

**Montana-Dakota Utilities Co.
Electric Utility - South Dakota
Lambda and Capacity Costs
July 2015 through June 2016**

Month		Lambda		
		On-Peak \$/MWh	Off-Peak \$/MWh	Total \$/MWh
July	2015	\$30.21	\$30.03	\$30.07
August	2015	30.21	29.25	29.47
September	2015	26.87	26.87	26.87
October	2015		26.82	26.82
November	2015		26.72	26.72
December	2015		42.15	42.15
January	2016		43.59	43.59
February	2016		48.18	48.18
March	2016		30.21	30.21
April	2016		30.92	30.92
May	2016		30.58	30.58
June	2016	31.53	29.36	29.89
Average		\$29.71	\$32.89	\$32.96

Monthly Capacity Payments

Rate 96	\$7.385	\$/kW-Month	(Cost of an installed peaking combustion turbine)
Rate 97	\$34.050	\$/kW-Month	(Cost of an installed baseload unit)

**Montana-Dakota Utilities Co.
Electric Utility - South Dakota
Calculation of Capacity Payments
July 2015 through June 2016**

Rate 96

Monthly Capacity Payments:	\$7.385	\$/kW-Month	Cost of an installed peaking combustion turbine
Capital cost of combustion turbine	\$816		
Escalation rate	3%		
Levelized Fixed Charge	10.544%	1/	

Rate 96 Capacity Payment formula: $= \$816 \times 1.03^{(2016-2015)} \times .10544 / 12$

Rate 97

Monthly Capacity Payments:	\$34.050	\$/kW-Month	Cost of an installed baseload unit
Capital cost of installed baseload unit	\$3,882		
Escalation rate	3%		
Levelized Fixed Charge	10.219%	2/	

Rate 96 Capacity Payment formula: $= \$3,882 \times 1.03^{(2016-2015)} \times .10219 / 12$

1/ See Attachment A pages 3-5. Turbine with 35-year book life.

2/ See Attachment A pages 6-8. Base load unit with 50-year book life.

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Levelized Fixed Charge Rate - CT**

Summary of Results

Sum of Present Values 1/	1.233935
Capital Recovery Factor 2/	0.085446
Levelized Fixed Charge 3/	<u><u>10.544%</u></u>

Assumptions

ROR	7.959%
ROR with taxes	10.856%
Federal Tax Rate	35.000%
State Tax Rate	
Combined Federal/State Tax Rate	35.0000%
1 - Tax Rate	65.0000%
Service Life of Asset (in years)	35
Tax Life (in years - 5, 7, 10, 15, 20 , or 39)	15

1/ Sum of annual net present values.

2/ $((+ROR*(1+ROR)^{book\ life})/((1+ROR)^{book\ life}-1))$.

3/ Product of annual present value x capital recovery factor.

