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March 1, 2018

Docket Control
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

RE: Arizona Public Service Company's 2017 Demand Side Management (DSM) Progress Report; Docket No. E-00000U-18-0055

Pursuant to the Electric Energy Efficiency Standard Rules (EESR) and A.A.C. R14-2-2409(A):

By March 1 of each year, an affected utility shall submit... a DSM progress report providing information on each of the affected utility's Commission-approved DSM programs....

In addition, Decision Nos. 73089, 74006, 74703, and 74813 require the DSM Progress Reports to include supplemental information. As a result, APS submits its 2017 DSM Annual Progress Report in compliance with EESR and the above-referenced decisions.

If you have any questions regarding this information, please contact me at (602) 250-3341.

Sincerely,

Kerri A. Carnes

KC/bm

c: Elijah Abinah
James Armstrong
Ranelle Paladino
Barbara Keene

Arizona Corporation Commission

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ARIZONA PUBLIC SERVICE COMPANY

2017 DEMAND SIDE MANAGEMENT ANNUAL PROGRESS REPORT

March 1, 2018



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I. Introduction

Arizona Public Service Company ("APS" or "Company") is filing this Demand Side Management Annual Progress Report ("Progress Report") for 2017 ("Reporting Period") in compliance with A.A.C. R14-2-2409(A) and the reporting requirements contained in Arizona Corporation Commission ("ACC" or "Commission") Decision Nos. 73089, 74406, 74703, and 74813. This report includes the following information for all APS Demand Side Management ("DSM") programs that were in place during the Reporting Period:

- APS's progress toward meeting the cumulative energy efficiency standard;
- An identification of Commission approved DSM Programs and measures by customer segment;
- A description of the findings from any research projects completed;
- A brief description of the program;
- Program goals, objectives, and savings targets;
- Level of customer participation;
- Costs incurred disaggregated by type of cost, such as administrative costs, rebates, and monitoring costs;
- A description of the results of evaluation and monitoring activities;
- kW and kWh savings;
- Environmental benefits including reduced emissions and water savings;
- Incremental benefits and net benefits in dollars;
- Performance Incentive calculations;
- Problems encountered and proposed solutions;
- A description of modifications proposed for the following year;
- If applicable, program or program measure termination and proposed date of termination;
- Where applicable, reporting requirements included in Commission Decision No. 73089, 74406, 74703, and 74813. Due to the length of the Decision No. 74703 reporting requirements, that information has been included in separate work papers; and
- Other significant information.

II. 2017 DSM Program Results

A. Compliance with Energy Efficiency ("EE") Requirements

In Decision No. 76313, the Commission established a cumulative annual EE savings requirement for calendar year 2017 of 14.18% of the utility's 2016 retail kilowatt-hour ('kWh') sales. The 14.18% was slightly lower than the Energy Efficiency Standard prescribed cumulative level of savings of 14.50% due to the leveling out of the annual EE savings requirement from 2016 through 2020 as approved by the Commission in Decision No. 75679. A summary of APS's 2017 compliance with the Energy Efficiency Standard is shown in Table 1. In 2017, the Company achieved 111.6% of the Commission's approved annual DSM goal as established in Decision No. 76313. APS exceeded the cumulative

megawatt hour ("MWh") savings goal for 2017, achieving cumulative savings of 14.37% against a goal of 14.18%.

Table 1
2017 DSM Savings Goal & Achievement

Goal Calculation	
2016 Retail Sales ¹	27,488,698
2017 Cumulative EE Standard (EES)	<u>14.50%</u>
2017 Goal (MWh)	4,046,162
Less Cumulative Savings from 2011 through 2016 ²	<u>3,152,416</u>
2017 DSM Savings Goal from EES	758,370
Less Credit for Pre-EES Savings in 2017	<u>169,986</u>
Original DSM Savings Goal Less Pre-EES Credit	588,384
Levelized 2017 DSM Savings Goal based on 5-Year average of Remaining Required Savings from 2016 to 2020³ (consistent with Decision 76313)	562,129
Results in MWh	
Contribution From Demand Response	132,572
Contribution From EE Programs & EE Initiatives	<u>494,776</u>
Total 2017 MWh Achieved	627,348
Over or (Under) 2017 Goal	65,219
% of 2017 Savings Goal Achieved	111.6%
Results as a % of 2016 Retail Sales	
2011 through 2016 Cumulative Savings % ³	11.82%
2017 Annual Savings % of 2016 Retail Sales	2.28%
2017 Credit for Pre-EES Savings	0.62%
2017 Cumulative Savings % ⁴	14.37%
3rd Party MER Verified Savings for 2017	628,539
Difference: 2017 MER Verified to 2017 APR	1,191

Note:

¹Includes billed and unbilled sales, does not include line losses, excludes Freeport McMoran Mine.

²Cumulative savings through 2016 are MER Verified MWh savings.

³Does not include Pre-EES Credit.

⁴Includes Pre-EES Credit.

IV. Program Results and Program Incentive Calculations

Program expenses are provided in Tables 2a through 3b and DSM program megawatt ("MW") and megawatt-hour ("MWh") savings are provided in Tables 4 and 5. Tables 6 and 7 provide net benefits and Table 8 shows the performance incentive calculation for 2016. Table 9 provides the environmental benefits associated with the lifetime energy savings resulting from DSM programs. Table 10 shows 2016 demand response ("DR") load reduction and savings values.

B. Year-To-Date DSM Program Expenses

Table 2a
Demand Response Program Expenses 2017

Program	Rebates & Incentives	Measurement Evaluation and Research ("MER")	Metering	Program Implementation ¹	Program Marketing	Planning & Administration	Total Program Costs
Marketing & MER of Rate Options	\$0	\$0	\$0	\$0	\$11,831	\$0	\$11,831
Peak Solutions	\$0	\$0	\$0	\$1,748,222	\$0	\$332,243	\$2,080,465
Total	\$0	\$0	\$0	\$1,748,222	\$11,831	\$332,243	\$2,092,296

Table 2b
Energy Efficiency Program Expenses 2017

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implementation ¹	Program Marketing	Planning & Administration	Total Program Costs
Residential Programs							
Consumer Products	\$3,083,624	\$0	\$0	\$3,250,769	\$171,822	\$514,972	\$7,021,187
Existing Homes HVAC	\$3,669,352	\$75,133	\$1,533	\$1,698,578	\$95,364	\$416,178	\$5,956,138
Existing Homes - Home Performance	\$2,055,314	\$1,848	\$179	\$439,405	\$28,285	\$173,803	\$2,698,834
New Construction	\$4,319,000	\$0	\$0	\$505,996	\$30,334	\$233,529	\$5,088,859
Conservation Behavior	\$0	\$0	\$0	\$1,601,380	\$0	\$107,660	\$1,709,040
Multi-Family	\$737,005	\$13,471	\$0	\$811,177	\$14,982	\$147,824	\$1,724,459
Limited Income	<u>\$2,434,285</u>	<u>\$11,541</u>	<u>\$16,220</u>	<u>\$50,000</u>	<u>\$21,342</u>	<u>\$96,518</u>	<u>\$2,629,906</u>
Total	\$16,298,580	\$101,993	\$17,932	\$8,357,305	\$362,129	\$1,690,484	\$26,828,423
Non-Residential Programs							
Large Existing Facilities	\$13,809,508	\$188,067	\$33,576	\$4,086,512	\$526,691	\$598,335	\$19,242,689
New Construction	\$2,906,040	\$29,474	\$1,109	\$581,490	\$5,500	\$44,249	\$3,567,862
Small Business	\$1,524,443	\$36,935	\$2,138	\$758,441	\$93,557	\$36,468	\$2,451,982
Energy Information Services	\$17,254	\$2,865	\$0	\$117,167	\$308	\$0	\$137,594
Schools ²	<u>\$2,141,494</u>	<u>\$39,228</u>	<u>\$1,069</u>	<u>\$1,456,778</u>	<u>\$7,485</u>	<u>\$67,445</u>	<u>\$3,713,499</u>
Total	\$20,398,739	\$296,569	\$37,892	\$7,000,388	\$633,541	\$746,497	\$29,113,626
Other Initiatives							
Energy Storage Pilot	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Energy and Demand Education Pilot	\$0	\$0	\$733,190	\$0	\$0	\$0	\$733,190
Codes & Standards	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$22,448</u>	<u>\$0</u>	<u>\$23,375</u>	<u>\$45,823</u>
Total	\$0	\$0	\$733,190	\$22,448	\$0	\$23,375	\$779,013
Total EE Programs	\$36,697,319	\$398,562	\$789,014	\$15,380,141	\$995,670	\$2,460,356	\$56,721,062
							Measurement, Evaluation & Research
							\$2,176,477
							Performance Incentive ³
							\$4,326,579
							Total EE Program Expense
							\$63,224,118
							Total DSM Expense ⁴
							\$65,316,414

Notes:

¹Includes the cost for the Implementation Contractor.

²Schools are permitted to receive funding from other Non-Residential programs. Refer to the Schools Program section for additional information regarding total funds allocated to school districts.

³Details of the Performance Incentive calculation are provided in Table 8.

⁴Total DSM Expense listed in Table 2b does not reflect \$5,000,000 for New Rate Education approved in Decision No. 76295

Table 2c

2017 Energy Efficiency Program Implementation Costs - APS Compared to Contractor¹

Program	APS Expense	Contractor Expense	Total Implementation Cost
Residential Programs			
Consumer Products	\$125,574	\$3,125,195	\$3,250,769
Existing Homes HVAC	\$347	\$1,698,231	\$1,698,578
Existing Homes - Home Performance	\$37,072	\$402,333	\$439,405
New Construction	\$226,614	\$279,382	\$505,996
Conservation Behavior	\$0	\$1,601,380	\$1,601,380
Multi-Family	\$10,610	\$800,567	\$811,177
Limited Income	\$0	\$50,000	\$50,000
Residential Total	\$400,217	\$7,957,088	\$8,357,305
Non-Residential Programs			
Large Existing Facilities	\$0	\$4,086,512	\$4,086,512
New Construction	\$0	\$581,490	\$581,490
Small Business	\$0	\$758,441	\$758,441
Energy Information Services	\$0	\$117,167	\$117,167
Schools	\$0	\$1,456,778	\$1,456,778
Non-Residential Total	\$0	\$7,000,388	\$7,000,388
Codes & Standards	\$143	\$22,305	\$22,448
EE Implementation Costs	\$400,360	\$14,979,781	\$15,380,141

¹Required by Commission Decision No. 73089.

C. Program-To-Date DSM Program Expenses

Table 3a

Program-To-Date Demand Response Program Expenses: January 2010 - December 2017

Program	Rebates & Incentives	Measurement Evaluation and Research	Metering	Program Implementation ¹	Program Marketing	Planning & Administration	Total Program Costs
HEI Pilot	\$596,904	\$242,929	\$0	\$706,433	\$129,123	\$569,131	\$2,244,520
Marketing & MER of Rate Options	\$0	\$0	\$37,756	\$147,290	\$180,294	\$0	\$365,340
Peak Solutions	\$0	\$0	\$51,017	\$16,424,744	\$0	\$858,209	\$17,333,970
Total	\$596,904	\$242,929	\$88,773	\$17,278,467	\$309,417	\$1,427,340	\$19,943,830

Table 3b

Program-To-Date: Energy Efficiency Program Expenses: January 2005 - December 2017

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implementation ¹	Program Marketing	Planning & Administration	Total Program Costs
Residential Programs							
Consumer Products	\$44,180,144	\$4,633	\$53,335	\$25,930,606	\$4,558,983	\$3,458,311	\$78,186,012
Existing Homes HVAC	\$45,498,527	\$1,374,655	\$1,926,770	\$13,228,154	\$2,320,000	\$2,346,938	\$66,695,044
Existing Homes - Home Performance	\$14,429,057	\$132,618	\$34,177	\$7,828,223	\$1,025,923	\$854,765	\$24,304,763
New Construction	\$28,435,385	\$776,231	\$130,597	\$4,096,449	\$3,142,600	\$2,038,891	\$38,620,153
Appliance Recycling	\$1,445,036	\$0	\$0	\$3,683,392	\$1,147,461	\$387,826	\$6,663,715
Conservation Behavior	\$0	\$0	\$0	\$7,772,491	\$0	\$545,052	\$8,317,543
Multi-Family	\$4,422,558	\$24,482	\$101	\$5,323,985	\$103,152	\$686,078	\$10,560,356
Shade Tree	\$165,813	\$0	\$3,837	\$725,169	\$19,407	\$57,191	\$971,417
Prepaid Energy Conservation	\$0	\$0	\$0	\$32,114	\$1,744	\$93,027	\$126,885
Limited Income	\$22,821,337	\$136,556	\$75,535	\$929,135	\$162,885	\$1,292,623	\$25,418,071
Total	\$161,397,857	\$2,449,175	\$2,224,352	\$69,549,718	\$12,482,155	\$11,760,702	\$259,863,959
Non-Residential Programs							
Large Existing Facilities	\$112,452,664	\$1,871,574	\$370,207	\$30,019,007	\$6,097,157	\$4,199,339	\$155,009,948
New Construction	\$22,707,588	\$352,588	\$67,415	\$7,717,840	\$1,289,741	\$994,855	\$33,130,027
Small Business	\$14,756,467	\$277,894	\$38,538	\$6,245,448	\$1,136,569	\$716,974	\$23,171,890
Building Operator Training	\$0	\$56,897	\$0	\$22,043	\$15,783	\$7,480	\$102,203
Energy Information Services	\$231,674	\$26,182	\$1,753	\$434,804	\$13,919	\$29,112	\$737,444
Schools ²	\$17,464,246	\$345,879	\$32,067	\$7,983,402	\$836,606	\$713,321	\$27,375,521
Total	\$167,612,639	\$2,931,014	\$509,980	\$52,422,544	\$9,389,775	\$6,661,081	\$239,527,033
Other Initiatives							
Energy Storage Pilot	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Energy and Demand Education Pilot	\$0	\$0	\$733,190	\$0	\$0	\$0	\$733,190
Codes & Standards	\$0	\$0	\$0	\$425,211	\$0	\$127,302	\$552,513
Total	\$0	\$0	\$733,190	\$425,211	\$0	\$127,302	\$1,285,703
Total EE Program Costs	\$329,010,496	\$5,380,189	\$3,467,522	\$122,397,473	\$21,871,930	\$18,549,085	\$500,676,695
							Measurement, Evaluation & Research
							\$20,735,337
							Performance Incentive ³
							\$55,439,017
							Total EE Program Expense
							\$576,851,049
							Total DSM Expense
							\$596,794,879

Notes:

¹Includes the cost for the Implementation Contractor.

²Schools are permitted to receive funding from other Non-Residential programs. Refer to the Schools Program section for additional information regarding total funds allocated to school districts.

³Details of the Performance Incentive calculation are provided in Table 8. The program-to-date performance incentive amount is a summation of the performance incentive amount as calculated during each previous reporting period beginning with the January through June 2005 Progress Report.

