind resources, or hydroelectric resources.

b. The proposal to measure and pay for measured capacity is based upon the witness's past experience in QF proceedings before the MPSC, but the proposed method most closely resembles the SPP method as outlined by NREL Conference Paper NREL/CP-500-43433, June 2008. The major differences are:
   - SPP calculates capacity contribution monthly instead of annually;
   - SPP uses 10% of all hours instead of 10% of On-Peak hours, and
   - SPP averages up to ten years instead of five years.

   SPP recently changed its methodology, reducing the exceedance from 85% to 60%.

VS-005 cont'd

c. The statement is a generalization of Mr. Bushnell's experience, including the record in Docket No. D2012.2.3.

d. No. However, the proposals contained in this filing are not the same as the proposals contained in Docket No. D2012.1.3. In Docket No. D2012.1.3, NorthWestern's proposal was to set the capacity contribution using an 85% exceedance method. In this proceeding, NorthWestern's proposal is to use an 85% exceedance method to measure capacity contribution and pay each QF for their contribution (a five-year average).

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-006 Subject: NWE Generating Resources

Please provide the nameplate capacity and assumed firm capacity contribution from all of NWE's owned and contracted generating resources, including its owned and contracted hydro, wind, and solar resources. This data should be consistent with NWE's current Plan.

RESPONSE:

See the chart below.

RESOURCES	NAMEPLATE CAPACITY	CAPACITY CONTRIBUTION
Owned Hydro Electric Assets	442	270.2
Basin Creek	51.75	51.75
Colstrip	222	222
DGGS	150	150
CELP	35	35
YELP***	52	55
Physical Instruments*	107.4	59.4
Current Owned And Contracted Wind and Solar**	263.3	3.4

*Physical Instruments includes market purchase from PPL for 25 MW, purchase from Transalta for 25 MW, Turnbull Hydro, Flint Creek Hydro, Lower South Fork, Tiber, small QF-1 wind and hydro, and small Tier II hydro resources.

**Renewable wind and solar generators are represented in aggregate by their portfolio production of dependable energy during peak demand hours.

***Yellowstone Energy Limited Partnership executed a PPA that specifically listed contract capacity at 52 MW which is reflected in our tables; the actual plant was constructed at 65 MW which leads to the larger peak capacity for planning purposes.

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-007 Subject: Value of Environmental Benefits (Exhibit JBB-2)

Concerning the value of the Environmental Benefits shown in Exh. JBB-2, pages 1 to 3 of 10:

a. Please provide the basis for the value of the Environmental Benefits that NWE has assumed.

b. Please explain why a 5-year contract is necessary in order for QFs to derive any monetary benefit from transferring these benefits to NWE.

RESPONSE:

a. The value of environmental benefits shown in Exhibit__(JBB-2) are reflective of the carbon price forecast contained in NorthWestern's 2015 Electricity Supply Resource Procurement Plan.

b. The carbon price forecast does not take effect until the year 2022. Therefore, QF-1 contracts with terms expiring prior to 2022 do not see any monetary benefit from transferring those benefits to NorthWestern. NorthWestern would not expect to see developers with short duration contracts transfer their environmental benefits to NorthWestern.

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-008 Subject: Avoided Costs (Hansen Testimony)

Concerning Table 2 of Mr. Hansen's testimony:

a. Please explain fully why the avoided cost price under the Long-1 condition is not the market price, because that is the opportunity cost of the utility to sell lower-cost power into the higher-priced market.

b. Please explain fully why the avoided cost price under the Long-2 condition is not the market price, because that is the lower cost at which the utility could buy power to serve its load, displacing its own generation with higher variable costs.

c. Please provide the number of hours in each PowerSimm run for each type of QF resource in which the avoided energy cost was zero as a result of the Long-2 condition.

RESPONSE:

a. Section 292.303 of Order 69 states, "A qualifying facility may seek to have a utility purchase more energy or capacity than the utility requires to meet its total system load. In such a case, while the utility is legally obligated to purchase any energy or capacity provided by a qualifying facility, the purchase rate should only include payment for energy or capacity which the utility can use to meet its total system load." The avoided cost rate should only include the energy that is used to meet the system load. For every hour NorthWestern's portfolio is long, the marginal cost/incremental cost would be the highest dispatchable resource used to serve load. Long-1 condition occurs during times that the market price is above the variable cost of any dispatchable generation resource. The avoided cost would be the variable cost of the marginal/highest cost dispatchable generation resource.