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Levelized Fixed Charge Rate - CT**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Rev. Requ. As % (Net Investment)	Return	Book Depr.	O&M	Ad Valorem Tax	Total Charge	Present Value Factor	Present Value	Accum. Present Value	LCFR	Tax Depr. Accel.	Deferred Income Tax	
1	1	1.000	0.10856	0.02857	0.00000	0.00935	0.14648	0.92628	0.13568	0.13568	0.14648	0.05000	0.00750
2	2	0.964	0.10464	0.02857	0.00000	0.00935	0.14257	0.85799	0.12232	0.25800	0.14460	0.09500	0.02325
3	3	0.912	0.09902	0.02857	0.00000	0.00935	0.13694	0.79474	0.10883	0.36683	0.14224	0.08550	0.01993
4	4	0.864	0.09375	0.02857	0.00000	0.00935	0.13168	0.73615	0.09693	0.46377	0.13989	0.07700	0.01695
5	5	0.818	0.08881	0.02857	0.00000	0.00935	0.12673	0.68188	0.08642	0.55018	0.13765	0.06930	0.01426
6	6	0.775	0.08416	0.02857	0.00000	0.00935	0.12208	0.63161	0.07711	0.62729	0.13552	0.06230	0.01181
7	7	0.735	0.07978	0.02857	0.00000	0.00935	0.11770	0.58504	0.06886	0.69615	0.13352	0.05900	0.01065
8	8	0.696	0.07552	0.02857	0.00000	0.00935	0.11344	0.54191	0.06148	0.75763	0.13163	0.05900	0.01065
9	9	0.656	0.07126	0.02857	0.00000	0.00935	0.10918	0.50196	0.05481	0.81243	0.12983	0.05910	0.01069
10	10	0.617	0.06700	0.02857	0.00000	0.00935	0.10492	0.46496	0.04878	0.86122	0.12811	0.05900	0.01065
11	11	0.578	0.06274	0.02857	0.00000	0.00935	0.10067	0.43068	0.04335	0.90457	0.12646	0.05910	0.01069
12	12	0.539	0.05848	0.02857	0.00000	0.00935	0.09640	0.39893	0.03846	0.94303	0.12487	0.05900	0.01065
13	13	0.499	0.05422	0.02857	0.00000	0.00935	0.09215	0.36952	0.03405	0.97708	0.12334	0.05910	0.01069
14	14	0.460	0.04996	0.02857	0.00000	0.00935	0.08788	0.34228	0.03008	1.00716	0.12187	0.05900	0.01065
15	15	0.421	0.04570	0.02857	0.00000	0.00935	0.08363	0.31704	0.02651	1.03367	0.12046	0.05910	0.01069
16	16	0.382	0.04144	0.02857	0.00000	0.00935	0.07936	0.29367	0.02331	1.05698	0.11910	0.02950	0.00033
17	17	0.353	0.03831	0.02857	0.00000	0.00935	0.07623	0.27202	0.02074	1.07772	0.11783	0.00000	(0.01000)
18	18	0.334	0.03629	0.02857	0.00000	0.00935	0.07421	0.25197	0.01870	1.09642	0.11666	0.00000	(0.01000)
19	19	0.316	0.03427	0.02857	0.00000	0.00935	0.07220	0.23339	0.01685	1.11326	0.11558	0.00000	(0.01000)
20	20	0.297	0.03226	0.02857	0.00000	0.00935	0.07018	0.21618	0.01517	1.12844	0.11458	0.00000	(0.01000)
21	21	0.279	0.03024	0.02857	0.00000	0.00935	0.06816	0.20025	0.01365	1.14209	0.11366	0.00000	(0.01000)
22	22	0.260	0.02823	0.02857	0.00000	0.00935	0.06615	0.18548	0.01227	1.15435	0.11280	0.00000	(0.01000)
23	23	0.241	0.02621	0.02857	0.00000	0.00935	0.06413	0.17181	0.01102	1.16537	0.11199	0.00000	(0.01000)
24	24	0.223	0.02419	0.02857	0.00000	0.00935	0.06211	0.15914	0.00989	1.17526	0.11124	0.00000	(0.01000)
25	25	0.204	0.02218	0.02857	0.00000	0.00935	0.06010	0.14741	0.00886	1.18412	0.11054	0.00000	(0.01000)
26	26	0.186	0.02016	0.02857	0.00000	0.00935	0.05808	0.13654	0.00793	1.19205	0.10988	0.00000	(0.01000)

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Levelized Fixed Charge Rate - CT**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Rev. Requ. As % (Net Investment)	Return	Book Depr.	O&M	Ad Valorem Tax	Total Charge	Present Value Factor	Present Value	Accum. Present Value	LFCR	Tax Depr. Accel.	Deferred Income Tax
Year												
27	0.167	0.01815	0.02857	0.00000	0.00935	0.05607	0.12648	0.00709	1.19914	0.10926	0.00000	(0.01000)
28	0.149	0.01613	0.02857	0.00000	0.00935	0.05405	0.11715	0.00633	1.20547	0.10868	0.00000	(0.01000)
29	0.130	0.01411	0.02857	0.00000	0.00935	0.05203	0.10852	0.00565	1.21112	0.10813	0.00000	(0.01000)
30	0.111	0.01210	0.02857	0.00000	0.00935	0.05002	0.10052	0.00503	1.21615	0.10761	0.00000	(0.01000)
31	0.093	0.01008	0.02857	0.00000	0.00935	0.04800	0.09311	0.00447	1.22061	0.10712	0.00000	(0.01000)
32	0.074	0.00806	0.02857	0.00000	0.00935	0.04599	0.08624	0.00397	1.22458	0.10666	0.00000	(0.01000)
33	0.056	0.00605	0.02857	0.00000	0.00935	0.04397	0.07988	0.00351	1.22809	0.10623	0.00000	(0.01000)
34	0.037	0.00403	0.02857	0.00000	0.00935	0.04195	0.07399	0.00310	1.23120	0.10582	0.00000	(0.01000)
35	0.019	0.00202	0.02857	0.00000	0.00935	0.03994	0.06854	0.00274	1.23393	0.10544	0.00000	(0.01000)