D. Year-To Date DSM Electric Savings

Table 4
DSM Electric Savings 2017^{1, 3, 4}

Program	Gross Peak MW Capacity Savings	Gross Annual MWH Savings	Gross Lifetime MWH Savings ²	Net Peak MW		
				Capacity Savings ⁴	Net Annual MWH Savings ⁴	Net Lifetime MWH Savings ^{2, 4}
Residential Programs						
Consumer Products	16.6	90,801	1,501,451	16.6	90,801	1,501,451
Existing Homes HVAC	13.8	18,164	203,237	13.8	18,164	203,237
Existing Homes - Home Performance	4.6	9,755	89,978	4.6	9,755	89,978
New Construction	4.0	8,901	178,011	4.0	8,901	178,011
Conservation Behavior	9.7	54,232	54,232	9.7	54,232	54,232
Multi-Family	1.40	8,049	123,383	1.40	8,049	123,383
Limited Income	<u>0.2</u>	<u>1,340</u>	<u>23,463</u>	<u>0.2</u>	<u>1,340</u>	<u>23,463</u>
Total	50.3	191,242	2,173,755	50.3	191,242	2,173,755
Non-Residential Programs						
Large Existing Facilities	36.1	191,010	2,632,909	36.05	191,010	2,632,909
New Construction	6.5	35,780	630,917	6.45	35,780	630,917
Small Business	3.0	15,836	206,615	2.95	15,836	206,615
Energy Information Services	2.8	2,709	13,544	2.8	2,709	13,544
Schools	<u>4.5</u>	<u>18,314</u>	<u>268,545</u>	<u>4.45</u>	<u>18,314</u>	<u>268,545</u>
Total	52.7	263,649	3,752,530	52.7	263,649	3,752,530
Energy Storage Pilot	-	-	-	-	-	-
Energy and Demand Education Pilot	-	-	-	-	-	-
Codes & Standards	9.8	34,269	401,586	9.81	34,269	401,586
System Savings	-	5,616	5,616	0	5,616	5,616
DR Contribution		<u>132,572</u>			<u>132,572</u>	
Total DSM Savings	112.8	627,348	6,333,487	112.8	627,348	6,333,487

Notes:

¹Savings for 2008 and after are MER adjusted, per Decision No. 69663, and savings prior to 2008 are not MER adjusted.

²Refers to savings over the expected lifetime of all program measures.

³Savings are adjusted for line losses (energy 7.0%, demand 11.7%) and a capacity reserve factor of 15%.

⁴Based on 2010 MER net to gross ratio ("NTGR") analysis, APS is utilizing a NTGR of 1.0 for all DSM programs and measures.

E. Program-To-Date DSM Electric Savings

Table 5
Program-To-Date DSM Electric Savings: January 2005 - December 2017^{1, 3}

Program	Gross Peak MW Capacity Savings	Gross Annual MWH Savings	Gross Lifetime MWH Savings ²	Net Peak MW Capacity Savings ⁴	Net Annual MWH Savings ⁴	Net Lifetime MWH Savings ^{2, 4}
Residential Programs						
Consumer Products	186.8	1,560,429	11,329,989	168.4	1,414,336	10,496,580
Existing Homes HVAC	113.2	162,383	2,109,771	102.9	151,653	1,949,845
Existing Homes - Home Performance	27.2	49,062	633,040	27.0	48,657	628,583
New Construction	57.4	112,273	2,245,454	56.5	110,269	2,205,368
Appliance Recycling	4.0	66,195	397,166	9.2	60,756	364,532
Conservation Behavior	50.4	265,510	265,510	50.4	265,510	265,510
Multi-Family	6.5	53,500	623,325	6.5	53,500	623,325
Shade Tree	1.1	2,005	60,114	1.1	2,005	60,114
Prepaid Energy Conservation	0.6	3,172	3,172	0.6	3,172	3,172
Limited Income	<u>2.6</u>	<u>16,912</u>	<u>305,018</u>	<u>2.6</u>	<u>16,912</u>	<u>305,018</u>
Total	449.8	2,291,441	17,972,559	425.2	2,126,770	16,902,047
Non-Residential Programs						
Large Existing Facilities	258.5	1,522,375	20,440,863	253.2	1,476,160	19,806,907
New Construction	50.5	353,706	5,222,362	47.9	318,345	4,718,582
Small Business	35.1	162,074	2,156,184	34.4	157,928	2,098,873
Building Operator Training	0.2	1,001	12,447	0.1	701	8,713
Energy Information Services	13.6	5,634	55,911	13.6	5,634	55,911
Schools	<u>32.0</u>	<u>153,552</u>	<u>2,186,870</u>	<u>31.1</u>	<u>148,264</u>	<u>2,106,741</u>
Total	389.7	2,198,342	30,074,637	380.1	2,107,032	28,795,727
Energy Storage Pilot	-	-	-	-	-	-
Energy and Demand Education Pilot	-	-	-	-	-	-
Codes & Standards	44.4	183,456	1,767,618	44.4	183,456	1,767,618
System Savings	0.1	13,481	26,690	0.1	13,481	26,690
DR Contribution		<u>442,917</u>			<u>442,917</u>	
Total	44.5	639,854	1,794,308	44.5	639,854	1,794,308
Total DSM Savings	884.0	5,129,637	49,841,504	849.8	4,873,656	47,492,082

Notes:

¹Savings for 2008 and after are MER adjusted, per Decision No. 69663, and savings prior to 2008 are not MER adjusted.

²Refers to savings over the expected lifetime of all program measures.

³Savings are adjusted for line losses (energy 7.0%, demand 11.7%) and a capacity reserve factor of 15%.

⁴Based on 2010 MER Net to Gross Ratio ("NTGR") analysis, APS is utilizing a NTGR of 1.0 for all DSM programs and measures.

F. Year-To-Date Energy Efficiency Societal Benefits

Table 6
Energy Efficiency Societal Benefits 2017

Program	Program Cost	Societal Benefits	Societal Cost	Net Benefits	Benefit/Cost Ratio
Residential Programs					
Consumer Products	\$ 7,021,187	41,304,790	17,838,054	\$ 23,466,736	2.32
Existing Homes HVAC	\$ 5,956,139	\$ 10,364,673	\$ 8,113,066	\$ 2,251,607	1.28
Existing Homes - Home Performance	\$ 2,698,834	\$ 3,247,743	\$ 2,980,669	\$ 267,075	1.09
New Construction	\$ 5,088,859	7,858,413	\$7,092,200	\$ 766,213	1.11
Conservation Behavior	\$ 1,709,040	\$1,401,324	\$1,527,241	\$ (125,917)	0.92
Multi-Family	\$ 1,724,459	3,901,005	\$2,670,654	\$ 1,230,350	1.46
Limited Income ¹	\$ 2,629,907	\$ 2,629,907	\$ 2,629,907	\$ -	1.00
Total	\$ 26,828,425	\$ 70,707,855	\$ 42,851,791	\$ 27,856,063	1.65
Non-Residential Programs					
Large Existing Facilities	\$ 19,242,689	\$ 79,624,756	\$ 52,073,886	\$ 27,550,870	1.53
New Construction	\$ 3,567,862	\$ 15,973,950	\$ 9,268,099	\$ 6,705,851	1.72
Small Business	\$ 2,451,982	\$ 6,182,073	\$ 4,478,066	\$ 1,704,007	1.38
Energy Information Services	\$ 137,593	\$ 541,866	\$ 164,612	\$ 377,254	3.29
Schools	\$ 3,713,499	\$ 8,366,716	\$ 7,844,925	\$ 521,791	1.07
Total	\$ 29,113,625	\$ 110,689,361	\$ 73,829,588	\$ 36,859,773	1.50
Energy Storage Pilot	\$ -	\$ -	\$ -	\$ -	
Energy and Demand Education Pilot	\$ 731,090	\$ -	\$ 731,090	\$ (731,090)	0.00
Codes & Standards	\$ 45,823	\$ 11,924,290	\$ 45,823	\$ 11,878,467	260.2
Measurement, Evaluation & Research	\$ 2,176,477	\$ -	\$ 2,176,477	\$ (2,176,477)	
Performance Incentive	\$ 4,326,579	\$ -	\$ 4,326,579	\$ (4,326,579)	
Total	\$ 7,279,969	\$ 11,924,290	\$ 7,279,969	\$ 4,644,321	
Total Energy Efficiency Societal Benefits	\$ 63,222,019	\$ 193,321,505	\$ 123,961,348	\$ 69,360,157	1.56
Notes:					
¹ APS analysis is consistent with Decision No. 68647. Program Costs include weatherization and bill assistance. Societal Costs do not include bill assistance because it does not contribute to electric savings.					

G. Program-To-Date EE Societal Benefits

Table 7

Program-To-Date Energy Efficiency Societal Benefits: January 2005 - December 2017

Program	Program Cost	Societal Benefits	Societal Cost	Net Benefits
Residential Programs				
Consumer Products	\$78,186,012	\$472,628,787	\$144,833,668	\$327,795,119
Existing Homes HVAC	\$66,695,045	\$131,993,844	\$94,620,646	\$37,373,198
Existing Homes - Home Performance	\$23,396,030	\$47,853,580	\$39,118,155	\$8,735,426
New Construction	\$38,620,153	\$130,404,416	\$75,607,110	\$54,797,306
Appliance Recycling	\$6,741,931	\$17,548,709	\$5,222,843	\$12,325,866
Conservation Behavior	\$8,317,543	\$8,108,266	\$7,912,196	\$196,070
Multi-Family	\$10,560,357	\$25,234,855	\$14,667,847	\$10,567,007
Shade Tree	\$970,668	\$4,512,595	\$2,357,226	\$2,155,369
Prepaid Energy Conservation	\$126,885	\$96,059	\$122,220	-\$26,161
Limited Income ^{1,2}	<u>\$25,418,072</u>	<u>\$23,381,960</u>	<u>\$23,381,960</u>	<u>\$0</u>
Total	\$259,032,696	\$861,763,071	\$407,843,871	\$453,919,199
Non-Residential Programs				
Large Existing Facilities	\$155,009,948	\$775,307,767	\$373,873,535	\$401,434,232
New Construction	\$33,130,027	\$194,697,948	\$70,744,010	\$123,953,938
Small Business	\$23,171,890	\$103,550,258	\$36,030,983	\$67,519,275
Building Operator Training	\$102,203	\$424,302	\$183,392	\$240,910
Energy Information Services	\$737,442	\$3,985,658	\$1,178,487	\$2,807,171
Schools	<u>\$27,375,521</u>	<u>\$92,836,471</u>	<u>\$55,721,066</u>	<u>\$37,115,405</u>
Total	\$239,527,031	\$1,170,802,404	\$537,731,473	\$633,070,931
Energy Storage Pilot	\$0	\$0	\$0	\$0
Energy and Demand Education Pilot	\$731,090	\$0	\$731,090	-\$731,090
Codes & Standards	\$552,513	\$64,897,222	\$30,642,840	\$34,254,382
Measurement, Evaluation & Research	\$20,735,337	\$0	\$20,735,337	-\$20,735,337
Performance Incentive	<u>\$ 55,429,631</u>	<u>\$0</u>	<u>\$55,429,631</u>	<u>-\$55,429,631</u>
Total Energy Efficiency Societal Benefits	\$576,008,298	\$2,097,462,696	\$1,053,114,242	\$1,044,348,454

Notes:

¹Program Costs include weatherization and bill assistance. Societal Costs do not include bill assistance because it does not contribute to electric savings.

²APS analysis is consistent with Decision No. 68647.

H. 2017 Performance Incentive Calculation

Table 8
2017 Performance Incentive

Achievement Relative to Performance Incentive Level	
Total MWh Saved in 2017	627,348
Less System Savings	5,616
Total MWh Saved less System Savings	621,732
Total MWh Saved less System Savings as % of 2017 Goal	111.7%

Achievement Relative to DSM Goal	Performance Incentive as % of Net Benefits	Performance Incentive Capped at No More Than \$0.0125 per kWh saved
96% to 105%	7%	454,891,000 kWh x \$0.0125
Net Benefits (Prior to PI, Codes & Standards, and System Savings)	\$61,808,269	
Calculation of Performance Incentive	\$4,326,579	\$5,686,138
Performance Incentive Amount for 2017 (Min. of % of Net Benefits or Capped amount at \$0.0125 per kWh)	\$4,326,579	

Notes:

¹The Performance Incentive methodology/calculation was approved in Decision No. 69663 and was modified in Decision No. 71448 and Decision No. 74406.

I. Net Environmental Benefits

Table 9
2017 Net Environmental Benefits

Reporting Period	Water (Mil Gal)	SOx (Lbs)	NOx (Lbs)	CO2 (Mil Lbs)	PM10 (Lbs)
Year-to-Date: Jan - Dec	2,008	28,184	535,496	5,694	156,437
Program-to-Date: Since Jan 2005	15,055	211,340	4,015,456	42,695	1,173,054

Notes:

¹The environmental reductions are based on the net energy savings of all program measures installed during the Reporting Period over their expected lifetimes.

²Some measures will result in customer water savings, which this calculation does not include. Only utility water savings are included in this calculation.

J. Demand Response Load Reduction and Energy Savings

Table 10
Demand Response Program
Load Reduction and Energy Savings 2017

Program/Initiative	Load Reduction (MW)	Energy Savings (MWh) ¹
APS Peak Solutions	29.5	132,572
Critical Peak Pricing	0.1	367
Time of Use Rates & Super Peak	177.7	778,326
Total	207.3	911,265

Demand Response Counted Towards the EES	132,572
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Notes:

¹Energy Savings (MWh) = Load reduction (MW) X (8,760/2) hours which is a 50% load factor.

K. Supplemental Charts

Table 11

DSM Funds Billed by Customer Class: January - December 2017¹

DSM Funds Collected by Class (\$000)*	
Residential	\$ 20,776,580
Commercial	\$ 19,831,497
Industrial	\$ 2,940,769
Irrigation	\$ 31,080
Streetlights	\$ 223,121
Other Public Authority	\$ 3,286
Total DSM Funds	\$ 43,806,333

* Does not include \$13.7 million collected in base rates for DSM funding in 2017 consistent with Decision No. 76295.

Table 12

Retail Sales by Customer Class: January - December 2017

Retail Sales	Year End 2017
Residential	13,207,135
Commercial	12,380,386
Industrial	2,272,833
Irrigation	11,368
Hwy Lighting & Other Public Authority	146,289
Total Retail Sales (MWhs)	28,018,011

Table 13
EE Savings for the Following Rate Schedules: January - December 2017

Rate Schedule	MW Savings	Annual MWh Savings	Lifetime MWh Savings
E-32 L	14.1	66,138	955,402
E-32 TOU	1.1	6,648	75,880
E-34	0.6	3,966	44,331
E-35	0.8	5,322	69,386
E36 XL	0.0	0	0
GS on E-30	0.0	0	0
Lighting Services	0.8	4,016	60,182

Note: this table contains a subset of all non-residential rates, therefore the totals do not match Table 4.

Terms and Definitions Used in Tables 1-13

Consumer Education: Funds allocated to support general consumer education about EE improvements and programs.

Free-riders: Program participants who would have installed the energy-efficient DSM measures anyway, even if the program were not in operation.

Gross Savings: Demand and energy savings related to the DSM programs prior to accounting for reductions for free riders and additions for spillover.

Measurement, Evaluation & Research ("MER"): Activities that will identify current baseline energy efficiency levels and the market potential of DSM measures, perform process evaluations, verify that energy-efficient measures are installed, track savings, and identify additional EE research.

Net Savings: Demand and energy savings related to the DSM programs after accounting for reductions for free-riders and additions for spillover.

Performance Incentive: Percentage share of DSM net economic benefits (benefits minus costs), capped at a percent of total DSM expenditures, depending on the percent of MWh savings goal achieved.

Planning and Administration: APS's costs to plan, develop and administer programs, which includes management of program budgets, oversight of the RFP process and implementation contractor, program development, program coordination and general overhead expenses.

Program Implementation: Program delivery costs associated with implementing the program - includes implementation contract labor and overhead costs, as well as other direct program delivery costs.

Program Marketing: Expenses related to program marketing and increasing DSM consumer awareness (direct program marketing costs as opposed to general consumer education).

Rebates and Incentives: Money allocated for customer rebates and incentives, installation of low income weatherization and low income bill assistance.