b. Section 292.303 of Order 69 states, "A qualifying facility may seek to have a utility purchase more energy or capacity than the utility requires to meet its total system load. In such a case, while the utility is legally obligated to purchase any energy or capacity provided by a qualifying facility, the purchase rate should only include payment for energy or capacity which the utility can use to meet its total system load." The avoided cost rate should only include the energy that is used to meet the system load. For every hour NorthWestern's portfolio is long, the marginal cost/incremental cost would be the highest dispatchable resource used to serve load. Long-2 condition occurs during times that the market price is below

VS-008 cont'd

the variable cost of any dispatchable generation resource. The avoided cost would be zero as there is no avoidable resource.

c. See the chart below.

Hours by Resource when short, Long-1, and Long-2			
	Wind	Solar	Hydro
Short	105,455	106,219	104,873
Long-1	90,544	90,058	90,855
Long-2	23,145	22,867	23,415

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-009 Subject: Avoided Costs Methodology

Please explain whether and when the Commission has adopted the use of production cost model results for setting avoided cost prices.

RESPONSE:

The Montana Commission first adopted calculations of avoided cost based upon production costing models beginning in 1981 (Docket No. 81.2.15) and most recently on August 5, 2016 (Docket No. D2015.7.59).

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-010 Subject: Interconnection Requests (Exhibit AMM-1)

Concerning the interconnection requests received by NWE, as discussed by Mr. Hines (p. JDH-7) and Ms. Mueller (p. AMM-5), please provide an Excel version of Exh. AMM-1.

RESPONSE:

The interconnection requests received by NorthWestern are posted on the Company's Open Access Same-Time Information System (OASIS) website. Exhibit__(AMM-1) was downloaded from that website on April 28, 2016, and an updated version from June 7, 2016 was provided as Exhibit NWE-2 at the June 9 hearing. View the most current interconnection queue (an Excel document) at the following link:

http://www.oatioasis.com/NWMT/NWMTdocs/GenConnect7.html

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-011 Subject: NWE's Avoided Transmission and Distribution Costs

For use in calculating NWE's avoided transmission and distribution costs, please provide:

a. The voltage level at which each of the still-active solar projects in NWE's current interconnection queue would interconnect. Please indicate whether this is a distribution or transmission voltage on the NWE system.

b. For the most recent calendar year for which such data is available, please provide the following data:

   i. The hourly loads (i.e. the 8,760 hourly loads over the year) for each distribution substation on the company's system. Generic (e.g. numbered) substation labels may be used if the company prefers, for security reasons or to preserve customer confidentiality. Please indicate for what percentage of such substations the company has such hourly data. If hourly load data is only available for those distribution substations with SCADA, please provide that data for the substations with SCADA.
   ii. Alternatively, if hourly load data is not available for some distribution substations, please provide the magnitude of the annual peak load (in MW) at each such distribution substation that does not have hourly load data, and the time and date of such peak load, if available.
   iii. The maximum kW capacity of each distribution substation.

c. For the most recent calendar year for which such data is available, please provide the following data:

   i. The hourly loads (i.e. the 8,760 hourly loads over the year) for each transmission substation on the company's system. Generic (e.g. numbered) substation labels may be used if the company prefers, for security reasons or to preserve customer confidentiality. Please indicate for what percentage of such substations the company has such hourly data. If hourly load data is only available for those transmission substations with SCADA, please provide that data for the substations with SCADA.
   ii. Alternatively, if hourly load data is not available for some transmission substations, please provide the magnitude of the annual peak load (in MW) at each such transmission substation that does not have hourly load data, and the time and date of such peak load, if available.

VS-011 cont'd

iii. The maximum kW capacity of each transmission substation.

d. Please provide the company's current investment plan for its transmission and distribution facilities, preferably over the next five years, but for at least the next three years. This should include:

i. The annual transmission and distribution plant additions and retirements in each year, by FERC account if available.
ii. The forecasted annual peak demands, in MW, on the company's transmission and distribution systems.

e. Please provide data, by FERC account, on the company's historical investments for its transmission and distribution facilities for the last ten years (2006-2015).

RESPONSE:

a. See Attachment.

b. The requested information is being extracted from multiple data sources, and will be provided shortly.

c. The requested information is being extracted from multiple data sources, and will be provided shortly.

d. i. See Attachment.

ii. Below is the NorthWestern Transmission group's load forecast for NorthWestern's Balancing Authority Area.

