2027 SD DSM Plan Cost-Effectiveness Analysis

RESIDENTIAL HVAC - Air Conditioner 15.2 SEER2

2027 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$103,461	$103,461	$103,461	$103,461
T & D	N/A	$12,704	$12,704	$12,704	$12,704
Marginal Energy	N/A	$16,355	$16,355	$16,355	$16,355
Environmental Externality	N/A	N/A	N/A	N/A	$6,496
Subtotal	N/A	$132,520	$132,520	$132,520	$139,015
Participant Benefits					
Bill Reduction - Electric	$120,984	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$64,400	N/A	N/A	$64,400	$64,400
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$185,384	N/A	N/A	$64,400	$64,400
Total Benefits	$185,384	$132,520	$132,520	$196,920	$203,415
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Utility Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$64,400	$64,400	$64,400	$64,400
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$64,400	$64,400	$64,400	$64,400
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$120,984	N/A	N/A
Subtotal	N/A	N/A	$120,984	N/A	N/A
Participant Costs					
Incremental Capital Costs	$80,812	N/A	N/A	$80,812	$80,812
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$80,812	N/A	N/A	$80,812	$80,812
Total Costs	$80,812	$64,400	$185,384	$145,212	$145,212
Net Benefit (Cost)	$104,573	$68,120	($52,864)	$51,708	$58,204
Benefit/Cost Ratio	2.29	2.06	0.71	1.36	1.40

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2027 ELECTRIC — GOAL

Input Summary and Totals

Program "Inputs" per Customer kW

Lifetime (Weighted on Generator kWh)	A	18.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	90.00%
Gross Load Factor at Customer	E	8.03%
Transmission Loss Factor (Energy)	F	5.620%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$946

Program Summary per Participant

Gross kW Saved at Customer	I	0.33 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.32 kW
Gross Annual kWh Saved at Customer	(B x E x I)	235 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	249 kWh

Program Summary All Participants

Total Participants	J	184
Total Budget	K	**$64,400**
Gross kW Saved at Customer	(J x I)	61.52 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**60 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	43,280 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**45,858 kWh**
Societal Net Benefits	(J x I x H)	**$58,204**
Utility Program Cost per kWh Lifetime		**$0.0780**
Utility Program Cost per kW at Gen		**$1,082**

2027 SD DSM Plan Cost-Effectiveness Analysis

RESIDENTIAL HVAC - high efficiency Heat Pump Hot Water Heater

2027 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$6,943	$6,943	$6,943	$6,943
T & D	N/A	$858	$858	$858	$858
Marginal Energy	N/A	$9,063	$9,063	$9,063	$9,063
Environmental Externality	N/A	N/A	N/A	N/A	$4,789
Subtotal	N/A	$16,864	$16,864	$16,864	$21,654
Participant Benefits					
Bill Reduction - Electric	$67,121	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$5,600	N/A	N/A	$5,600	$5,600
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$72,721	N/A	N/A	$5,600	$5,600
Total Benefits	$72,721	$16,864	$16,864	$22,464	$27,254
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Utility Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$5,600	$5,600	$5,600	$5,600
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$5,600	$5,600	$5,600	$5,600
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$67,121	N/A	N/A
Subtotal	N/A	N/A	$67,121	N/A	N/A
Participant Costs					
Incremental Capital Costs	$10,976	N/A	N/A	$10,976	$10,976
Incremental O&M Costs	$1,159	N/A	N/A	$1,159	$1,159
Subtotal	$12,135	N/A	N/A	$12,135	$12,135
Total Costs	$12,135	$5,600	$72,721	$17,735	$17,735
Net Benefit (Cost)	$60,586	$11,264	($55,857)	$4,729	$9,519
Benefit/Cost Ratio	5.99	3.01	0.23	1.27	1.54

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2027 ELECTRIC — GOAL

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	13.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	100.00%
Gross Load Factor at Customer	E	86.28%
Transmission Loss Factor (Energy)	F	5.620%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,030

Program Summary per Participant		
Gross kW Saved at Customer	I	0.34 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.36 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,532 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,683 kWh