Spillover: Refers to indirect energy impacts of the program and estimated savings from customers who implement energy-efficient savings strategies as a result of knowledge of APS's program but who do not receive an incentive through the program.

Training and Technical Assistance: Cost of EE training and technical assistance.

V. Residential Energy Efficiency Programs

1. Consumer Products Program

Description

The Consumer Products Program is made up of three program elements – Residential Lighting, Residential Pool Pumps, and Residential Smart Thermostats. The Residential Lighting element of the program promotes high-efficiency ENERGY STAR® Light Emitting Diodes (“LEDs”). LEDs use up to 90% less energy than standard incandescent bulbs and last up to twenty-five times longer, typically saving consumers –up to \$80 in energy costs over the life of each 60 Watt equivalent incandescent bulb. The program offers discounts on LEDs through cooperative agreements with retailers and lighting manufacturers. This provides consumers with reduced retail prices on energy efficient lighting at local retailers.

As part of the Lighting Program element, APS offers CFL recycling in partnership with participating retailers and Veolia Environmental Services, which operates a recycling facility in Phoenix. Customers may take their burned out CFLs to participating retail locations throughout the APS service territory for free recycling. Home Depot and Lowe’s support their own corporate CFL recycling programs, while select Ace and True Value hardware stores utilize the APS recycling services.

The Residential Pool Pump element of the program is designed to improve residential pool operations while saving energy and maintaining equivalent or better standards for pool sanitation and cleanliness. The program promotes the installation and optimal calibration of energy-efficient, variable-speed pool pumps with a rebate that was \$100 from January 1, 2017 through September 30, 2017. The rebate was reduced to \$50 from October 1, 2017 through the end of the 2017 reporting period.

The Smart Thermostat program element is designed to encourage customer adoption of this new technology. A \$75 rebate is being made available for each thermostat purchased through retail channels and/or installed by HVAC or home performance contractors. Rebates are paid directly to customers who have their eligible thermostat(s) successfully installed and registered with the smart thermostat manufacturer and complete an online application.

Program Goals, Objectives and Savings Target

The goal of the lighting program element is to promote the purchase of high-efficiency LEDs while increasing awareness on the benefits of ENERGY STAR® rated lighting products.

The goal of the Energy-Efficient Pool Pump program element is to promote the purchase of high-efficiency ENERGY STAR® variable-speed pool pumps. In a typical Arizona home with a pool, the pool pump energy use can make up a substantial portion of annual energy use, often second after heating and cooling costs.

The goal of the Smart Thermostat program element is to promote the purchase of smart thermostats that provide energy efficiency and peak demand savings for the leading energy consuming system in a typical Arizona desert home – air conditioning. In addition to their significant energy savings features, smart thermostats also offer capabilities for demand response and load management.

Table 14 - Consumer Products Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
15.2	101,272	1,053,336

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

During this Reporting Period, the energy-efficient lighting element of the program resulted in sales of 1,079,356 LEDs through participating retail locations. In addition, APS distributed 70,916 LEDs during community outreach events. The total LEDs distributed during 2017 was 1,150,272. In 2017, approximately 272 retail outlets participated throughout the APS service territory. Participating retailers during this Reporting Period included: Ace Hardware, Costco, Dollar Tree, Goodwill Industries, 99 Cent Only, Home Depot, Lowe's, Sam's Club, Target, and Wal-Mart.

The Pool Pump measure provided rebates for 3,772 variable-speed pool pumps purchased by customers during this Reporting Period and currently includes over 200 participating pool retailers, distributors, and pool builders. During this Reporting Period, 4 pump calibration training seminars were held with a total of more than 48 pool professionals trained. Additionally, 15 pool technicians were trained on-site providing hands on calibration experience. The program representatives routinely conducted retail visits to inform pool professionals and provide updates regarding the APS rebate program.

The Smart Thermostat measure provided rebates for 11,915 devices purchased by customers during the 2017 reporting period. The measure currently offers the customer the option of eight different manufacturer's thermostats and over 34 different models - the market leaders included are Nest, Eco bee and Honeywell.

Evaluation/Monitoring Activities and Research Results

- Updated incremental material cost and avoided incandescent replacement cost assumptions for LED measures offered.
- Calculated annual energy and demand savings from rebated CFLs placed in storage in prior years and brought into use in 2017.
- Collaborated with program implementer to streamline and optimize the lighting savings verification process.
- Continued to review and update LED, Pool Pump, and Smart Thermostat Measure Analysis Spreadsheets and Analytic Databases.
- Gathered smart thermostat data in support of energy and demand savings impact analysis for smart thermostats.
- Held Monthly meetings with APS CPP Program Manager to keep current on program changes and needs, answer questions, and plan ahead for evaluation needs

- Held Quarterly meetings with APS program managers and implementers to review MER findings, identify research needs, and discuss data needs and constraints relevant to impact assessment in 2018 for smart thermostat measures.
- Completed a survey of over 1,500 residential customers to quantify willingness-to-adopt smart thermostats and other smart devices.

Consumer Education and Outreach

The program conducted retailer visits and retailer trainings during the Reporting Period to educate retail sales staff, assess inventories of merchandise, check point of purchase displays, address availability of qualified product, and communicate with retail sales staff.

In addition to the bulb sales at retail locations, APS has purchased a supply of LEDs to use for the low income program and for customer education and awareness building purposes.

APS supported 215 community education and customer outreach events during this reporting period to promote the Consumer Products programs and educate customers about other APS programs, rebates, and opportunities for saving energy and money. For a comprehensive list of events and dates, please refer to the work-papers provided to ACC Staff.

Advertising and article placements for the Lighting program element included the following:

- Articles in the Lifestyles Residential newsletters/e-newsletters: May and July.
- Point of sale signage at participating lighting retail locations, including specialty signage at Target.
- Produced three bill inserts with different calls to action that went out to customers in February, April and October that highlighted APS discounted CFLs and LEDs.
- Produced bill messages (printed directly on customer bills) for February and October
- Held 494 store trainings and performed 504 store visits in September and October, resulting in increased sales and awareness. Overall, there were 2,748 store visits for the year.
- Sent geo-targeted lighting messaging through social media to promote retail events in April for Earth Day, and in October for fall home shows.
- Posted general lighting messaging on social media to promote changing out incandescent bulbs to LEDs in February, May, and October.
- Ran print ads in the Yuma market highlighting weekend LED promotion events at the local Lowe's and Home Depot stores.
- Produced large pull-up signage for use at retail events.
- Updated lighting towers display messaging.
- Produced LED donation flyer.

The program also conducted a range of marketing and advertising activities to raise awareness about variable-speed pool pumps including:

- Provided program brochures for consumers at outreach events.
- Direct mail, web banner, bill insert and eblast campaign to target market of pool customers in Spring and Summer.
- Posted general pool pump messaging on social media in January, May and September.
- Posted pool pump messaging promoting the calculator on social media in April and July.

- Produced pool pump bill insert that went out to customers in April, and bill insert that went out in July, sharing messaging with the Home Performance program.
- Maintained program web pages on aps.com including basic information, online application forms, video content, answers to frequently asked questions, and a list of participating Pool Retailers.
- Produced collateral for point-of-sale materials, including many different styles and sizes of store signage.
- Produced a 3-sided standing signage that promoted all 3 programs for lighting, pools, and smart thermostats with the new logos.
- Updated the Spanish pools brochure and general Switch to Save sign topper.
- Produced door hangers for pool partner professionals to use and leave on pool pump installation/calibration sites.

In addition, the program conducted a range of marketing and advertising activities for the smart thermostat program element including:

- Created point of sale signage at participating smart thermostat retail locations, including a breakroom poster, 3ft aisle violators, brochures explaining the enrollment process and qualifications and distributed pins to trained staff.
- Trained 556 store associates in 2017, resulting in increased awareness.
- Created program web pages on aps.com including basic information, upcoming events, a search tool listing participating brick-and-mortar retailers, answers to frequently asked questions.
- Produced large trifold table top display.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

In accordance with ACC Decision No.76313, APS reduced incentive levels for variable speed pool pumps from \$100 to \$50 per unit effective on October 1, 2017 through the end of the reporting period. In accordance with the same ACC Decision No. 76313, APS reduced the average incentive of \$1.60 per LED to an average of \$0.80 per LED on October 1, 2017 through the end of the reporting period.

Other Significant Information

The Smart Thermostat measure was started in the fourth quarter of 2016 and was not cost effective due to startup costs and low participation in the reporting period. In 2017 with a full year of implementation, the program proved to be cost effective.

MER Adjusted Gross kW and kWh Savings

Table 15 - MER Adjusted Gross MW and MWh Savings - Consumer Products Program

Measure	# Units*	Annual Gross MWh Savings**	Lifetime Gross MWh Savings**	MW Peak Demand Savings**
Giveaway LEDs	70,916	3,348	77,015	0.5
LEDs	1,079,356	62,538	1,250,769	8.6
2017 In-Service LEDs	NA	2,205	2,359	0.3
2017 In-Service CFLs	NA	7,864	8,414	1.1
Smart Thermostats	11,915	7,624	76,243	5.5
Variable Speed Pool Pumps	3,772	7,221	86,652	0.8
TOTAL	1,165,959	90,801	1,501,451	16.6

*The total number of units is adjusted for 1) bulbs not yet placed into service 2) bulbs installed outside APS territory. Please refer to workpapers for the complete list of units in this reporting period. In service units refer to bulbs distributed in prior years that were assumed to be in storage and placed into service in 2017.

**Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

2. Residential New Home Construction

Description

This program promotes high-efficiency construction practices for new homes. It offers incentives to builders that meet the program’s EE standards. The program emphasizes the whole building approach to improving EE and includes field testing of homes to ensure performance. Participating builders are trained to apply building science principles to assure that high efficiency homes also have superior comfort and performance. The program also provides education for prospective homebuyers about the benefits of choosing an energy-efficient home and the features to consider.

The program takes advantage of the national ENERGY STAR® brand name, and promotes the U.S. Environmental Protection Agency (“EPA”) ENERGY STAR® label to prospective homebuyers. To encourage builders to meet the program’s high-efficiency standards, APS provides builder incentives for ENERGY STAR® version 3 compliant homes. To encourage builders to meet even higher EE standards, the program also offers a higher second tier incentive for builders that meet the higher savings level of Home Energy Rating System (“HERS”) 60.

Program Goals, Objectives and Savings Targets

The program objective is to increase the penetration of homes built to high-efficiency standards. The rationale for this program is that residential new construction in the APS service territory, particularly the Phoenix metro area, has historically been one of the biggest drivers of APS’s system load growth. It is more cost-effective to work with builders to implement EE at the time of construction rather than to attempt to retrofit efficiency after a home has been built. For many new home measures, such as building envelope improvements, the benefits of EE upgrades will be sustained for the life of the home to produce cost-effective savings.

Table 16 - Residential New Construction Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
5.2	10,899	217,983

*Based on 2017 program goals and objectives as approved in Decision No. 76313.

Levels of Customer Participation

During this Reporting Period, APS signed 5,357 homes that are committed to being built to ENERGY STAR® V3 and ENERGY STAR® V3 – HERS 60 program standards. At the end of this Reporting Period, there were 57 homebuilders and 303 subdivisions actively participating. The program currently includes ENERGY STAR® communities throughout the APS service territory including the Phoenix metro area, Yuma, Casa Grande, Florence, Prescott, Verde Valley, and Flagstaff.

Specifically, in 2017 APS paid builder incentives for the following completed homes:

- 2,450 ENERGY STAR Version 3
- 1,649 ENERGY STAR Version 3 – HERS 60

Evaluation/Monitoring Activities and Research Results

- Revised energy simulation models based on most recent program participants billing records, building characteristics, and HERS scores.
- Updated baseline efficiency assumptions and energy savings impacts for non-participant homes based on new building code adoptions across all APS jurisdictions, as well as non-participant billing records, climate zones, and square footages.
- Analyzed hourly AMI data and building characteristics for participating homes to identify high consuming households relative to their respective HERS rating. The analysis identified programmatic processes and building characteristics that are correlated with high consumption.
- Updated Residential New Construction Measure Analysis Spreadsheets and Analytic Database.
- Supported data requirements of implementation tracking system to meet evaluation needs.

Consumer Education and Outreach

Program marketing and education efforts during this Reporting Period include the following:

- *2017 Homebuilders Association Member Directory* - print ad to promote the APS ENERGY STAR® Home program to builders.
- *Provided Sales Agent Training* - for APS ENERGY STAR® Home builder sales staff.
- *Distributed APS ENERGY STAR® Home Program Sales Book* - for builder sales agents to use in selling the features of ENERGY STAR® Homes to prospective homebuyers.
- *Distributed APS ENERGY STAR® Model Home Materials* - for builders to put in model homes to advertise the different features and benefits of an ENERGY STAR® homes.
- *Distributed a homebuyer brochure* - that is targeted to new buyers and discusses the features and benefits of an ENERGY STAR® home. The brochures are being distributed at community events and at participating builders' model home sales offices.
- *Southwest Builders Show (An event hosted by HBACA)* – APS sponsored the Forecast Luncheon and staffed a trade show booth where APS program representatives discussed the APS ENERGY STAR program with builders and trade partners.

Problems Encountered and Proposed Solutions

The APS ENERGY STAR® Homes program experienced participation volumes much higher than projected in the third quarter of 2017. Incentive dollars were oversubscribed before the year ended. As a result, the following changes went into effect October 10, 2017:

1. No new homes were allowed to be submitted for incentive processing from October 1, 2017 to December 31, 2017.
2. New subdivision enrollment in the program was suspended.
3. The Rater incentive of \$50 per home was suspended indefinitely.
4. Program incentives were reduced described below.

Program Modifications/Terminations

Program modifications for the year included reducing program incentives for V3 HERS 61-70 homes from \$600 to \$500 and for HERS 60 or lower homes from \$1,500 to \$1,000. This incentive change applied to all homes submitted after October 1, 2017.

Other Significant Information

No information to report at this time.

MER Adjusted Gross kW and kWh Savings

**Table 17 - MER Adjusted Gross MW and MWh Savings
Residential New Construction Program**

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
APS ENERGY STAR Homes V3	2,450	4,012	80,233	2.0
APS ENERGY STAR Homes HERS60	1,649	4,889	97,778	2.0
TOTAL	4,099	8,901	178,011	4.0

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

In addition, program consumer education and homebuilder training efforts produce significant additional energy savings and benefits that are not quantified here.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

3. Residential Existing Homes Heating, Ventilation, and Air Conditioning Program

Description

The Residential Existing Homes Heating, Ventilation, and Air Conditioning Program ("Residential HVAC") uses a combination of financial incentives, contractor training and consumer education to promote the proper installation and maintenance of energy-efficient HVAC systems. The Air Conditioner ("AC") Rebate, Duct Test and Repair, Prescriptive Duct Repair, Residential Diagnostic and Western Cooling Control measures support energy-efficient Residential air conditioning and heating systems along with the proper installation, maintenance and repair of these systems.

The Residential Existing Homes HVAC program provides APS customers with referrals to contractors who meet strict program requirements for professional standards, technician training, and customer satisfaction.