VS-011 cont'd

Balancing Authority Area Load Forecast with DSM		
Peak MW		
Year	Summer	Winter
2016	1801	1729
2017	1821	1744
2018	1841	1759
2019	1861	1773
2020	1881	1778

Below is the NorthWestern Supply group's load forecast for the distribution system. It was taken from the 2015 Electricity Supply Resource Procurement Plan.

	1 in 2 Peak Demand Forecast Excluding DSM (MW)		
	Year	Winter	Summer
Forecast	2016	1224	1154
	2017	1244	1177
	2018	1264	1200
	2019	1285	1222
	2020	1305	1245

	Peak Demand DSM Savings Forecast (MW)		
	Year	Winter	Summer
Forecast	2016	40	38
	2017	50	48
	2018	60	58
	2019	69	66
	2020	79	76

	1 in 2 Peak Demand Forecast Including DSM (MW)		
	Year	Winter	Summer
Forecast	2016	1184	1116
	2017	1195	1129
	2018	1205	1143
	2019	1216	1156
	2020	1226	1169

e. See Attachment.

	A	B	C
1	**Active Solar Project**	**Substation**	**Voltage**
2	Martin Solar #215	Landers Fork Substation	25KV
3	River Solar #216	Divide Substation	25KV
4	Glass Solar #219	Helena Valley Substation	12.47KV
5	Canyon Creek Solar #221	Canyon Creek Substation	25KV
6	Malt Solar #222	Great Falls Riverview Substation	12.47KV
7	Fox Farm Solar #223	Great Falls Southwest Substation	12.47KV
8	Valley View Solar #225	Great Falls Northwest Substation	12.47KV
9	Ulm Solar #231	Ulm Substation	25KV
10	Couch Solar #232	Vaughn Substation	12.47KV
11	Fox Solar #233	Great Falls Southwest Substation	12.47KV
12	Chester Solar #241	Chester Substation	12.47KV
13	Portage Solar #242	Great Falls Southside Substation	12.47KV
14	Benton Solar #243	Fort Benton Substation	4.16KV
15	Bootlegger Solar I #246	Great Falls Riverview Substation	12.47KV
16	Manta Solar #247	Conrad City Substation	4.16KV
17	Fromberg Solar I #248	Fromberg Substation	12.47KV
18	Loma Solar I #250	Loma Substation	12.47KV
19	Malta Solar I #251	Malta City Substation	12.47KV
20	Cottonwood Solar #253	Harlowton Substation	4.16KV
21	Bootlegger Solar II #254	Great Falls Riverview Substation	12.47KV
22	Solar King #257	Big Sandy Substation	4.16KV
23	Stuckey Solar #259	Great Falls Northwest Substation	12.47KV
24	Ulm Solar #262	Ulm Substation	25KV
25	Choteau Solar #263	Choteau Substation	12.47KV
26	Geraldine Solar #264	Geraldine Substation	12.47KV
27	Great Falls Solar I #265	Great Falls Northwest Substation	12.47KV
28	Bridger Solar I #266	Bridger Substation	12.47KV
29	Havre Solar I #267	Havre Highland Park Substation	12.47KV
30	Stanford Solar #272	Stanford Substation	12.47KV
31	Great Falls Solar II #274	Great Falls Riverview Substation	12.47KV
32	Butte PV1 Solar #279	New transmission substation would be needed	100KV*
33	Petra Academy Solar #280	Bozeman Westside Substation	12.47KV
34	Dry Creek Solar #281	Straw Substation	12.47KV
35	Lavina Solar #282	Lavina Substation	4.16KV
36	Gage Solar #283	Jim Coulee Substation	12.47KV
37	Butte PV2 Solar #285	Industrial Park Substation	12.47KV
38	Toston PV1 Solar #289	Toston Substation	25 & 12.47KV**
39	South Butte PV1 Solar #292	South Butte Substation	12.47KV
40	Janney Solar #293	South Butte Substation or Industrial Park	12.47KV
41	Sypes Canyon Solar #294	Riverside Substation	12.47KV
42	Bear Gulch Solar #295	Twin Bridges Substation	12.47KV
43	Middle Solar #296	Sheridan City Substation	12.47KV
44	Sage Creek Solar #297	Stanford City Substation	12.47KV
45	NWE Bozeman Solar #298	Bozeman Westside Substation	12.47KV
46	Toston PV2 Solar #299	Toston Substation	25 & 12.47KV**
47			
48	* This is the only proposed interconnection to a transmission substation.		
49			
50	** Not studied yet; could be either voltage.		