- (1) Prior year's Net investment - Book Depreciation - Deferred Income Tax.
- (2) Return (adjusted for taxes) x Net Investment.
- (3) Depreciation rate based on the life of the investment.
- (4) Distribution O&M expense as percent of distribution plant.
- (5) Ad valorem tax rate on distribution plant.
- (6) Sum of return, depreciation, O&M and ad valorem taxes.
- (7) Present value factor reflecting overall rate of return.
- (8) Present value factor x total charge.
- (9) Accumulated present value.
- (10) Levelized fixed charge rate = accumulated present value x $((+ROR*(1+ROR)^{book\ life})/((1+ROR)^{book\ life}-1))$
- (11) Tax depreciation rates for a CT uses a 15 year tax life.
- (12) (Tax life - book life) x tax rate.

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Levelized Fixed Charge Rate - Baseload**

Summary of Results

Sum of Present Values 1/	1.256046
Capital Recovery Factor 2/	0.081358
Levelized Fixed Charge 3/	<u>10.219%</u>

Assumptions

ROR	7.959%
ROR with taxes	10.856%
Federal Tax Rate	35.000%
State Tax Rate	
Combined Federal/State Tax Rate	35.0000%
1 - Tax Rate	65.0000%
Service Life of Asset (in years)	50
Tax Life (in years - 5, 7, 10, 15, 20 , or 39)	20

1/ Sum of annual net present values.

2/ $((+ROR*(1+ROR)^{book\ life})/((1+ROR)^{book\ life}-1))$.

3/ Product of annual present value x capital recovery factor.