The AC Rebate with Quality Installation ("QI") measure offers financial incentives to homeowners for buying energy efficient HVAC equipment that is installed in such a manner that it meets the program requirements for air flow, refrigerant charge and sizing. The Duct Test and Repair ("DTR") measure provides financial incentives to customers for having their HVAC system's duct work tested for leakage and repaired. The Prescriptive Duct Repair ("PDR") measure provides financial incentives to customer for having the HVAC system sealed to reduce air leakage. It does not require a full test in and test out of the HVAC system like the DTR measure. The Residential Diagnostic ("RD") measure provides a financial incentive for an advanced diagnostic tune-up on existing air conditioning and heat pump equipment to ensure that it operates more efficiently. The main components of this measure are the correction of the refrigeration charge, leak repair, condenser coil cleaning and air flow verification. Finally, the Western Cooling Control ("WCC") measure provides a financial incentive to install a retrofit device that optimizes HVAC operation for the dry Southwest climate by running the HVAC unit's fan for a few additional minutes after the compressor shuts off to capture cooling from the coil and improve efficiency.

Program Goals, Objectives and Savings Targets

The Existing Homes HVAC program uses a combination of financial incentives, contractor training and consumer education to promote high-efficiency HVAC systems. The program focuses on the proper installation of equipment, increasing existing equipment efficiency, and the testing, sealing and repair of duct work in existing Residential homes.

Table 18 - Existing Homes HVAC Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
10.7	15,031	172,370

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

- A total of 16,263 rebates were paid through the program in 2017. APS has paid:
 - Quality Installation: 12,433 AC rebates.
 - Residential Diagnostics: 22 rebates.
 - Duct Test and Repair participation levels in 2017:

- 2,956 DTR reported rebates. There were 3,147 total rebates, 191 were for tests without repairs. Only the repair rebates (2,956) are used for calculating the demand and energy savings shown in the savings tables.
- Only 5 Prescriptive Duct Repair rebates were completed in 2017.
 - Western Cooling Control: 656 rebates.
- There are currently 155 contractors that can offer the APS AC Rebate of which 125 are APS Qualified Contractors. There are 30 Rebate Eligible contractors that entered the program through the application process approved by the ACC in October 2009, which does not require membership in the Arizona Heat Pump Council. There are currently 38 contractors that can offer the rebates outside the Phoenix metropolitan area.

Evaluation and Monitoring Activities and Research Results

- Completed initial installations for a residential end-use metering study at 50 homes in the Phoenix metro area and initiated the development of residential HVAC hourly load shapes based on 1-minute energy consumption data.
- Completed a survey of over 1,500 residential customers to quantify willingness-to-adopt smart thermostats and participate in smart thermostat-enabled demand response events.
- Updated Residential HVAC Measure Analysis Spreadsheets and Analytic Database including Quality Installation, Duct Test and Repair, Advanced Diagnostic Tune Up, and Western Cooling Control measure offerings.
- Completed an in-depth review of the Advanced Diagnostic Tune Up measure to verify savings and unit size.

Consumer Education and Outreach

Residential Existing Home HVAC program marketing and consumer/contractor education efforts for this Reporting Period include:

- Articles in APS FYI Newsletter for January (Duct Test & Repair), March (Residential Diagnostics, Cool Control), June (Cool Control), July (AC, Cool Control), September (DTR, Cool Control) and December, (Cool Control).
- Targeted Direct Mail and/or E-mail campaign for February (DTR), March (Residential Diagnostic, Cool Control), April (Cool Control), June (AC).
- Facebook ads in January (DTR), February (DTR), March (Residential Diagnostic, Cool Control), April (Residential Diagnostic), May (AC, Cool Control, Residential Diagnostics), June (Cool Control), July (AC) August (AC) September (Cool Control), October (AC, DTR) and November (DTR).
- Online Banner Ads and/or search engine marketing (SEM) in February (DTR), March (Residential Diagnostic, Cool Control), April (Residential Diagnostic), May (Residential Diagnostics, Cool Control) June (AC, Cool Control), July (AC), August (AC, Cool Control), October (Cool Control).
- Bill Inserts for February (DTR), April (Cool Control), and June (AC).
- Presentations to numerous community groups. Most of the consumer education events listed under Consumer Products also include information on the AC Rebate and other APS Residential programs.
- The aps.com homepage prominently features APS EE programs. These programs are grouped in one section of the homepage entitled "Save Energy and Money."

Problems Encountered and Proposed Solutions

During this Reporting Period there was very limited contractor interest or customer participation in the Residential Diagnostics rebate. Due to the lack of market interest, APS suspended this measure effective on Oct. 1, 2017 and re-allocated the associated budget to other Residential Existing Home measures.

Program Modifications/Terminations

On October 1st 2017 The QI rebate was reduced from \$245 to \$200. The Duct Test and Repair rebate was reduced from \$400 to \$250, and the Residential Diagnostics rebate reduced from \$95 to \$0.

MER Adjusted Gross kW and kWh Savings

Table 19 - MER Adjusted Gross MW and MWh Savings - Existing Homes HVAC Program

Measure	# Units	Annual Gross MWh Savings*	Lifetime Gross MWh Savings*	MW Peak Demand Savings
AC with Quality Installation	12,433	14,936	149,364	10.7
Diagnostics	22	13	77	0.0
Duct Test and Repair**	2,956	2,805	50,491	2.8
Prescriptive Duct Test and Repair	5	3	47	0.0
Western Cooling Control	656	407	3,258	0.3
TOTAL	16,072	18,164	203,237	13.8

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

** Duct Test and Repair # units shows only rebates paid for repair work. Rebates paid for duct tests only are not included.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

4. Home Performance with ENERGY STAR®

Description

The Home Performance with ENERGY STAR program (“HPwES”) promotes a whole house approach to energy efficiency by offering incentives for improvements to the building envelope and mechanical systems of existing homes within the APS service territory. HPwES includes measures that improve the efficiency of the home with air sealing, insulation and duct sealing.

The program offers home owners a comprehensive home energy checkup to help identify ways to improve energy efficiency and comfort throughout the home. This program element offers a direct install feature that includes up to 10 LED’s and one low-flow showerhead that are installed at the time of the checkup. Additional incentives are available for duct sealing, air sealing, and insulation once a home owner has completed the HPwES checkup. After measures are installed, rigorous testing and quality assurance protocols then verify installation quality and performance. The program also includes the Energy Analyzer which offers residential customers a free on-line energy audit tool that provides home energy efficiency recommendations customized for their home and lifestyle, including savings tips and behavioral savings opportunities that participants can pledge to complete.

Program Goals, Objectives and Savings Targets

The HPwES measures promote a whole house approach to EE by offering education, technical assistance and financial incentives for improvements to the building envelope of existing Residential homes within the APS service territory.

Table 20 - Existing Homes - Home Performance Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
3.9	8,267	107,016

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

During this Reporting Period:

- A total of 2,731 contractor incentives were paid through HPwES for completed and approved energy audits. Each home that received a \$99 home energy audit, also received a direct install bag containing one low-flow showerhead and ten 9-watt LED light bulbs through September 31st 2017. Beginning October 1st 2017, the LED giveaways dropped to 5 per Energy Audit.
- The APS HPwES program paid rebates for measures installed in 1,315 participating homes. This indicates an approximate 48% of homes that completed an audit during the Reporting Period took steps to install additional measures as a result of the audit. The total number of customer rebates paid was 2,653. Specifically, APS has paid:
 - 1,502 duct sealing and repair rebates
 - 33 air sealing and insulation rebates

- 942 insulation only rebates
- 176 Western Cooling Control Devices.

- There are currently 35 qualified HPwES contractors. Contractors must complete the Building Performance Institute's Building Analyst certification and undergo a mentorship prior to becoming active. HPwES currently serves Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, Yavapai, and Yuma counties. We continue to promote contractor participation in underserved areas to provide options for customers.
- During this reporting period, the APS Home Performance answer line received 498 referral inquiries by telephone.
- During 2017 the Energy Analyzer web based energy audit program served 40,785 verified customers that logged into APS.com and calibrated the survey to their actual use. Of those, 1,651 continued on to participate in the full Home Performance with ENERGY STAR program.

Evaluation/Monitoring Activities and Research Results

- Completed initial installations for a residential end-use metering study at 47 homes in the Phoenix metro area and initiated the development of residential HVAC, hot water and appliance hourly load shapes based on 1-minute energy consumption data.
- Completed a survey of over 1,500 residential customers to quantify willingness-to-participate in the following programs: smart thermostat-enabled demand response, thermal storage with grid interactive water heaters, and residential scale battery storage.
- Characterized the savings and costs for remote audits to streamline program recruitment efforts.
- Continued review of program tracking data bases and provided guidance on structuring data exports of participant audit data containing building characteristics, insulation levels, blower door test results, window types, HVAC system type and efficiency to support annual savings analysis and verification process.
- Characterized the energy and demand impacts and incremental measure costs of smart timers for residential water heaters for inclusion as a new measure in the program.
- Installed data loggers on electric water heaters equipped with smart timers at 4 homes in Phoenix to verify the accuracy of the data logging capability of the timers. The data will also be used to derive baseline and efficient consumption patterns to support program planning efforts for this measure.
- Updated program Measure Analysis Spreadsheets and Analytic Database.

Consumer Education and Outreach

HPwES marketing and consumer/contractor education efforts for this Reporting Period include:

- Continued to utilize the Energy Analyzer online audit tool on aps.com and social media channels as a lead generator for the HPwES program. Educated customers on how their home uses energy and what energy efficiency program recommendations

are available to them. When customers receive a recommendation to consider an on-site energy audit, customers can apply immediately from the results page to enter into the HPwES program and receive contractor referrals.

- Began working on updates to the Energy Analyzer web based energy audit tool to be released in early 2018. Energy Analyzer 2.0 will include interval data, mobile device optimization and a better user experience. It will be more customized with more relevant tips to help customers save through efficiency and shifting loads out of peak pricing times.
- For customers who participate in energy audits, from initial engagement to project completion, APS provides customers with a simple, streamlined process to help guide them including a "My Project" dashboard that helps track their project status, review program documents and receive digital coaching throughout their program participation.
- Employed search engine marketing (SEM) and digital ads to better target customers actively searching for ways to improve their energy efficiency.
- Continued with a "hometown" concept for homeowners that match them with one contractor whose service area includes their neighborhood. This feature was designed to eliminate confusion for customers looking at an entire list of contractors. The new referral tool now captures the contractors' bio, website link, BBB profile and logo for a more thorough description.
- Distributed HPwES brochures through community events, trade allies, contractors, and other industry partners.
- Executed trigger based direct email communications to customers with a high propensity to participate in the program.
- Maintained the aps.com/checkup program page and continued to make it more customer friendly. A stand-alone website is available at www.azhomeperformance.com.
- Placed articles in: APS newsletter and e-newsletter for several months throughout the year for both Home Performance and Energy Analyzer.
- Delivered presentations on the APS Residential DSM programs to numerous community groups. Most of the consumer education events listed under Consumer Products included information on the HPwES and other APS Residential programs.
- Delivered presentations to several Real Estate and Lender groups on the benefits of adding Home Performance into the sale of an existing home, and the value of the new Home Performance with ENERGY STAR Certificate of Energy Improvements which is provided to participating homeowners who complete energy efficiency home upgrades through the program.
- The APS Home Performance program continues to be highlighted at the national level for its high level of quality work and customer service. A member of our trade ally pool has won the National EPA/Energy Star Contractor of the year award for the second consecutive year.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

On October 1st 2017 the incentive level for Duct Test & Repair was reduced from \$400 to \$250 and the number of LED's supplied during on-site audits was reduced from 10 bulbs to 5.

Other Significant Information

The Home Performance with ENERGY STAR[®] program is a valuable program to assist residential customers in improving the energy efficiency of their homes and in supporting a local network of home performance contractors who can help deliver efficiency services. The program is a driver for customers to participate in energy efficiency and often customer's first experience and entry point with APS when trying to diagnose high bill concerns or comfort problems inside their home. By channeling customers into the program, we are able to provide important services and education to help customers manage their bill and provide solutions. In addition to electric energy savings the program can also generate significant additional benefits for customers such as health and safety and indoor air quality.

In recognition of the ongoing success of the APS EE program portfolio and the APS Home Performance with ENERGY STAR[®] and ENERGY STAR Homes Programs, APS was selected by the EPA as a 2017 ENERGY STAR[®] Partner of the Year, Sustained Excellence Award winner.

APS works closely with other utilities in the state to coordinate the delivery of HPwES statewide. In 2017, APS continued to work closely with Salt River Project as we coordinated program implementation to optimize delivery across both electric service territories. This coordination allowed us to further ensure market consistency, while enhancing the customer experience through a joint program delivery.

MER Adjusted Gross kW and kWh Savings

Table 21 - MER Adjusted Gross MW and MWh Savings - Existing Homes - Home Performance

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Online Audits	40,785	5,630	5,630	2.6
Low Flow Showerheads	2,731	213	2,133	0.0
Cool Control	73	100	801	0.1
Duct Repair	1,503	1,426	25,673	1.4
Direct install LED	24,235	1,258	27,670	0.1
Insulation Weighted	981	1,127	28,071	0.4
TOTAL	70,308	9,755	89,978	4.6

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

In addition to the savings shown above, HPwES conducts a number of market transformation efforts, such as contractor training and customer education activities designed to transform the EE market. This results in spillover which produces additional energy savings and net benefits which are not quantified here.

5. Residential Conservation Behavior Program

Description

The Residential Conservation Behavior Program provides participating residential customers with periodic reports containing information designed to motivate them to change their energy usage behavior to save energy.

To drive conservation behavior, this program provides comparative Home Energy Reports to participants that show how the energy usage in that customer's home compares with similar homes. Coupled with the comparison data, customers receive recommendations for specific and targeted actions they can take to save energy.

Derived from best practices in behavioral science research, this program uses the power of normative messaging to successfully engage and motivate conservation actions of targeted individuals. Comparing an individual's energy use to what is "normal" has proven to be an effective mechanism to attract attention and motivate action. Normative messaging on energy use, combined with recommendations on how to improve, is the basis of the concept for the Conservation Behavior program. The program provides a benchmark for customers to achieve and instills a sense of competition to produce sustained conservation behaviors.

Program Goals, Objectives, and Savings Targets

The goal of this Program is to motivate Program participants to save energy by changing their energy use behavior.

Table 22 - Conservation Behavior Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
15.2	101,272	1,053,336

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

The 2017 program was targeted to reach an average of approximately 270,000 residential (both single and multi-family) customers. There is also a control group of approximately 60,000 additional customers who do not receive reports and are used as a control group to assess energy savings among participants. Customers are able to "opt out" of the program at any time.

Evaluation/Monitoring Activities and Research Results

- Conducted annual mid-year regression analysis of monthly billing records to verify implementation contractor model savings estimates.
- Reviewed implementation contractor model to assess accuracy and reasonableness of outputs.
- Updated program Measure Analysis Spreadsheets and Analytic Database.

Consumer Education and Outreach

Participants receive periodic, direct mailed reports that provide energy usage benchmarks and customized energy efficiency tips to educate and help them reduce consumption.

Participants also have access to a web portal that provides even greater insight into usage, comparisons (both personal and with similar homes) and variety of energy savings tips.

APS also provides email reports in addition to the printed reports for approximately 65,000 aps.com activated program participants. The email reports are sent monthly and provide additional energy usage context and tips for greater energy savings potential.

Problems Encountered and Proposed Solutions

As mentioned earlier in this section, reports were not distributed for several months due to customer data migration that took place between February and July as part of the Customer Care and Billing system implementation, which interrupted direct mail and email HERs being sent in that timeframe. The direct mail reports were sent in July but then suspended for the remainder of the Reporting Period due to the high call volumes being experienced in the APS call center during this period. Due to these issues, the program achieved lower energy savings than were forecasted, which resulted in a program benefit cost ratio of less than 1.0 for the reporting period. In the 2018 DSM Plan, APS has proposed a revised program design for the program which should result in higher cost effectiveness.

Program Modifications/Terminations

No program modifications were made during this reporting period.