NorthWestern Energy - Capital Update - 5-Year Plan - June 2016

2016-2020 5-Year Capital Summary

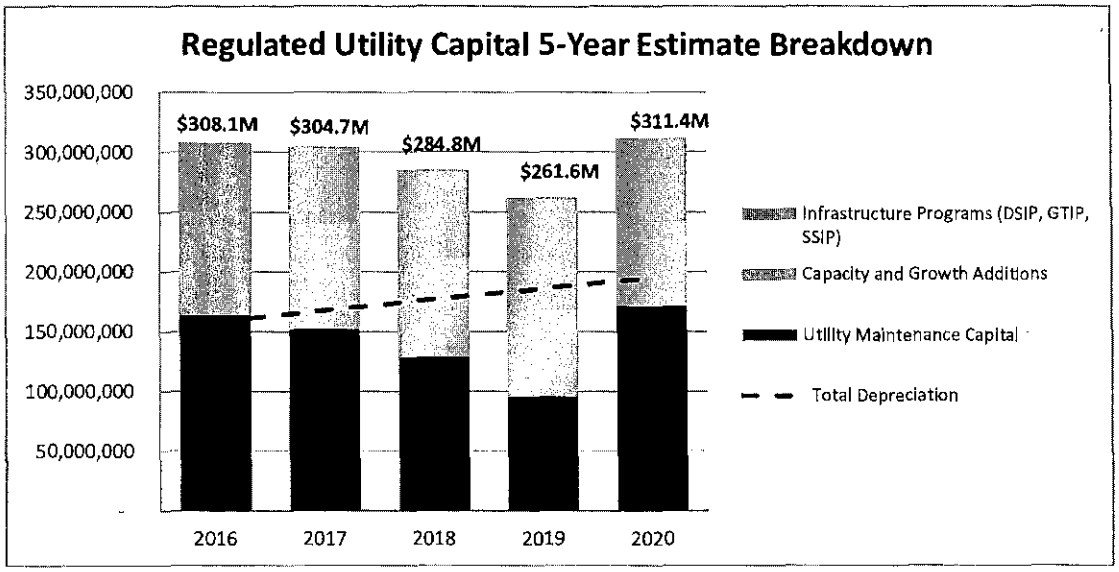
	2016	2017	2018	2019	2020	5-Year Total
Electric Distribution	73,174,732	92,726,013	100,416,634	91,599,752	115,153,803	473,070,935
Electric Transmission	69,077,990	67,696,959	60,214,287	61,823,895	39,543,979	298,357,110
Generation and Production	33,189,183	31,684,850	20,482,007	25,900,341	20,522,522	131,778,903
DSIP	51,846,047	43,224,546	21,500,000	21,145,028	36,854,972	174,570,592
Gas Distribution	15,496,222	14,781,289	14,128,139	14,316,884	12,076,352	70,798,886
Gas Transmission	22,403,685	27,652,171	40,605,821	28,702,023	74,839,112	194,202,812
Fleet, Facilities, BT, Comm, Other	34,608,189	25,435,620	27,413,111	18,102,077	12,369,259	117,928,256
Investment Growth Dakota Access, Sustainability	8,307,953	1,504,744	-	-	-	9,812,697
Total Capital	**308,104,000**	**304,706,192**	**284,760,000**	**261,590,000**	**311,360,000**	**1,470,520,191**