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Calculation of Levelized Fixed Charge Rate - Baseload**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Rev. Requ. As % (Net Investment)	Return	Book Depr.	O&M	Ad Valorem Tax	Total Charge	Present Value Factor	Present Value	Accum. Present Value	LFGR	Tax Depr. Accel.	Deferred Income Tax	
Year													
1	1	1.000	0.10856	0.02000	0.00000	0.00935	0.13791	0.92628	0.12774	0.12774	0.13791	0.03750	0.00613
2	2	0.974	0.10572	0.02000	0.00000	0.00935	0.13507	0.85799	0.11589	0.24363	0.13655	0.07219	0.01827
3	3	0.936	0.10157	0.02000	0.00000	0.00935	0.13092	0.79474	0.10405	0.34768	0.13481	0.06677	0.01637
4	4	0.899	0.09762	0.02000	0.00000	0.00935	0.12697	0.73615	0.09347	0.44115	0.13307	0.06177	0.01462
5	5	0.865	0.09386	0.02000	0.00000	0.00935	0.12321	0.68188	0.08402	0.52517	0.13139	0.05713	0.01300
6	6	0.832	0.09028	0.02000	0.00000	0.00935	0.11963	0.63161	0.07556	0.60073	0.12978	0.05285	0.01150
7	7	0.800	0.08686	0.02000	0.00000	0.00935	0.11621	0.58504	0.06799	0.66872	0.12826	0.04888	0.01011
8	8	0.770	0.08359	0.02000	0.00000	0.00935	0.11294	0.54191	0.06121	0.72992	0.12682	0.04522	0.00883
9	9	0.741	0.08046	0.02000	0.00000	0.00935	0.10981	0.50196	0.05512	0.78504	0.12546	0.04462	0.00862
10	10	0.713	0.07736	0.02000	0.00000	0.00935	0.10671	0.46496	0.04961	0.83466	0.12416	0.04461	0.00861
11	11	0.684	0.07425	0.02000	0.00000	0.00935	0.10360	0.43068	0.04462	0.87928	0.12292	0.04462	0.00862
12	12	0.655	0.07114	0.02000	0.00000	0.00935	0.10049	0.39893	0.04009	0.91937	0.12174	0.04461	0.00861
13	13	0.627	0.06804	0.02000	0.00000	0.00935	0.09739	0.36952	0.03599	0.95535	0.12060	0.04462	0.00862
14	14	0.598	0.06493	0.02000	0.00000	0.00935	0.09428	0.34228	0.03227	0.98762	0.11951	0.04461	0.00861
15	15	0.569	0.06182	0.02000	0.00000	0.00935	0.09117	0.31704	0.02891	1.01653	0.11846	0.04462	0.00862
16	16	0.541	0.05872	0.02000	0.00000	0.00935	0.08807	0.29367	0.02586	1.04239	0.11746	0.04461	0.00861
17	17	0.512	0.05561	0.02000	0.00000	0.00935	0.08496	0.27202	0.02311	1.06550	0.11649	0.04462	0.00862
18	18	0.484	0.05251	0.02000	0.00000	0.00935	0.08186	0.25197	0.02062	1.08613	0.11556	0.04461	0.00861
19	19	0.455	0.04940	0.02000	0.00000	0.00935	0.07875	0.23339	0.01838	1.10451	0.11467	0.04462	0.00862
20	20	0.426	0.04629	0.02000	0.00000	0.00935	0.07564	0.21618	0.01635	1.12086	0.11381	0.04461	0.00861
21	21	0.398	0.04319	0.02000	0.00000	0.00935	0.07254	0.20025	0.01453	1.13539	0.11299	0.02231	0.00081
22	22	0.377	0.04093	0.02000	0.00000	0.00935	0.07028	0.18548	0.01304	1.14842	0.11222	0.00000	(0.00700)
23	23	0.364	0.03952	0.02000	0.00000	0.00935	0.06887	0.17181	0.01183	1.16025	0.11150	0.00000	(0.00700)
24	24	0.351	0.03810	0.02000	0.00000	0.00935	0.06745	0.15914	0.01073	1.17099	0.11084	0.00000	(0.00700)
25	25	0.338	0.03669	0.02000	0.00000	0.00935	0.06604	0.14741	0.00974	1.18072	0.11022	0.00000	(0.00700)
26	26	0.325	0.03528	0.02000	0.00000	0.00935	0.06463	0.13654	0.00883	1.18955	0.10965	0.00000	(0.00700)