Other Significant Information

In addition to conservation behavior savings, one of the key benefits of this program is that it promotes the wide array of APS rebate programs in the tips offered on each report.

MER Adjusted Gross kW and kWh Savings

Table 23 - MER Adjusted Gross MW and MWh Savings - Conservation Behavior Program

Measure	# Participants	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Conservation Behavior Program	244,707	54,232	54,232	9.7
TOTAL	244,707	54,232	54,232	9.7

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

6. Multifamily Energy-Efficiency Program

Description

The Multifamily Energy Efficiency Program ("MEEP") encourages energy efficiency improvements in multifamily complexes within the APS service territory.

MEEP uses a three-track approach to promote efficiency within the multifamily market segment.

- **Track 1** Provides free direct install measures to retrofit the residential dwellings of existing communities. Participating communities receive enough LEDs, low flow showerheads, and faucet aerators to retrofit every community dwelling. Facility personnel, with implementation contractor field support, conduct all product installations.
- **Track 2** Provides complementary energy assessments of the community common area facilities. The energy assessment identifies opportunities for additional EE savings and the applicable Solutions for Business incentives that are available.
- **Track 3** Targets new construction and major renovation multifamily projects. This track encourages energy efficient building principles by paying an incentive to builders on a per unit basis for building to the energy efficiency standards outlined in builder option packages ("BOP"). Higher incentives are offered for achieving increasingly higher levels of energy efficiency.

Program Goals, Objectives, and Savings Targets

The MEEP program objectives are to:

- Reduce peak demand and overall energy consumption in the multifamily housing market segment.
- Promote existing community EE retrofits of both dwelling units and common areas.
- Promote higher efficiency construction standards in the development of new multifamily projects.
- Increase overall awareness about the importance and benefits of EE improvements to the landlord and property ownership community.

Table 24 - Multi-Family Energy Efficiency Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
1.50	8,607	120,361

*Based on 2017 goals and objectives as approved in Decision No. 76313.

Levels of Customer Participation

A total of 29 multifamily communities participated in the direct install program in 2017 totaling 13,342 apartment dwellings. In total there were 8,550 CFLs, 81,562 LEDs, 9,057 faucet aerators, and 3,755 showerheads installed in multifamily dwellings.

The New Construction/Major renovation program saw 8 projects participate in 2017. A total of 1,146 units received rebates in 2017.

Evaluation/Monitoring Activities and Research Results

- Developed survey instruments for and conducted interviews with existing buildings and new construction property managers to assess program satisfaction and influence, motivation for program participation, barriers to participation, verify installation and persistence rates for direct installation measures, and assess baseline conditions for new construction projects to inform program design modifications in future implementation plans.
- Updated program Measure Analysis Spreadsheets and Analytic Database.
- Reviewed implementation program tracking database and supporting HERS rating documentation to refine savings assumptions.
- Characterized the energy and demand impacts and incremental measure costs of smart timers for residential water heaters, and quality installation of new air conditioners for inclusion as a new measure in this program.
- The baseline field study was utilized to develop new prescriptive requirements for the multifamily new construction program

Consumer Education and Outreach

MEEP consumer education and outreach efforts for this Reporting Period include:

- Distribution of MEEP brochures to customers.
- Word of mouth and door to door outreach was utilized to get program messaging out in the market place and to secure many of the program's participants.
- Maintained a presence on aps.com to give customers a point of reference for all program information.
- Provided customer educational leave behind materials promoting EE in all dwellings that were retrofitted.
- Delivered MEEP presentations at community events.
- Distributed Direct Install and New Construction case studies.
- Distributed a common area improvement program brochure.
- Distributed promotional leave behinds for residents to inform them of other APS EE program offerings.
- Utilized a landing page at aps.com/meep designed to make it easy for customers to get immediate assistance with program enrollment.
- Distributed recognition plaques for MEEP New Construction projects completed in 2017.
- Developed and distributed outreach savings kits that included samples of all direct install products.
- Promoted the program at the Arizona Multihousing Association Education Conference and Income Property Manager Expo.
- Developed and distributed window clings for all multifamily communities retrofitted in 2017.

Problems encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No program modifications were made during this reporting period.

MEEP New Construction Optional Measures Installed

In Commission Decision No. 73089, APS was directed to report the number and type of optional measures that builders/developers are choosing to install, as well as energy savings, coincident demand savings, and actual cost for each optional measure selected by Multifamily New Construction participants.

A total of 8 multifamily new construction projects received incentives in 2017. All but two projects went through the performance path. The performance path allows builders or developers of Multifamily new construction projects to use any building design to reach program compliance as long as the building's performance, when tested by a certified HERS rater, meets the minimum performance HERS scores standards established for each BOP. These performance path projects don't select optional items from the prescriptive list. Three projects elected to use the prescriptive path. The optional measures chosen and other required information are included in the table below. Note that because builders are unwilling to share construction cost data, actual costs for the optional measures isn't available. However, APS has included an estimate of incremental costs in the table below for each optional item using industry cost data.

Table 25 - Optional Measures Selected by MEEP New Construction Participants

Projects	HVAC Equipment	Lighting and/or Windows	Lighting, Windows and/or Fan Motor	Ducts	Savings per Measure kWh/Unit	Demand per Measure kWh/Unit	Incremental Cost
Union at Roosevelt		✓	✓	✓	2,007	0.534	\$551.38
McKinley Row	✓	✓	✓		2,091	0.556	\$870.48

MER Adjusted Gross kW and kWh Savings

Table 26 - MER Adjusted Gross MW and MWh Savings - Multi-Family Energy Efficiency Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Direct Install Low Flow Showerhead	3,755	877	8,765	0.1
Direct Install Low Flow Faucet Aerators	9,057	433	4,331	0.0
Direct Install CFLs	8,550	410	2,870	0.0
Direct Install LEDs	81,562	3,834	57,516	0.5
Builder Option Package (BOP) 1	0	0	0	0.0
Builder Option Package (BOP) 2	17	35	701	0.0
Builder Option Package (BOP) 3	1,129	2,460	49,200	0.8
TOTAL	104,070	8,049	123,383	1.4

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Other Significant Information

No information to report at this time.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

7. Energy Wise Limited Income Assistance

Description

APS's Energy Wise Limited Income Assistance Program is designed to improve the efficiency, safety and health attributes of homes for customers whose income falls within the defined federal poverty guidelines. This program serves limited income customers with various home improvements including cooling system repair and replacement, insulation, sunscreens, water heaters, window repairs and improvements as well as other general repairs. Per Commission Decision No. 68647, the program is conducted in accordance with the rules of the federal Weatherization Assistance Program ("WAP"). WAP incorporates a performance-based energy audit procedure that focuses on optimizing investment in energy efficiency through a systems approach. Participating agencies utilize a Department of Energy site specific REM Design energy audit procedure that ensures that the overall Savings to Investment Ratio ("SIR") for the entire package of materials/measures including the cost of incidental repairs is greater or equal to one. In addition, participating agencies also use a prescriptive priority list developed by the Arizona Department of Housing to determine which cost effective measures to install. There is also a multifamily housing component designed to extend the benefits of weatherization to these types of complexes. The program is administered by various community action agencies throughout APS's service territory.

Program Goals, Objectives, and Savings Targets

- To improve the efficiency of homes for customers whose income falls within the defined poverty guidelines.
- To provide customers information on energy management and conservation.

Table 27 - Limited Income Weatherization Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.7	1,431	25,751

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

A total of 552 households received assistance during the Reporting Period. A single household may have received more than one type of assistance.

Table 28- Limited Income Weatherization Program Participation

Type of Assistance	Number of Households
Health and Safety	0
Repair and Replace	0
Weatherization	552
Total	552

Evaluation/Monitoring Activities and Research Results

Weatherization measures must pass the cost effectiveness test that is detailed in the federal government's Weatherization Assistance Program (WAP) rules. These rules allow certain

prescriptive measures, which vary with the climate zone and type of housing construction. Measures not on the prescriptive list must be assessed by a computer analysis to determine the economic feasibility.

The Arizona Department of Housing Weatherization Assistance Program (ADOH WAP), with information from APS, has been analyzing the electric energy used in weatherized homes before and after the weatherization measures were implemented. It takes a year of data before the weatherization and another year of data after the weatherization to get an accurate gauge of the impact of the measures. As the data base grows over time, a more accurate picture of the impact of the weatherization activities will emerge.

Information from the Governor's Office of Energy Policy (GEOP) report for fiscal year 2014, submitted January 2016 is provided below:

Utility Bill Analysis

This report includes jobs completed across Arizona using data provided by APS, TEP, Unisource Gas and Electric and Southwest Gas utility data. This analysis is ongoing, new data will be updated to these values on a quarterly basis.

Provided are Savings to Investment Ratios (SIR) for total investment from all funding spent (diagnostics, energy measures and health and safety measures) and for energy related measure only (diagnostics and energy measures).

Assumptions

Present value is based on 17.5 years measure life, discount rate of 3% and a utility cost escalation rate of 3%.

Results Summary

The combined SIR of all jobs reviewed to date for funds (LIHEAP, DOE, Utilities, CDBG, URRD, SERC) spent on diagnostics, energy measures and health and safety measures is currently at 1.0. Health and safety represented 19% of expenditures.

The combined SIR of all jobs reviewed to date for funds spent on energy measures and diagnostics only (not including health and safety measures) was 1.22

The average saving per home reviewed was 2270 kWh and 33 therms of natural gas (gas therms average includes all electric homes).

It should be noted that, GOEP study savings are based on an average of all homes located throughout the state that participated in the study.

Consumer Education and Outreach

Program marketing efforts and outreach included:

- Conducted weatherization outreach and field visits to participating CAP offices.
- Sponsored weatherization workshops with Red Feather in the Tuba City area for Navajo Nation and Hopi Nation customers.
- Participated in Arizona Department of Housing State Weatherization Policy Advisory Committee meetings for developing the Department of Energy State plan.
- Partnered with the International Sonoran Desert Alliance (ISDA) to incorporate weatherization training into the local journeyman training.
- Attended Weatherization Peer to Peer meetings.

Problems Encountered and Proposed Solutions

No problems encountered.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

MER Adjusted Gross kW and kWh Savings

Table 29 - MER Adjusted Gross MW and MWh Savings - Low Income Weatherization

Measure	# Homes	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Weatherization	552	1,340	23,463	0.2
TOTAL	552	1,340	23,463	0.2

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

The kW factor used to calculate the savings are based on data from the GEOP study. The annual energy demand savings per home in this study are estimated to be 0.3 kW. A 17.5 years measure life and kWh savings factor of 2,270 kWh per home, from the current GOEP report, has been utilized to determine the appropriate kWh savings.

Benefits and Net Benefits/Performance Incentive Calculation

The net benefits for this program are provided in Tables 6 and 8.

Costs Incurred

Costs incurred for this program during the current Reporting Period are listed below:

Table 30 - Cost Incurred - Low Income Weatherization

Activity	Incentives	Training & Technical Assistance	Consumer Education	Program Implementation	Program Marketing	Planning & Admin	Program Total Cost
Bill Assistance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Health & Safety	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Repair and Replace	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Weatherization	\$ 2,381,829	\$ 7,000	\$ 1,551	\$ -	\$ 18,574	\$ -	\$ 2,408,954
3rd Party Manager - Arizona Community Action Association	\$ -	\$ -	\$ -	\$ 50,089	\$ -	\$ -	\$ 50,089
APS Program Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 61,988	\$ 61,988
Total	\$ 2,381,829	\$ 7,000	\$ 1,551	\$ 50,089	\$ 18,574	\$ 61,988	\$ 2,521,031

Note: This table displays all Energy Wise Program costs, including Health and Safety, and Repair and Replace. However, these categories are not included in Table 2.

Commission Decision No. 73089 requires APS to report spending for non-EE measures in the Energy Wise Program. There were no non-EE measures or associated spending in this program during this timeframe.

VI. Non-Residential Programs

8. Large Existing Facilities

Description

The Large Existing Facilities Program provides prescriptive incentives for owners and operators of large (more than 100 kW aggregated peak monthly demand) Non-Residential facilities to promote energy efficiency improvements in technologies such as lighting, HVAC, motors and refrigeration applications. The Direct Install approach is available for facilities that are individually metered with a peak demand of 400 kW and less. For EE applications not covered by the prescriptive incentives, the program offers custom incentives that are evaluated individually based on energy savings. The program also provides incentives to reduce the cost of an energy study that identifies energy-saving opportunities. The program provides educational and promotional materials designed to assist facility and business owners and operators in making decisions to improve the efficiency of their facilities.

Program Goals, Objectives and Savings Targets

- Promote and support EE opportunities for existing large Non-Residential customers.
- Promote the installation of high-efficiency technologies including, but not limited to lighting, HVAC equipment, motors and refrigeration systems.
- Promote market transformation through APS trade allies, customer outreach and technical training classes.

Table 31 - Large Existing Facilities Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
36.9	164,975	2,198,064

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

During this Reporting Period, APS paid \$14,168,066 in Large Existing program incentives. This figure represents a total of 1,974 paid applications from 714 unique customers and includes projects implemented through Direct Install. Payments to school districts and charter schools comprised 82 of the 1,974 applications.

Table 32 - Large Existing Facilities Program Incentives Paid

Incentive Status by Fund for Paid Applications	Incentives Paid
Large Existing – Prescriptive & Custom	\$14,056,211
Large Existing – Studies	\$111,855
Total Large Existing Funds	\$14,168,066

In Commission Decision No. 70637, APS was required to track DSM applications resulting from studies for which incentives have been paid and to report results to the Commission. During this Reporting Period, APS paid incentives for 26 study applications from 13

customers including 24 feasibility studies. Three (3) of the 26 studies have already resulted in implementation of the associated measures. Since the program's inception, 520 studies have been completed. Of those 520 studies, 199 have resulted in EE project applications to date.

In Commission Decision No. 73089, APS was required to report the type of measures installed by customers after a study was completed. The following measures were installed for studies completed in 2017: lighting and custom lighting.

Evaluation/Monitoring Activities and Research Results

- Updated energy and demand savings for Energy Management System (EMS) projects based on on-site investigations that verified performance of rebated EMS projects. Investigations included in-depth interviews with facility and energy managers, observations of EMS operation and functionality, and data collection of facility construction and energy systems that would support further analysis of EMS measures.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Completed updates to hourly load shape assumptions for Custom measures to identify impacts on system load.
- Simulated dimming of commercial lighting measures during peak demand periods to inform potential program modifications.
- Developed and updated hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential Measure Analysis Spreadsheets and Analytic Database.
- Calculated energy and demand impacts, and researched incremental costs to determine the cost effectiveness of new prescriptive measures including: outdoor LED lighting, LED street lighting, and conservation behavior.

Consumer Education and Outreach

The focal point of program development activities is centered on specific market segments. The program developed technical resources, information, trainings and advertisements to engage and educate these specific segments.

The program continued to develop and foster relationships with industry and stakeholder associations to enhance outreach efforts and connections with members. During the 2017 Reporting Period, these activities included estimated participation in the following:

- Feb 22 – Southwest Building and Facilities Management Expo (125 attendees)
- Mar 29 – Arizona Bio Industry Expo (50 attendees)
- April 9 – Edison Electric Institute Key Accounts Workshop (200 attendees)
- May 10 – APS Energy Update Meeting, Metro (100 attendees)

- May 16 – APS Energy Update Meeting, Yuma (75 attendees)
- May 17 – APS Energy Update Meeting, Prescott (75 attendees)
- May 18 – APS Energy Update Meeting, Flagstaff (75 attendees)
- May 24 – Prescott Chamber of Commerce Workshop (35 attendees)
- Sept 5 – Payson Chamber of Commerce luncheon (70 attendees)
- Sept 6 – Show Low and Pinetop Chamber of Commerce breakfast (40 attendees)
- Sept 14 – Good Morning Flagstaff, Greater Flagstaff Chamber of Commerce (200 attendees)
- Oct 12 - Arizona Small Business Association Mixer (40 attendees)
- Oct 20 – American Institute of Architects Annual Awards Program (100 attendees)
- Nov 7 - APS Energy Update Meeting, Metro (100 attendees).