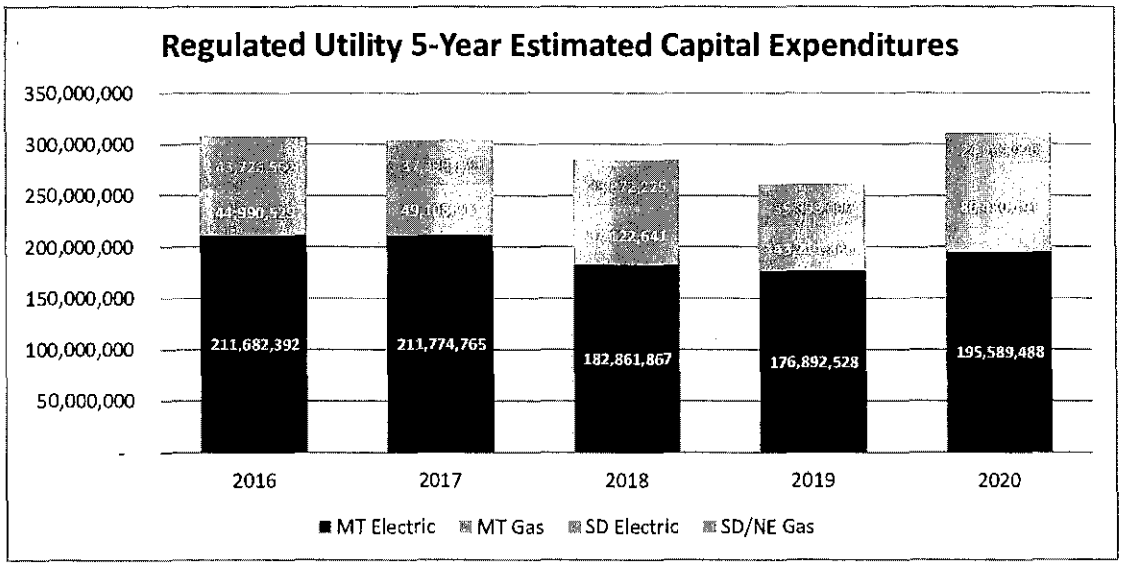
	2016	2017	2018	2019	2020	Total
Capacity and Growth Additions	78,196,692	86,270,793	83,091,658	72,516,450	71,250,466	391,326,058
Compliance NERC, PIM, HCA Gas	11,675,535	13,682,084	13,827,319	13,660,011	7,305,663	60,150,612
DSIP, GTIP, SSIP, and Infrastructure	58,045,603	65,214,816	72,967,338	93,727,032	68,741,701	358,696,489
Generation and Production	33,189,183	31,684,850	20,482,007	25,900,341	20,522,522	131,778,903
Fleet, Facilities, BT, Comm, Other	34,608,189	25,435,620	27,413,111	18,102,077	12,369,259	117,928,256
Investment Growth Dakota Access, Sustainability	8,307,953	1,504,744	-	-	-	9,812,697
Maintenance Capital - Praoctive, Reactive, Other	84,080,846	80,913,285	66,978,567	37,684,088	131,170,389	400,827,176
Total Capital	**308,104,000**	**304,706,192**	**284,760,000**	**261,590,000**	**311,360,000**	**1,470,520,191**

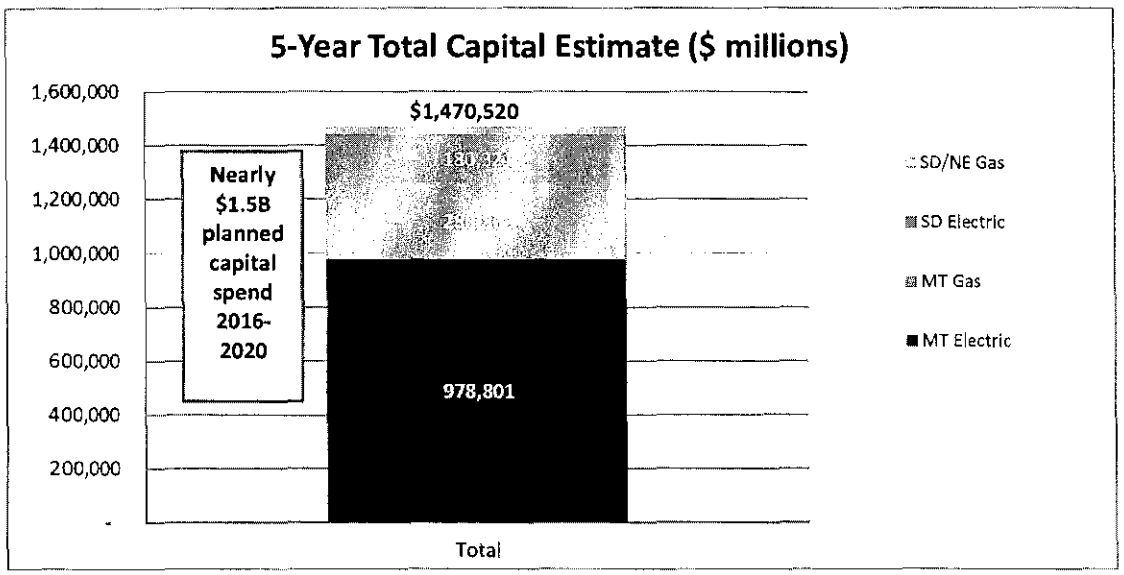
	2016	2017	2018	2019	2020	Total
Utility Maintenance Capital	163,553,753	151,715,839	128,701,004	95,346,518	171,367,833	710,684,947
Capacity and Growth Additions	86,504,645	87,775,537	83,091,658	72,516,450	71,250,466	401,138,755
Infrastructure Programs (DSIP, GTIP, SSIP)	58,045,603	65,214,816	72,967,338	93,727,032	68,741,701	358,696,489
Total Capital	**308,104,000**	**304,706,192**	**284,760,000**	**261,590,000**	**311,360,000**	**1,470,520,191**