Program Summary All Participants		
Total Participants	J	14
Total Budget	K	**$5,600**
Gross kW Saved at Customer	(J x I)	4.69 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	35,448 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**37,559 kWh**
Societal Net Benefits	(J x I x H)	**$9,519**
Utility Program Cost per kWh Lifetime		**$0.0115**
Utility Program Cost per kW at Gen		**$1,110**

2027 SD DSM Plan Cost-Effectiveness Analysis

RESIDENTIAL HVAC - Non-ducted Mini-split Heat Pump

2027 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,659	$1,659	$1,659	$1,659
T & D	N/A	$204	$204	$204	$204
Marginal Energy	N/A	$17,188	$17,188	$17,188	$17,188
Environmental Externality	N/A	N/A	N/A	N/A	$10,009
Subtotal	N/A	$19,051	$19,051	$19,051	$29,060
Participant Benefits					
Bill Reduction - Electric	$125,238	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,000	N/A	N/A	$4,000	$4,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$129,238	N/A	N/A	$4,000	$4,000
Total Benefits	$129,238	$19,051	$19,051	$23,051	$33,060
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Utility Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$4,000	$4,000	$4,000	$4,000
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$4,000	$4,000	$4,000	$4,000
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$125,238	N/A	N/A
Subtotal	N/A	N/A	$125,238	N/A	N/A
Participant Costs					
Incremental Capital Costs	$42,323	N/A	N/A	$42,323	$42,323
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$42,323	N/A	N/A	$42,323	$42,323
Total Costs	$42,323	$4,000	$129,238	$46,323	$46,323
Net Benefit (Cost)	$86,916	$15,051	($110,187)	($23,271)	($13,262)
Benefit/Cost Ratio	3.05	4.76	0.15	0.50	0.71

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2027 ELECTRIC — GOAL

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	90.00%
Gross Load Factor at Customer	E	607.37%
Transmission Loss Factor (Energy)	F	5.620%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	($11,841)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.11 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.11 kW
Gross Annual kWh Saved at Customer	(B x E x I)	5,959 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	6,314 kWh

Program Summary All Participants		
Total Participants	J	10
Total Budget	K	**$4,000**
Gross kW Saved at Customer	(J x I)	1.12 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	59,590 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**63,138 kWh**
Societal Net Benefits	(J x I x H)	**($13,262)**
Utility Program Cost per kWh Lifetime		**$0.0042**
Utility Program Cost per kW at Gen		**$3,690**

2027 SD DSM Plan Cost-Effectiveness Analysis

RESIDENTIAL HVAC - Smart Thermostat

2027 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$7,412	$7,412	$7,412	$7,412
T & D	N/A	$919	$919	$919	$919
Marginal Energy	N/A	$1,207	$1,207	$1,207	$1,207
Environmental Externality	N/A	N/A	N/A	N/A	$669
Subtotal	N/A	$9,539	$9,539	$9,539	$10,208
Participant Benefits					
Bill Reduction - Electric	$7,546	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$2,250	N/A	N/A	$2,250	$2,250
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$9,796	N/A	N/A	$2,250	$2,250
Total Benefits	$9,796	$9,539	$9,539	$11,789	$12,458
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Utility Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$2,250	$2,250	$2,250	$2,250
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,250	$2,250	$2,250	$2,250
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$7,546	N/A	N/A
Subtotal	N/A	N/A	$7,546	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,250	$9,796	$2,250	$2,250
Net Benefit (Cost)	$9,796	$7,289	($258)	$9,539	$10,208
Benefit/Cost Ratio	INF	4.24	0.97	5.24	5.54

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2027 ELECTRIC

GOAL

Input Summary and Totals

Program "Inputs" per Customer kW

Lifetime (Weighted on Generator kWh)	A	10.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	76.00%
Gross Load Factor at Customer	E	7.28%
Transmission Loss Factor (Energy)	F	5.620%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,262

Program Summary per Participant

Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.15 kW
Gross Annual kWh Saved at Customer	(B x E x I)	115 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	121 kWh

Program Summary All Participants

Total Participants	J	45
Total Budget	K	**$2,250**
Gross kW Saved at Customer	(J x I)	8.09 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**7 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	5,157 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**5,464 kWh**
Societal Net Benefits	(J x I x H)	**$10,208**

Utility Program Cost per kWh Lifetime	**$0.0412**
Utility Program Cost per kW at Gen	**$340**