Customer Awareness and Advertising

In 2017, the Solutions for Business program developed and implemented a multi-channel media campaign to increase awareness among APS business customers. The campaign consisted of an overarching umbrella awareness effort designed to reach the larger business community for broad exposure. We also provided strategic communications support for ongoing outreach through supplier contractors, Trade Allies and APS Key Account Managers (KAMs). This included updating and creating key outreach tools to promote the program, customer case studies, bill communications, and a Trade Ally web portal:

- Continued the awareness campaign, “APS has a rebate for that” that was started in 2016 and executed primarily through paid media. A strategic mix of online banner ads, radio, print, search engine marketing (SEM), newsletters, direct mailers and email drove traffic to the Solutions for Business website.
- Sent a letter to approximately 45,000 customers promoting the benefits of energy efficiency and our educational resources including a video and infographic and we followed up with a similar email to customers who had email addresses on file.
- Developed seven new customer case studies showing the benefits of efficiency improvements for participating businesses.
- Developed bill communications to promote S4B to customers when energy costs are top of mind. Bill communications included six apsFYI newsletters, monthly bill inserts as well as messages printed directly on the bill. The messaging across these owned communications aimed to build customer awareness of the program.
- Engaged and communicated with Trade Allies through quarterly e-newsletters that provide timely updates on program information and changes. We also host an online website where we post weekly tips and publish one original article a month on an energy-related topic.
- Updated and produced giveaway items and collateral for program outreach teams to use when visiting with customers.
- Produced and printed large checks for presentations to recognize participation and help raise awareness of the program at customer events.

Technical Training

Training courses help customers and trade allies understand technologies and potential for energy savings. This understanding promotes quicker adoption of energy efficiency technologies and encourages customers to undertake more in-depth and holistic projects. Classes allow interaction among customers, topic experts and contractors who can perform work, thus facilitating the contracting process. Feedback from this educational series

indicates that customers are more likely to adopt energy efficiency technology following such presentations and the knowledge gained from them.

APS continued to work closely with the Arizona Chapter of the Association of Energy Engineers ("AEE-AZ") to promote and manage registration of the APS Technical Training series. AEE-AZ provided access to their membership to promote the trainings and the Solutions for Business program and provided APS with turnkey registration support for the training classes that occurred during this Reporting Period. Attendance remained strong during this Reporting Period with many repeat attendees.

The classes held during this Reporting Period attracted 512 attendees at Technical Training events:

- January 18 – Industrial Facilities, Pumping Systems (24 attendees)
- January 31 – LEDs Webinar (100 attendees)
- February 15 – Strategic Energy Management (26 attendees)
- March 15 - HVAC (57 attendees)
- March 16 - Chillers (52 attendees)
- April 12 - Lighting (62 attendees)
- May 9 – Business Energy Analyzer Webinar (40 attendees)
- May 17 – Energy Modeling / Energy Plus (19 attendees)
- June 21 – Benchmarking with Energy Star (22 attendees)
- July 19 – Building Controls (31 attendees)
- August 8 – Custom Projects Webinar (41 attendees)
- August 16 – Energy 101 (15 attendees)
- Sept 19 – The Changing Focus of DSM Webinar (75 attendees)
- Sept 20 – Measurement & Evaluation (24 attendees)
- October 4 – The Changing Focus of DSM Webinar (116 attendees)
- October 18 – Utility Rates (58 attendees)
- November 15 – Thermal Storage (22 attendees)
- December 13 – Codes and Standards (19 attendees).

The program sponsored the following training organizations and related classes:

- AEE – Certified Energy Manager series – semester-long class with 19 participants
- AEE – Certified Renewables Energy Professional series – week-long class with 12 participants

Commission Decision No. 73089 requires APS to report Energy Management System ("EMS") and LED measures, annual savings, capacity savings and measure life individually. See the table below:

Table 33 - Large Existing Facilities Program Measures

Measure	Quantity	kWh Savings	kW Savings	Measure Life
EMS - DDC Replacing Pneumatic or Manual Thermostat	1,601,888 sq. ft.	5,673,928	1,187	15
EMS - DDC Replacing Programmable Thermostat or Digital System	2,352,414 sq. ft.	7,283,120	1,538	15
EMS - Integrated Lighting Control	455,665 sq. ft.	833,387	156	10
LED - Non-reflector	96,552	14,923,948	2,899	7
LED - Reflector	29,478	4,216,129	912	7
LED - MR16	6,797	928,728	157	7
Linear LED 2 Foot	5,993	167,917	29	16
Linear LED 3 Foot	5,254	277,364	48	17
Linear LED 4Foot	351,454	24,202,049	4,132	17
Linear LED 8 Foot	8,842	719,658	123	17

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2017, APS did not raise the rebate amount for any measures causing it to exceed 50% of the incremental cost of the measure.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2017, APS did not raise the rebate amount for any measures causing it to exceed 50% of the incremental cost of the measure.

During this reporting period, modifications to the baseline performance requirements for Whole Building projects, and all new construction measures have increased as shown below.

- Whole Building projects must exceed ASHRAE 90.1 2010 standards
- Air-cooled and water-cooled chillers must exceed ASHRAE 90.1 2013 standards
- All other new construction measures must exceed ASHRAE 90.1 2010 standards

On September 29, 2017 the following measures were removed from the program:

- Lighting*
- Refrigeration*
- Motors
- HVAC tune-up
- CO & CO₂ sensors

- Hotel room occupancy sensors
- High efficiency appliances

*Lighting and refrigeration rebates will continue to be available for K-12 schools contingent upon funding availability.

Self-Direction

On January 23, 2009, the Commission issued Decision No. 71444 approving Self-Direction. In this Reporting Period, no customers participated in Self-Direction.

Freeport McMoran Opt-Out Provision

Commission Decision No. 74813 exempted Freeport McMoran from paying into the DSMAC and participating in the Solutions for Business program for their Bagdad mine. It was furthered ordered by the Commission that Freeport McMoran continue to obtain and report energy efficiency activities and savings on an annual basis for their Bagdad mine. During this reporting period, Freeport McMoran reported installing high-efficiency motors, variable speed drives and LED lighting. Based upon the information provided by Freeport McMoran, APS estimates that the Freeport McMoran Bagdad mine saved approximately 3,154 MWh annually. As ordered, these savings from the Freeport McMoran Bagdad mine are not included in the savings values reported as part of this Demand Side Management portfolio.

Direct Install

The Direct Install measures were launched in April 2009. While these measures are targeted to small businesses, program rules allow small facilities (under 400 kW demand) of large customers to participate. K-12 school buildings of any size can also participate in Direct Install measures. In this Reporting Period, 194 Direct Install projects for Large Existing Facilities were paid a total of \$1,570,968 in incentives. Pursuant to Commission Decision No. 73089, APS has provided a breakdown of required Direct Install program information within the Small Business section.

Trade Allies

Trade Allies are contractors and other industry professionals who deliver efficiency solutions to customers. The program incorporates a Trade Ally program to ensure an informed and engaged network of service providers work with APS's customers. To be listed as a Solutions for Business Trade Ally, a company must submit an application and attend program training. To remain on the list, the company must participate in the rebate program and attend annual refresher training. Additionally, each Trade Ally must maintain good customer service performance and represent the Solutions for Business program appropriately in accordance with the APS Solutions for Business Policies and Procedures. Outreach is conducted through strategic partnerships within the energy and contracting industry as well as trade show and event participation. In house Trade Ally training is provided monthly which consists of educating contractors on utilization and promotion of the program.

In addition to the monthly training classes and multiple on-site contractor hosted events, the program produced and participated in the following Trade Ally focused events:

- March 24 – APS Solutions for Business Annual Trade Ally Event (175 attendees)
- April 12 – Building Operator training, Electric League of Arizona Event (50)

- Nov 1 – Building Operator training, Electric League of Arizona (25).

Also as a result of the program’s focus on Trade Ally development and recruiting efforts, 14 new trade allies (companies) were approved during this Reporting Period for a total at the end of this Reporting Period of 187 trade allies (companies).

MER Adjusted Gross kW and kWh Savings

The following table reflects the MER adjusted total energy and demand saving achievements in this Reporting Period for the Large Existing Facilities program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 34 - MER Adjusted Gross MW and MWh Savings - Large Existing Facilities

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Large Existing Facilities	191,010	2,632,909	28.0
TOTAL	191,010	2,632,909	28.0

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred During the Reporting Period

Cost information is provided in Tables 2(b) and 2(c).

9. New Construction and Major Renovations

Description

The Non-Residential New Construction and Major Renovations program includes four elements: 1) design assistance and feasibility studies, 2) custom measures, 3) prescriptive measures, and 4) whole building applications (construction & design incentives). Design incentives involve efforts to integrate efficiency into a customer's design process to influence equipment/systems selection and specification as early in the process as possible. Custom and prescriptive incentives are available for efficiency improvements in lighting, HVAC, motors and refrigeration applications. Whole building applications are intended to promote integrated design strategies.

Program Goals, Objectives and Savings Targets

- Promote integrated design and integrated analysis of alternative high-efficiency design packages through design assistance in new construction and major renovation applications.
- Assist the customer design team in examining alternative high-efficiency design packages through the provision of the design incentive.
- Promote market transformation through APS trade allies, customer outreach and technical training classes.

Table 35 - New Construction Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
7.5	29,713	413,059

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

The majority of new construction and major renovation projects under way are choosing the Whole Building application. In this Reporting Period, APS paid a total of \$2,926,589 in New Construction incentives. This represents 82 applications from 51 unique customers. One (1) of the 82 applications was from a school district. Incentive status is provided below.

Table 36 - New Construction Program Incentives Paid

Incentive Status for Paid Applications	Incentives Paid
Large New Construction – Prescriptive & Custom	\$2,867,437
Large New Construction – Studies	\$59,152
Total Large New Construction Funds	\$2,926,589

Commission Decision No. 70637 required APS to continue tracking DSM customer applications resulting from studies for paid incentives, and report the semi-annual and cumulative results of its program-to-date tracking efforts. During this Reporting Period, 7 design assistance studies were paid a total of \$49,152 and one commissioning study was paid for \$10,000. Seven (7) of these 8 applications have resulted in EE projects to date.

Since program inception, 104 studies have been completed. Of those 104 studies, 71 resulted in applications for EE projects.

Commission Decision No. 73089 required APS to report the type of measures installed subsequent to the receipt of study or design assistance incentives. The following measure was installed for studies completed in 2017: whole building.

During this Reporting Period, the program received 13 Whole Building Pre-Notification applications and 8 Whole Building Final-Notification applications; 8 Whole Building projects were paid incentives.

Evaluation and Monitoring Activities and Research Results

- Updated energy and demand savings for Energy Management System (EMS) projects based on on-site investigations that verified performance of rebated EMS projects. Investigations included in-depth interviews with facility and energy managers, observations of EMS operation and functionality, and data collection of facility construction and energy systems that would support further analysis of EMS measures.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Completed updates to hourly load shape assumptions for Custom measures and Whole Building measures to identify impacts on system load.
- Simulated dimming of commercial lighting measures during peak demand periods to inform potential program modifications.
- Continued to develop and update hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential Measure Analysis Spreadsheets and Analytic Database.
- Calculated energy and demand impacts, and researched incremental costs to determine the cost effectiveness of new prescriptive measures including: outdoor LED lighting, LED street lighting, and conservation behavior.

Consumer Education and Outreach

Strategic partnerships with industry organizations such as the American Institute of Architects (AIA) and U.S. Green Building Council (USGBC) continue to play an important role in New Construction outreach. During this Reporting Period, APS continued to sponsor the Energy Award at the annual awards of AIA. This partnership will help the program attract allies in the architectural sector and promote the Whole Building incentive. Architects can access low cost Continuing Education Units through the APS Technical Training program.

In addition, we developed a leave-behind piece explaining the two different rebate paths for New Construction: Prescriptive and Whole-Building. We also enhanced the webpage to make the process clearer.

In addition to many of the marketing and outreach activities described for the Large Existing program, outreach activities for the New Construction program focus on educating potential program participants from the following customer segments: owner-occupied buildings, government buildings (schools, county, city, state) and signature projects.

Additional New Construction program events:

- May 17 – Energy Modeling / Energy Plus (19 attendees)
- Oct 20 – American Institute of Architects Annual Awards Program (100 attendees).

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2017, APS did not raise the rebate amount for any measures causing it to exceed 50% of the incremental cost of the measure.

During this reporting period, modifications to the baseline performance requirements for Whole Building projects, and all new construction measures have increased as shown below.

- Whole Building projects must exceed ASHRAE 90.1 2010 standards
- Air-cooled and water-cooled chillers must exceed ASHRAE 90.1 2013 standards
- All other new construction measures must exceed ASHRAE 90.1 2010 standards

MER Adjusted Gross kW and kWh Savings

The following table reflects the MER adjusted total energy and demand saving achievements in this Reporting Period for the Large New Construction Program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 37 - MER Adjusted Gross MW and MWh Savings - Non-Residential New Construction and Major Renovation

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
New Construction and Major Renovation	35,780	630,917	6.5
TOTAL	35,780	630,917	6.5

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

10. Small Business Program

Description

The Non-Residential Small Business Program provides prescriptive incentives for small Non-Residential customers (≤ 100 kW of aggregated peak monthly demand) for EE improvements in lighting, HVAC, motors and refrigeration applications through a simple and straightforward mechanism for program participation. Small Business customers are also eligible for custom incentives to implement EE measures. The program provides incentives for conducting an energy study that identifies energy saving opportunities.

Program Goals, Objectives and Savings Targets

- Promote and support EE opportunities for small Non-Residential customers.
- Promote the installation of high-efficiency lighting, packaged HVAC equipment, motors and refrigeration systems.
- Provide customers with direct energy saving opportunity identification and implementation services through the Direct Install family of measures.
- Promote cross-training and EE assessment and referral opportunities among lighting and refrigeration contractors.
- Promote market transformation through APS trade allies and customer outreach.

Table 38 - Small Business Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
4.4	17,527	200,132

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

While the program offers a pre-notification process, final applications are only processed after the project is completed and all required documentation is submitted and approved.

Table 39 - Small Business Program Incentives Paid

Incentive Status for Paid Applications	Incentives Paid
Small Business – Prescriptive & Custom	\$1,541,247
Small Business – Studies	\$0
Total Small Business Funds	\$1,541,247

Of the 743 small business projects paid, 417 were conducted through the Classic prescriptive/custom program and 326 were conducted through Direct Install. One (1) of the 743 applications was from school districts.

APS paid incentives on 743 applications from 593 unique customers during this Reporting Period.

Commission Decision No. 70637, required APS to continue tracking DSM customer applications resulting from studies for paid incentives, and report the semi-annual and

cumulative results of its program-to-date tracking efforts. There was zero study incentives paid in the Small Business program during this Reporting Period. Twenty-one (21) studies have been completed since program inception, of which 8 study applications have resulted in EE projects.

In Commission Decision No. 73089, required APS to report the type of measures installed by customers after a study was completed. In this reporting period, no measures were installed as a result of the studies completed.