	2016	2017	2018	2019	2020	Total
Montana	256,672,921	260,882,976	239,984,508	220,104,413	282,019,678	1,259,664,496
South Dakota/Nebraska	51,431,079	43,823,215	44,775,492	41,485,587	29,340,322	210,855,696
Total Capital	**308,104,000**	**304,706,192**	**284,760,000**	**261,590,000**	**311,360,000**	**1,470,520,191**

	2016	2017	2018	2019	2020	Total
MT Electric	211,682,392	211,774,765	182,861,867	176,892,528	195,589,488	978,801,040
MT Gas	44,990,529	49,108,211	57,122,641	43,211,885	86,430,191	280,863,456
SD Electric	43,726,562	37,399,178	38,372,225	35,853,097	24,969,926	180,320,989
SD/NE Gas	7,704,517	6,424,037	6,403,267	5,632,490	4,370,395	30,534,707
Total Capital	**308,104,000**	**304,706,192**	**284,760,000**	**261,590,000**	**311,360,000**	**1,470,520,191**


Regulated Utility Capital 5-Year Estimate Breakdown
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
-
$308.1M
$304.7M
$284.8M
$261.6M
$311.4M
2016
2017
2018
2019
2020
Infrastructure Programs (DSIP, GTIP, SSIP)
Capacity and Growth Additions
Utility Maintenance Capital
Total Depreciation


Regulated Utility 5-Year Estimated Capital Expenditures
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
-
211,682,392
211,774,765
182,861,867
176,892,528
195,589,488
2016
2017
2018
2019
2020
MT Electric
MT Gas
SD Electric
SD/NE Gas


5-Year Total Capital Estimate ($ millions)
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
$1,470,520
978,801
Nearly $1.5B planned capital spend 2016-2020
Total
SD/NE Gas
SD Electric
MT Gas
MT Electric

	Plant Additions									
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Electric Transmission Plant										
(350) Land and Land Rights	223,947	233,884	2,655,996	61,852	14,516	76,989	9,800	806,038	5,685,548	3,930,524
(352) Structures and Improvements	1,631,057	423,452	552,072	709,888	1,943,449	5,827,166	2,384,721	2,622,691	579,377	1,654,422
(353) Station Equipment	9,941,593	1,472,894	4,681,142	5,526,768	16,276,690	13,046,030	13,132,651	2,036,786	12,914,720	28,584,247
(354) Towers and Fixtures	138,832	30,588	7,847	72,833	28,863	24,520	6,386	-	-	-
(355) Poles and Fixtures	7,972,181	2,163,909	2,519,782	2,079,936	4,034,007	2,696,521	4,706,041	15,156,713	14,056,638	28,437,157
(356) Overhead Conductors and Devices	4,097,275	3,017,424	2,160,474	2,333,800	3,742,674	3,308,121	1,610,146	3,150,170	995,295	4,555,737
(359) Roads and Trails	-	17,243	83	-	-	-	-	-	-	-
Total Electric Transmission Additions	24,004,885	7,359,393	12,577,396	10,785,077	26,040,199	24,979,347	21,849,746	23,772,398	34,231,578	67,162,088
Electric Distribution Plant										
(360) Land and Land Rights	81,124	36,877	92,553	37,492	206,338	880,990	202,150	32,361	4,917	6,994
(361) Structures and Improvements	156,843	76,066	245,510	265,189	971,878	557,291	1,410,258	245,205	235,423	2,158,267
(362) Station Equipment	3,728,701	3,772,780	4,685,422	2,873,428	5,009,864	7,912,571	10,417,682	7,562,040	5,428,635	13,075,893
(364) Poles, Towers, and Fixtures	6,057,040	5,308,943	7,414,662	7,414,665	8,252,907	11,555,964	10,384,441	17,246,212	26,806,679	24,296,571
(365) Overhead Conductors and Devices	5,353,028	4,373,460	2,759,161	3,586,472	2,457,319	2,628,100	938,303	4,090,906	2,920,732	4,402,135
(366) Underground Conduit	6,524,446	6,467,696	4,010,658	3,852,659	3,684,307	2,706,756	1,564,823	5,619,358	8,076,855	9,807,320
(367) Underground Conductors and Devices	6,143,301	5,143,991	4,788,215	3,819,544	2,671,304	4,155,744	6,349,833	13,457,254	13,672,069	18,050,804
(368) Line Transformers	8,742,487	7,983,168	7,367,360	6,040,767	5,308,697	4,982,901	5,543,298	6,729,082	7,804,816	8,694,268
(369) Services	4,686,631	3,799,925	4,128,748	3,904,798	3,663,209	2,030,842	2,143,421	3,540,112	4,839,412	6,147,673
(370) Meters	2,424,458	1,276,592	1,326,737	1,193,715	994,027	1,008,698	889,448	1,310,709	1,196,935	1,278,446
(373) Street Lighting and Signal Systems	4,466,868	1,124,567	782,185	446,593	556,815	558,670	504,676	432,846	783,820	868,723
Total Electric Distribution Additions	48,364,928	39,364,065	37,601,212	33,435,323	33,776,665	38,978,527	40,348,333	60,266,085	71,770,293	88,787,095