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Calculation of Levelized Fixed Charge Rate - Baseload**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Rev. Requ. As % (Net Investment)	Return	Book Depr.	O&M	Ad Valorem Tax	Total Charge	Present Value Factor	Present Value	Accum. Present Value	LFGR	Tax Depr. Accel.	Deferred Income Tax	
Year													
27	27	0.312	0.03387	0.02000	0.00000	0.00935	0.06322	0.12648	0.00800	1.19754	0.10911	0.00000	(0.00700)
28	28	0.299	0.03246	0.02000	0.00000	0.00935	0.06181	0.11715	0.00724	1.20478	0.10861	0.00000	(0.00700)
29	29	0.286	0.03105	0.02000	0.00000	0.00935	0.06040	0.10852	0.00655	1.21134	0.10815	0.00000	(0.00700)
30	30	0.273	0.02964	0.02000	0.00000	0.00935	0.05899	0.10052	0.00593	1.21727	0.10771	0.00000	(0.00700)
31	31	0.260	0.02823	0.02000	0.00000	0.00935	0.05758	0.09311	0.00536	1.22263	0.10730	0.00000	(0.00700)
32	32	0.247	0.02681	0.02000	0.00000	0.00935	0.05616	0.08624	0.00484	1.22747	0.10692	0.00000	(0.00700)
33	33	0.234	0.02540	0.02000	0.00000	0.00935	0.05475	0.07988	0.00437	1.23185	0.10655	0.00000	(0.00700)
34	34	0.221	0.02399	0.02000	0.00000	0.00935	0.05334	0.07399	0.00395	1.23579	0.10622	0.00000	(0.00700)
35	35	0.208	0.02258	0.02000	0.00000	0.00935	0.05193	0.06854	0.00356	1.23935	0.10590	0.00000	(0.00700)
36	36	0.195	0.02117	0.02000	0.00000	0.00935	0.05052	0.06349	0.00321	1.24256	0.10560	0.00000	(0.00700)
37	37	0.182	0.01976	0.02000	0.00000	0.00935	0.04911	0.05881	0.00289	1.24545	0.10532	0.00000	(0.00700)
38	38	0.169	0.01835	0.02000	0.00000	0.00935	0.04770	0.05447	0.00260	1.24805	0.10505	0.00000	(0.00700)
39	39	0.156	0.01694	0.02000	0.00000	0.00935	0.04629	0.05046	0.00234	1.25038	0.10481	0.00000	(0.00700)
40	40	0.143	0.01552	0.02000	0.00000	0.00935	0.04487	0.04674	0.00210	1.25248	0.10457	0.00000	(0.00700)
41	41	0.130	0.01411	0.02000	0.00000	0.00935	0.04346	0.04329	0.00188	1.25436	0.10435	0.00000	(0.00700)
42	42	0.117	0.01270	0.02000	0.00000	0.00935	0.04205	0.04010	0.00169	1.25605	0.10414	0.00000	(0.00700)
43	43	0.104	0.01129	0.02860	0.00000	0.00935	0.04924	0.03714	0.00183	1.25787	0.10398	0.00000	(0.01001)
44	44	0.085	0.00927	0.02860	0.00000	0.00935	0.04722	0.03440	0.00162	1.25950	0.10382	0.00000	(0.01001)
45	45	0.067	0.00725	0.02860	0.00000	0.00935	0.04520	0.03187	0.00144	1.26094	0.10366	0.00000	(0.01001)
46	46	0.048	0.00524	0.02860	0.00000	0.00935	0.04319	0.02952	0.00127	1.26221	0.10352	0.00000	(0.01001)
47	47	0.030	0.00322	0.02860	0.00000	0.00935	0.04117	0.02734	0.00113	1.26334	0.10338	0.00000	(0.01001)
48	48	0.011	0.00120	0.02860	0.00000	0.00935	0.03915	0.02533	0.00099	1.26433	0.10324	0.00000	(0.01001)
49	49	-0.008	(0.00082)	0.02860	0.00000	0.00935	0.03713	0.02346	0.00087	1.26520	0.10312	0.00000	(0.01001)
50	50	-0.026	(0.00284)	0.02860	0.00000	0.00935	0.03511	0.02173	0.00076	1.26597	0.10300	0.00000	(0.01001)

**Montana-Dakota Utilities Co.
Electric Utility- South Dakota
2015 Avoided Cost Rate Update
Calculation of Levelized Fixed Charge Rate - Baseload**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Year	Rev. Requ. As % (Net Investment)	Return	Book Depr.	O&M	Ad Valorem Tax	Total Charge	Present Value Factor	Present Value	Accum. Present Value	LFCR	Tax Depr. Accel.	Deferred Income Tax

- (1) Prior year's Net investment - Book Depreciation - Deferred Income Tax.
- (2) Return (adjusted for taxes) x Net Investment.
- (3) Depreciation rate based on the life of the investment.
- (4) Distribution O&M expense as percent of distribution plant.
- (5) Ad valorem tax rate on distribution plant.
- (6) Sum of return, depreciation, O&M and ad valorem taxes.
- (7) Present value factor reflecting overall rate of return.
- (8) Present value factor x total charge.
- (9) Accumulated present value.
- (10) Levelized fixed charge rate = accumulated present value x $((+ROR*(1+ROR)^{book\ life})/((1+ROR)^{book\ life}-1))$
- (11) Tax depreciation rates for distribution plant uses 20 year tax life.
- (12) (Tax life - book life) x tax rate.