Evaluation and Monitoring Activities and Results

- Updated energy and demand savings for Energy Management System (EMS) projects based on on-site investigations that verified performance of rebated EMS projects. Investigations included in-depth interviews with facility and energy managers, observations of EMS operation and functionality, and data collection of facility construction and energy systems that would support further analysis of EMS measures.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Completed updates to hourly load shape assumptions for Custom measures to identify impacts on system load.
- Simulated dimming of commercial lighting measures during peak demand periods to inform potential program modifications.
- Updated hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential Measure Analysis Spreadsheets and Analytic Database.
- Calculated energy and demand impacts and researched incremental costs to determine the cost effectiveness of new prescriptive measures including: outdoor LED lighting, LED street lighting, and conservation behavior.

Consumer Education and Outreach

The broad awareness advertising campaign that was mentioned in Large Existing included many messages targeted to the small-mid audience such as Express Solutions' free lighting assessment and rebates.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminated

Commission Decision No. 73089 requires APS report the number of EMS and LED measures installed, the annual energy and capacity savings, and measure life on an individual basis. Please see the table below:

Table 40– Small Business Program Modifications

Measure	Quantity	kWh Savings	kW Savings	Measure Life
LED - non-reflector	13,262	2,034,500	397	7
LED – reflector	5,015	730,951	156	7
LED - MR16	470	64,291	11	7
Linear LED 2 Foot	800	26,021	5	14
Linear LED 3 Foot	15	1,252	0	17
Linear LED 4 Foot	31,478	4,698,259	820	17
Linear LED 8 Foot	469	65,009	14	17

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2017, APS did not raise the rebate amount for any measures causing it to exceed 50% of the incremental cost of the measure.

The Standard measures listed below were terminated during this reporting period in order to provide opportunities to expand the more efficient LED options that now exist.

- Screw-in CFLs
- Hardwired CFLs
- Cold Cathode
- Premium T8/T5 linear fluorescent lamps
- T8/T5 linear fluorescent lamps High Bay

During this reporting period, modifications to the baseline performance requirements for replace on burnout (ROB) measures have increased as shown below.

- Air-cooled and water-cooled chillers must exceed ASHRAE 90.1 2013 standards
- All other measures must exceed ASHRAE 90.1 2010 standards

Beginning on September 29th, lighting and refrigeration measures were no longer accepted through the direct install program.

During this reporting period, APS launched the Business Energy Analyzer, an online audit tool, to help customers better understand their energy use and get custom recommendations on ways to save energy. Recommendations range from no-/low-cost tips to capital improvements. Promotions included bill inserts, digital ads and emails.

MER Adjusted Gross kW and kWh Savings

The following table reflects the total energy and demand saving achievements in this Reporting Period for the Small Business Program.

Table 41 - MER Adjusted Gross MW and MWh Savings - Non-Residential Small Business Program

Program	Annual	Lifetime	MW Peak Demand Savings
	Gross MWh Savings	Gross MWh Savings	
Small Business	15,836	206,615	3.0
TOTAL	15,836	206,615	3.0

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

Direct Install

Pursuant to Commission Decision No. 73089, APS is providing a breakdown of required direct install program information below. Direct Install incentives were paid on 326 projects for Small Business customers during this Reporting Period. While small businesses are the primary target for the Direct Install offering, large customers with facilities of 400 kW or less premise demand qualify for Direct Install measure incentives, and schools of any size can participate. In addition to the 326 projects paid to small businesses, 233 Direct Install projects for Large Businesses and Schools were paid.

Projects implemented through Direct Install during this Reporting Period saved 22,509 MWh annually and 326,185 MWh over the lifetime of the measures.

1. Active Number of Contractors and Contractor Identification: Direct Install contractor participation from approved contractors has remained consistent. During this Reporting Period, 14 approved contractors participated in Direct Install. Contractors participating during the current Reporting Period include the following:

- Accel Electric
- Atom Electrical Services
- Burden Electric LLC
- D & H Electric Inc.
- Demand Drop
- Inline Electrical Resources
- J and S Electric
- Kortman Electric Inc.
- Lightday Solar
- Midstate Energy LLC
- Red Mountain Lighting and Energy Services Inc.
- Rob Love Electric Inc.
- US Energy Services Inc.
- Westmoor Electric, Inc.

Two Express Solutions contractor training meetings were held for parties interested in participating in Direct Install this year. In addition, program changes are communicated with all Direct Install trade allies and contractor training is provided on an adhoc basis for any questions that arise from the contractor community. One new company was approved for Direct Install measure participation during the 2017 program year.

2. Number of Direct Install Jobs Completed: A total of 559 Direct Install projects were paid incentives during this Reporting Period.

3. Dollar Value of the Direct Install Incentives Paid to Contractors: During this Reporting Period, \$2,931,254 in Direct Install incentives were paid to contractors. This represents 47% of the total project costs.

4. Dollar Value of the Direct Install Jobs Paid by the Customer: The total cost of the Direct Install projects during this Reporting Period was \$6,214,205. Customers paid \$3,282,951 toward these Direct Install projects during this Reporting Period.

5. Quantity of Each Direct Install measure for which incentives were paid:

Table 42 - Direct Install Measures

Direct Install Measure	Quantity
Delamping	0
T8 Lighting	47
LED Lighting	95,059
Occupancy Sensors	38
Exit Signs	115
Refrigerated Case Fan Motors	1,099
Anti-Sweat Heater Controls	464
Refrigerated Novelty Case Controls	44
Refrigerated Case Evaporator Fan Controls	0
Hard-Wired CFL	1
Occupancy Sensors - Vending Machines	0

6. Number of Instances Where Incentives Were Reduced Because of Eligibility for Incentives Paid by Other Entities:

No known occurrences during this Reporting Period.

7. Spending and Savings Numbers Attributable to Direct Install for the Period and Year-to-Date and Program-to-Date:

Table 43 - Direct Install Savings Year-to-Date

kW Savings	Annual kWh Savings	Lifetime kWh Savings
4,768	22,509,393	326,185,325

Table 44 - Direct Install Savings MER Adjusted Program-to-Date

kW Savings	Annual kWh Savings	Lifetime kWh Savings
36,756	185,485,901	2,631,508,739

MER savings are adjusted for line losses (energy 7.0%, demand 11.7%) and a capacity reserve factor of 15%

Rebate spending for Direct Install was \$2,931,254 in 2017 and was \$21,436,373 program to date.

8. Descriptions of the Types of Businesses Participating in Direct Install: The "Retail" sector participated in the Direct Install measure at the highest rate of frequency within identified business segments and accounted for 30% of Direct Install projects paid during this Reporting Period.

Table 45 - Direct Install Participation

Participation included the following business types:	
Grocery	95
Hotel/Motel	24
K-12 School	56
Medical	16
Miscellaneous	76
Office	54
Process Industrial	11
Restaurant	54
Retail	167
Warehouse	6

9. Estimate of Avoided Marketing or Other Program or Administration Costs: The costs to implement and market the Small Business program prior to implementing the Direct Install measures were higher on a \$/kWh basis as compared to the classic program. This is because low participation resulted in low kWh savings over which to spread implementation costs. From the program inception through 2008 because Direct Install was not available, implementation and marketing costs for Small Business was \$1.41M (excluding incentives). Program net annual savings achieved were 5,544,000 kWh. This resulted in non-incentive program costs of \$.25/kWh saved for the Small Business program.

In this Reporting Period, estimated Direct Install implementation and marketing costs were \$0.041/kWh saved, due to increased kWh savings and lower costs of the Direct Install process. The total Small Business program cost savings is estimated to be \$4,704,463 over the 2008 program cost rate. [Reduced program costs = $(\$0.25 - \$0.041) \times 22,509,393$ net annual savings.]

11. Schools Program

Description

The Schools program includes a dedicated budget for schools and provides assistance for reducing the energy used in school buildings, including public, private and charter schools ("K-12"). The incentives available for schools include the same DSM measures that are available for all Non-Residential customers, as well as Direct Install measures for K-12 schools of any size. In addition, schools are still able to access rebates for lighting and refrigeration measures that have been terminated for other customers.

Program Goals, Objectives and Savings Targets

- Maximize the energy savings that can be attained with available DSM funds by providing schools incentives to upgrade lighting, HVAC, refrigeration, and any other energy consuming systems.
- Provide educational and training materials to facility managers and trade allies in order to aid schools in other energy conservation projects.
- Promote market transformation through APS trade allies, customer outreach and technical training classes.
- Provide incentives for other cost effective DSM projects by allowing schools to participate in any Non-Residential DSM Program including Direct Install.

Table 46 - Schools Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
3.4	15,541	224,056

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

In this Reporting Period, APS paid incentives for 215 applications from schools, of which 131 were paid from the schools fund category. This represents 42 unique school districts and charter schools. Schools continue to have a very high level of participation in the program.

The self-reported size of the school entity (based on the number of students) for approved applications paid in this Reporting Period are:

Table 47 - Schools Program Applications

Division	Programs	# of Applications	# of Students
Metro	Custom Measures - Retrofit	1	7788
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	21	5569
Metro	Prescriptive Measures - New Construction	1	4935
Non Metro	Prescriptive Measures - Retrofit	1	7007
Non Metro	Prescriptive Measures - Retrofit, Technical Assistance & Studies	2	3637
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	7	5456
Metro	Custom Measures - Retrofit, Express Solutions	2	328
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit, Express Solutions	16	34454
Non Metro	Express Solutions	1	3778
Metro	Custom Measures - Retrofit, Express Solutions	9	24906
Non Metro	Express Solutions	1	294
Non Metro	Prescriptive Measures - Retrofit	1	9343
Metro	Custom Measures - Retrofit	1	491
Non Metro	Prescriptive Measures - Retrofit	3	5368
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	3	934
Metro	Prescriptive Measures - New Construction, Prescriptive Measures - Retrofit	2	6065

Non Metro	Prescriptive Measures - Retrofit	1	1205
Metro	Prescriptive Measures - New Construction	1	407
Metro	Prescriptive Measures - New Construction, Technical Assistance & Studies	2	265
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	1	365
Metro	Prescriptive Measures - Retrofit	1	31828
Non Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	2	2337
Metro	Prescriptive Measures - Retrofit, Express Solutions	31	36884
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	2	6868
Metro	Prescriptive Measures - New Construction, Prescriptive Measures - Retrofit	3	27422
Non Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit, Express Solutions	8	4003
Non Metro	Custom Measures - Retrofit, Express Solutions	3	444
Non Metro	Express Solutions	4	1546
Metro	Custom Measures - Retrofit, Express Solutions	13	23354
Non Metro	Custom Measures - Retrofit, Express Solutions	16	1060
Metro	Express Solutions	1	843
Metro	Custom Measures - Retrofit, Express Solutions	1	13653
Metro	Prescriptive Measures - Retrofit	1	348
Metro	Prescriptive Measures - New Construction	1	752
Non Metro	Express Solutions	1	102

Metro	Technical Assistance & Studies	1	23967
Metro	Custom Measures - Retrofit, Express Solutions	4	134
Non Metro	Express Solutions	2	1176
Metro	Custom Measures - Retrofit	2	1232
Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	2	1165
Non Metro	Express Solutions	1	285
Non Metro	Prescriptive Measures - Retrofit, Custom Measures - Retrofit, Express Solutions	38	8699

When an incentive application is received from a school district and deemed eligible, funding is first allocated from the Schools budget up to a maximum of \$100,000. Any additional funding required to cover the application is then allocated from the appropriate Large Existing, New Construction or Small Business program budget.

APS paid \$3,059,450 in incentives to schools during the Reporting Period, of which \$1,758,263 was paid from the Schools program budget. The remaining \$1,301,187 was paid to schools from the Large Existing, Small Existing and New Construction program budgets (see Tables below).

Table 48 - Schools Program Incentives Paid from Program Budget

Incentive Status by Fund for Paid Applications	Incentives Paid
Schools Budget – Prescriptive, Custom, and Direct Install	\$1,738,357
Schools Budget – Feasibility, Design Assistance	\$19,906
Schools Budget – Retro commissioning Studies	\$0
Total School Funds	\$1,758,263

Table 49 – Total Schools Program Incentives Paid

Schools Funding Summary:	Incentives Paid
Schools – School Funds	\$1,758,263
Schools – Large Existing Funds	\$1,214,322
Schools – New Construction Funds	\$8,347
Schools – Small Business Funds	\$78,517
Total Paid to Schools	\$3,059,450

In Commission Decision No. 70637, the Commission ordered APS to continue tracking DSM applications resulting from studies for which incentives have been paid, and report the semi-annual and cumulative results of its program-to-date tracking efforts. Twenty (20) feasibility study incentives and two (2) commissioning incentives were paid from the school funds during this Reporting Period for a total of \$274,887. These applications resulted in 14 energy efficiency projects. Since program inception, 67 studies have been completed at schools; of those studies, 54 have resulted in EE projects at schools.

In Commission Decision No. 73089, the ACC requested that APS report the type of measures installed after a study was completed. The following measures were installed for studies completed in 2017: custom and lighting.

Schools Direct Install

Direct Install incentives were paid on 56 school projects during this Reporting Period. Of the 56 projects, 39 were paid from the Schools fund. Direct Install activities for this period are described in the Small Business Program report.

Pursuant to Commission Decision No. 73089, APS is providing a breakdown of required direct install program information within the Small Business section.

Evaluation and Monitoring Activities and Research Results

- Updated energy and demand savings for Energy Management System (EMS) projects based on on-site investigations that verified performance of rebated EMS projects. Investigations included in-depth interviews with facility and energy managers, observations of EMS operation and functionality, and data collection of facility construction and energy systems that would support further analysis of EMS measures.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Completed updates to hourly load shape assumptions for Custom to identify impacts on system load.
- Simulated dimming of commercial lighting measures during peak demand periods to inform potential program modifications.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential Measure Analysis Spreadsheets and Analytic Database.
- Calculated energy and demand impacts and researched incremental costs to determine the cost effectiveness of new prescriptive measures including: outdoor LED lighting, LED street lighting, and conservation behavior.

Consumer Education and Outreach

In addition to many of the marketing outreach activities described for the large existing program, marketing activities associated with the Schools program centered on four areas of focus:

Customer Awareness and Project Generation

During this Reporting Period, contacts were made including phone calls, e-mails, face to face visits, and meetings with public school districts, private and charter school leadership and associations, and other key stakeholders to identify potential new projects. Staff supported booths and networking events, establishing and/or nurturing relationships with school officials, decision makers, and contractors at the following Arizona Association of School Board Officials ("AASBO") and Arizona School Administrator's ("ASA") event locations:

- April - Spring Conference in Bullhead City - AASBO
- June - Summer Conference in Tucson - ASA booth

Coordination with the Schools Facility Board ("SFB")

Staff attends all SFB meetings to stay abreast of school EE projects, both funding and progress. Emergency repairs approved by SFB include equipment covered by program specifications such as cooling systems. As these are approved, Solutions for Business follows up with the districts to see how they can assist in planning the upgrades, scoping projects, reviewing plans, and completing the rebate application; to produce the most savings and rebates possible through the program.

Coordination with the APS Schools Key Account Manager

Program staff coordinates with the APS Key Account Managers ("KAM") who have schools assigned to them, to optimize the customer's time and value during planned meetings,

focused emails, and phone calls. The partnership with the APS's Schools KAMs has facilitated troubleshooting of other related customer issues or concerns, a direct approach to schools related issues and concerns, and the cross-selling of other DSM programs which will benefit the schools, while improving their energy efficiency.