NorthWestern Energy
Docket No. D2016.5.39
Application for Approval of Avoided Cost Tariff Schedule QF-1

Vote Solar/Montana Environmental Information Center
Set 1 (001-012)

Data Requests received July 14, 2016

VS-012 Subject: Natural Gas Cost

Please provide NWE's historical burnertip cost of natural gas, on an annual basis from 2001-2015.

RESPONSE:

See Attachment.

NorthWestern Energy

Natural Gas Supply-Commodity Rates

	Price/Therm		Price/Therm		Price/Therm
January 1, 2001	$ 0.197800	January 1, 2006	$ 1.026120	February 1, 2011	$ 0.537770
February 1, 2001	$ 0.383200	February 1, 2006	$ 0.853060	March 1, 2011	$ 0.533620
March 1, 2001	$ 0.383200	March 1, 2006	$ 0.756470	April 1, 2011	$ 0.526210
April 1, 2001	$ 0.383200	April 1, 2006	$ 0.721960	May 1, 2011	$ 0.531960
May 1, 2001	$ 0.383200	May 1, 2006	$ 0.752160	June 1, 2011	$ 0.631960
June 1, 2001	$ 0.383200	June 1, 2006	$ 0.754500	July 1, 2011	$ 0.513540
July 1, 2001	$ 0.383200	July 1, 2006	$ 0.755640	August 1, 2011	$ 0.516400
August 1, 2001	$ 0.383200	August 1, 2006	$ 0.671630	September 1, 2011	$ 0.512280
September 1, 2001	$ 0.383200	September 1, 2006	$ 0.665010	October 1, 2011	$ 0.499480
October 1, 2001	$ 0.383200	October 1, 2006	$ 0.662530	November 1, 2011	$ 0.489490
November 1, 2001	$ 0.383200	November 1, 2006	$ 0.620140	December 1, 2011	$ 0.492790
December 1, 2001	$ 0.383200	December 1, 2006	$ 0.653400	January 1, 2012	$ 0.479040
January 1, 2002	$ 0.217000	January 1, 2007	$ 0.647490	February 1, 2012	$ 0.461850
February 1, 2002	$ 0.217000	February 1, 2007	$ 0.610640	March 1, 2012	$ 0.450240
March 1, 2002	$ 0.217000	March 1, 2007	$ 0.675870	April 1, 2012	$ 0.396030
April 1, 2002	$ 0.217000	April 1, 2007	$ 0.595620	May 1, 2012	$ 0.363360
May 1, 2002	$ 0.217000	May 1, 2007	$ 0.698100	June 1, 2012	$ 0.350170
June 1, 2002	$ 0.217000	June 1, 2007	$ 0.618600	July 1, 2012	$ 0.394010
July 1, 2002	$ 0.217000	July 1, 2007	$ 0.798790	August 1, 2012	$ 0.391680
August 1, 2002	$ 0.217000	August 1, 2007	$ 0.705600	September 1, 2012	$ 0.399850
September 1, 2002	$ 0.217000	September 1, 2007	$ 0.713480	October 1, 2012	$ 0.393780
October 1, 2002	$ 0.217000	October 1, 2007	$ 0.691960	November 1, 2012	$ 0.424890
November 1, 2002	$ 0.217000	November 1, 2007	$ 0.692150	December 1, 2012	$ 0.427424
December 1, 2002	$ 0.337410	December 1, 2007	$ 0.706070	January 1, 2013	$ 0.424654
January 1, 2003	$ 0.337410	January 1, 2008	$ 0.687890	February 1, 2013	$ 0.418424
February 1, 2003	$ 0.337410	February 1, 2008	$ 0.749010	March 1, 2013	$ 0.413554
March 1, 2003	$ 0.337410	March 1, 2008	$ 0.825620	April 1, 2013	$ 0.405874
April 1, 2003	$ 0.337410	April 1, 2008	$ 0.846660	May 1, 2013	$ 0.406924
May 1, 2003	$ 0.337410	May 1, 2008	$ 0.912450	June 1, 2013	$ 0.385314
June 1, 2003	$ 0.337410	June 1, 2008	$ 1.161190	July 1, 2013	$ 0.425044
July 1, 2003	$ 0.498170	July 1, 2008	$ 1.063090	August 1, 2013	$ 0.380504
August 1, 2003	$ 0.480030	August 1, 2008	$ 1.076880	September 1, 2013	$ 0.356754
September 1, 2003	$ 0.467210	September 1, 2008	$ 0.879960	October 1, 2013	$ 0.367820
October 1, 2003	$ 0.450920	October 1, 2008	$ 0.808530	November 1, 2013	$ 0.374710
November 1, 2003	$ 0.465210	November 1, 2008	$ 0.752980	December 1, 2013	$ 0.401370
December 1, 2003	$ 0.431820	December 1, 2008	$ 0.748380	January 1, 2014	$ 0.435640
January 1, 2004	$ 0.456950	January 1, 2009	$ 0.682930	February 1, 2014	$ 0.438180
February 1, 2004	$ 0.499490	March 1, 2009	$ 0.668260	March 1, 2014	$ 0.498190
March 1, 2004	$ 0.494450	April 1, 2009	$ 0.557120	April 1, 2014	$ 0.595030
April 1, 2004	$ 0.514520	May 1, 2009	$ 0.551770	May 1, 2014	$ 0.654380
May 1, 2004	$ 0.553310	June 1, 2009	$ 0.512270	June 1, 2014	$ 0.654380
June 1, 2004	$ 0.593140	July 1, 2009	$ 0.575620	July 1, 2014	$ 0.496450
July 1, 2004	$ 0.591820	August 1, 2009	$ 0.515800	August 1, 2014	$ 0.450080
August 1, 2004	$ 0.566650	September 1, 2009	$ 0.527680	September 1, 2014	$ 0.433540
September 1, 2004	$ 0.576540	October 1, 2009	$ 0.509770	October 1, 2014	$ 0.432820
October 1, 2004	$ 0.539510	November 1, 2009	$ 0.555610	November 1, 2014	$ 0.432610
November 1, 2004	$ 0.630530	December 1, 2009	$ 0.537110	December 1, 2014	$ 0.427010
December 1, 2004	$ 0.617600	January 1, 2010	$ 0.522190	January 1, 2015	$ 0.424590
January 1, 2005	$ 0.603330	February 1, 2010	$ 0.552500	February 1, 2015	$ 0.381090
February 1, 2005	$ 0.578440	March 1, 2010	$ 0.528850	March 1, 2015	$ 0.355040
March 1, 2005	$ 0.596400	April 1, 2010	$ 0.497380	April 1, 2015	$ 0.352300
April 1, 2005	$ 0.679320	May 1, 2010	$ 0.373740	May 1, 2015	$ 0.323620
May 1, 2005	$ 0.699570	June 1, 2010	$ 0.278350	June 1, 2015	$ 0.323620
June 1, 2005	$ 0.651090	July 1, 2010	$ 0.569160	July 1, 2015	$ 0.340010
July 1, 2005	$ 0.651090	August 1, 2010	$ 0.548250	August 1, 2015	$ 0.325270
August 1, 2005	$ 0.651090	September 1, 2010	$ 0.527510	September 1, 2015	$ 0.323340
September 1, 2005	$ 0.792050	October 1, 2010	$ 0.516320	October 1, 2015	$ 0.318610
October 1, 2005	$ 0.891420	November 1, 2010	$ 0.503730	November 1, 2015	$ 0.290818
November 1, 2005	$ 0.976560	December 1, 2010	$ 0.511660	December 1, 2015	$ 0.277358
December 1, 2005	$ 0.861010	January 1, 2011	$ 0.541090		

Note: There was no Supply cost change in February 2009.