Attended Arizona Association of School Board Officials (AASBO) meetings

Program staff has attended AASBO bi-monthly meetings where school business and finance professionals meet. The latest news on legislative and financial issues pertaining to schools is disseminated at these meetings, and contacts have been made with school business officials to keep them abreast of all available rebates or funding that can help with energy efficiency upgrades; and the value of improvements at a reduced cost to the schools.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

During this Reporting Period, EMS and LED measures were installed. Commission Decision No. 73089 requires APS report the number of these measures installed, the annual energy and capacity savings, and measure life on an individual basis. Please see Table 53 below:

Table 50 –Schools Program Measures Savings

Measure	Quantity	kWh Savings	kW Savings	Measure Life
EMS - DDC Replacing Pneumatic or Manual T-stat	278,267 sq. ft.	1,062,982	231	15
EMS - DDC Replacing Programmable T-stat or digital system	873,035 sq. ft.	2,438,685	530	15
EMS - Integrated Lighting Control	111,237 sq. ft.	203,447	38	10
LED - non-reflector	724	120,849	23	7
LED – reflector	266	43,786	9	7
LED - MR16	26	3,576	1	7
Linear LED 2 Foot	55	5,186	1	15
Linear LED 3 Foot	77	6,457	2	17
Linear LED 4 Foot	37,369	4,450,449	981	17
Linear LED 8 Foot	14	2,434	1	17

See the Large Existing, New Construction and Direct Install program sections for a list of program changes.

MER Adjusted Gross kW and kWh Savings

The following table reflects the total energy and demand saving achievements for schools projects completed and paid during this Reporting Period.

**Table 51 - MER Adjusted Gross MW and MWh Savings - Non-Residential
Schools Program**

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Schools - School Program Funds	18,314	268,545	4.4
Schools - Large Existing Program Funds	13,189	206,516	3.3
Schools - New Construction Program Funds	73	1,193	0.0
Schools - Small Business Program Funds	453	7,241	0.1
TOTAL	32,028	483,495	7.9

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

12. Energy Information Services (“EIS”) Program

Description

The EIS Program helps customers (>100 kW) save energy through better understanding and control of their facilities’ electrical usage. EIS is a tool that provides data regarding usage (kWh) and demand (kW). This detailed information allows customers the ability to fine-tune equipment use, operations and produce summaries to document the impact of usage and demand modifications. Participating customers monitor their electric usage through a web-based dashboard that allows them to view historical 15-minute interval usage and demand graphics from the previous day. This information can be used to improve and monitor energy usage patterns, reduce energy use, reduce demands during on-peak periods and better manage overall facility energy operations.

APS is encouraging customers to take advantage of the EIS program by providing a one-time incentive of up to a maximum of \$12,000 per year of the cost of installing metering and communications equipment necessary to participate in the program. In Decision No. 76313 the Commission approved incentivizing 100% of the EIS cost for the first year.

Program Goals, Objectives and Savings Targets

- Provide monthly energy usage information to participating Non-Residential customers.
- Participants identify strategies to lower energy cost by reducing energy usage and demand.
- Educate EIS program participants about utility rate concepts and how managing or reducing their energy consumption through EE measures and operational practices can reduce their energy expenses.
- Educate participants on how to download billing history information and create spreadsheets to chart and graph their energy use, as well as to identify consumption trends and savings opportunities.
- Educate EIS participants about creating reports for management that justify energy-efficient capital expenses intended to produce operations and maintenance savings.
- Facilitate analysis of what-if scenarios to help facility manager to assess the benefits of capital improvements or operating adjustments to promote energy efficient changes.

Table 52 - Energy Information Services Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
5.7	84	421

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

Several customers were added and several opted out of the program in 2017. The result was no net change in the number of EIS customers. The number of enrolled meters was increased by 120 in 2017. A total of 70 customers comprised of 342 meters are currently enrolled in the EIS program.

Evaluation and Monitoring Activities and Research Results

- Updated savings impacts based on the results of in-depth interviews and analysis of usage data provided participating customers.
- Reviewed and updated program Measure Analysis Spreadsheets and Analytic Database.
- Conducted ongoing tracking and review of program participation data.

Consumer Education and Outreach

Implementation contractor provided onsite consultations with product demonstrations and online product demonstrations.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

MER Adjusted Gross kW and kWh Savings

Table 53 - MER Adjusted Gross MW and MWh Savings - Non-Residential Energy Information Services Program

Program	# Meters	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Energy Information Services	120	2,709	13,544	2.8
TOTAL	120	2,709	13,544	2.8

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2(b) and 2(c).

VII. Demand Response Programs

Time of Use ("TOU") Rates Including Super Peak Pricing ("SPP")

Description

TOU rates are designed 1) to reflect the time variation in the cost of producing electricity, to more accurately match those costs with the service being provided to the customer thereby encouraging efficient use of energy, and 2) to encourage customers to reduce consumption during peak hours or to shift energy usage to off-peak periods.

Program Goals, Objectives and Savings Targets

The program is estimated to provide a 2017 load reduction amount of approximately 178.6 MW from the Series 1 and 2 rates and 1.7 MW from the Super Peak rate. The 178.6 MW total load reduction provides a calculated estimate of 789,889 MWh in annual savings from January through December 2017. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiatives Load Reduction and Energy Savings 2017.

Levels of Customer Participation

Approximately 569,881 customers are enrolled in the TOU rates of which 3,179 are super peak customers. As of December 2017, 82 schools were enrolled in the TOU school rates.

Evaluation/Monitoring Activities and Research Results

No evaluation of TOU rates was performed during this Reporting Period.

Consumer Education and Outreach

The TOU marketing outreach is outlined below:

- Rate Brochures

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Programs or Measures Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

APS Peak Solutions® Program

Description

APS Peak Solutions® is a commercial and industrial demand response ("DR") program for APS's Yuma and Phoenix metro customers utilizing direct load control and manual load reduction.

The program is available for the summer months of June through September between 12:00 noon and 8:00 p.m. (Sunday - Saturday) daily. Customers are notified approximately two hours prior to the start of a Peak Solutions® event. Events are limited to minimum of one hour and maximum of four hours per day and 80 event-hours during the season. The program is required to have one test at the start of the season between June 1 and July 15 lasting for four hours.

Customers are paid an incentive check at the end of the season for their load reduction amount based on \$/kW or \$/ton of air conditioning.

Program Goals, Objectives and Savings Targets

In 2017, a 29.5 MW load reduction provided a calculated 132,572 MWh of annual savings from January through December 2017. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiatives Load Reduction and Energy Savings 2017. In 2017 the ACC removed the cap of 10% from DR MWh saving that can be counted toward the DSM goal.

Levels of Customer Participation

Approximately 759 customers are enrolled in the program.

Evaluation/Monitoring Activities and Research Results

During this Reporting Period one Peak Solutions® event was called in August 2017.

Consumer Education and Outreach

Customer program enrollment has been accomplished; outreach is primarily to customers enrolled in the program in preparation of an event.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Programs or Measures Modifications/Terminations

On August 23, 2017, in Decision No. 76313, the Commission approved a waiver of the 10 percent cap limiting the amount of energy savings from demand response and load management programs that APS can count towards compliance with the Energy Efficiency Standard.

Critical Peak Pricing – General Service and Residential

Description

Critical Peak Pricing ("CPP"), or its marketing name of Peak Event Pricing, is a DR program for both APS's business (or General Service) and Residential customers in the Yuma and Phoenix metro areas utilizing manual load reduction. CPP is a Pilot program which became effective on January 1, 2010.

The program provides a price signal to incent customers to reduce their usage during events initiated by APS. CPP events will take place during June through September, weekdays between 2 p.m. and 7 p.m. (Monday through Friday), excluding holidays. Customers will be notified of an event by telephone or e-mail by 4:00 p.m. of the day prior to the CPP event. Peak Events are limited to 80 hours during the season. APS is required to initiate a minimum of six events and a maximum of 18 events.

Customers receive a kWh discount incentive off of their existing rate for all of the electricity usage during the program months of June through September.

Program Goals, Objectives and Savings Targets

The program is estimated to provide a 2017 load reduction amount of 0.08 MW. The 0.08 MW load reduction will provide 366.8 MWh of calculated annual savings. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiatives Load Reduction and Energy Savings 2017.

Levels of Customer Participation

Approximately 353 Residential and no business customers are enrolled in the program.

Evaluation/Monitoring Activities and Research Results

3 CPP events were called during this Reporting Period and resulted in an average of 0.25 kW load reduction/customer per event.

Consumer Education and Outreach

Customers in the program were emailed energy reduction tips during event periods.

Problems Encountered and Proposed Solutions

During the 2017 DR season APS was experiencing an issue with our Customer Care and Billing system that limited our CPP event to 3 events. The issue was resolved and should not be an issue in 2018 implementation.

Programs or Measures Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

VIII. Demand Side Management Initiatives

Demand Response Energy Storage Load Management Initiative

The Demand Response, Energy Storage and Load Management (or 'DRESLM') initiative was approved by the Arizona Corporation Commission on August 23, 2017, in Decision No. 76314. The initiative includes emerging technologies for managing system load shapes and helping customers shift energy use to lower cost off-peak hours including battery storage, connected water heaters, and demand response with smart thermostats. In 2017, implementation focused on finalizing the technology assessment and issuing Requests for Proposals for each of the load management technologies, as well as a Distributed Energy Resource Management ('DERMs') platform to enable APS to communicate with and control these distributed energy resources. In 2018, APS will work to deploy these technologies with customers and we will report on the initiative's energy savings and benefits in the 2018 DSM Annual Progress Report.

APS System Savings Initiative

Description

The APS System Savings Initiative was approved in Decision No. 75323. The initiative is designed to save energy through efficiency upgrades to the APS system – including generation facilities, the transmission and distribution system, and APS owned streetlights, buildings and other facilities.

Program Goals, Objectives and Savings Targets

The objective of the APS System Savings Initiative is to take advantage of opportunities for energy savings within APS generation, transmission, distribution and operations facilities. The initiative offers the potential for significant cost effective energy savings that can help lower EES compliance costs for ratepayers while meeting the energy savings objectives of the EE Standard.

Table 56 - APS System Savings Initiative Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
6.9	20,000	20,000

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

By the end of 2017, there were a total of 13 APS distribution feeders that were installed and operating with Conservation Voltage Reduction.

Evaluation/Monitoring Activities and Research Results

During the program approval process, APS worked closely with ACC Staff and independent third party evaluators to review and confirm the energy savings and cost effectiveness calculations for this initiative. As projects have been implemented, APS has used the same processes to calculate and report savings that are currently being used for similar measures in the Non-Residential Solutions for Business program. All documentation of APS System

Savings projects has been provided to the independent third party evaluator for review and verification.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

Consumer Education & Outreach/Codes Support Activities

Not applicable.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross kW and kWh Savings

Table 57 - MER Adjusted Gross MW and MWh Savings - APS System Savings Initiative				
Project	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Conservation Voltage Reduction	13 feeders	5,616	5,616	0.0
TOTAL	13 feeders	5,616	5,616	0.0

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

Pursuant to Decision No. 75323, APS does not currently calculate net benefits or earn a performance incentive on energy savings from the APS System Savings Initiative.

Costs Incurred

There were no costs incurred for this program that are being collected through the DSMAC.

Energy Codes and Appliance Standards Initiative

Description

The Energy Codes and Appliance Standards ("C&S") Initiative delivers energy savings by supporting better compliance with energy codes and appliance standards in jurisdictions throughout the APS service area by working with code officials, building professionals and other market actors to develop strategies for achieving better code compliance more cost effectively.

C&S can be one of most cost-effective ways of promoting EE. C&S activities may be utilized to deliver low cost energy savings while supporting Arizona building officials, the construction community, customers and stakeholders. APS supports C&S activities with a multifaceted approach that provides unbiased support, information, resources, and expertise to jurisdictions and trade allies within the APS service area.

- **Residential and Commercial Energy Codes** - Activities are intended to support building officials, the builder community, and interested stakeholders. Targeted activities include providing technical support, research, subject matter expertise, resources, and training. Training classes are customized to meet local jurisdictional needs and are based on the climate zone and code that is currently being adopted. The classes help to translate building code requirements into a process for builders to follow with subcontractors in the field to ensure that each trade knows their role in code compliance and how to properly install construction details to meet code.

Utility programs are inextricably linked to building codes and appliance standards. Utility EE programs act as a catalyst to ready the market for new technologies or standards that are not currently common practice in the market place. By providing incentives, trade ally training and educating consumers, utility programs help to increase adoption of new energy efficient technologies and practices. Over time these practices become the commonly accepted business practice and the market adopts higher C&S as a result. While this helps to further the goal of energy efficiency, it also has a direct impact on the available market potential from utility programs. This is due to the fact that utility program savings are calculated using current building codes and appliance standards as the "baseline" for comparison.

In general, energy savings for utility program measures are calculated by taking the efficiency differential from the baseline product (typically represented by current building codes and appliance standards) as compared to the high efficiency product being promoted by the utility program. For example the APS Pools program promotes energy efficient variable speed pool pumps. When the program started in 2010, the pump savings were compared to a single speed pump as the baseline efficiency level. Starting in 2012, Arizona enacted a new appliance standard that sets dual speed pumps as the minimum efficiency requirement. As a result, the new 'baseline' for calculating variable speed pump savings is now based on a higher efficiency dual speed pump, since it is now the minimum efficiency level that someone can legally purchase. It also means that APS now counts less EE program savings from variable speed pumps based on this higher baseline efficiency level, even though customers who are replacing single speed pumps with variable speed will still see the full savings in their bills. Because of this, increases to building codes and appliance standards can make it more difficult to cost effectively meet utility program EE goals without some consideration being given for code and standards changes in the EE rules.

Program Goals, Objectives and Savings Targets

The goal of the APS Codes and Standards Initiative is to promote increased energy efficiency in the APS service territory through advancement of building codes and appliance standards, including increasing code awareness and better code compliance. Savings are quantified through independent MER evaluation. During this reporting period, energy savings are being reported resulting from codes and standards efficiency increases in Residential New Construction, Commercial New Construction, General Service Lamps, Linear Fluorescents, Motors, and HVAC.

Table 58 - Codes Initiative Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
11.9	40,566	0

*Based on 2017 program goals and objectives as approved in Decision No. 76313

Levels of Customer Participation

Participation levels are identified in APS’s Codes and Standards Report for 2017 issued by Navigant Consulting. This report will be submitted to the Commission in a subsequent filing.

Evaluation/Monitoring Activities and Research Results

Evaluation, monitoring, and research results are identified in APS’s Codes and Standards MER Report for 2017, as issued by Navigant Consulting. This report will be submitted to the Commission in a subsequent filing. MER activities included:

- Updated savings impacts based on the results of in-depth interviews and data provided by the customer.
- Conducted ongoing tracking and review of program participation data.
- Continued to review and update program Measure Analysis Spreadsheets and Analytic Database.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No measures were modified or terminated during this Reporting Period.

Consumer Education & Outreach

- Attended Central Arizona Chapter of the International Conservation Code Chapter Meetings.
- Serve as member of the Education Committee for AZBO.
- Attended Grand Canyon International Conservation Code Chapter Meetings.
- Attended the AZBO Annual Business Meeting held July in Big Piney.
- Major sponsor of “Proof is Possible Tour” hosted by Efficiency First Arizona.
- Hosted a Commercial Provisions of the IECC Training Class in partnership with the APS Solutions for Business Training Series.
- Provided IECC code books to students of IECC training classes.

- Sponsored a building science and IECC code compliance class at the AZBO Fall institute.
- Attended a Tiny Homes codes training class in Prescott.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross kW and kWh Savings

Table 59 - MER Adjusted Gross MW and MWh Savings - Building Codes and Appliance Standards Initiative

Measure	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Residential New Construction	4,190	83,800	2.1
Commercial New Construction	3,199	63,982	0.7
General Service Lamps	12,633	25,266	1.9
Linear Fluorescents	8,581	128,708	2.2
Motors	719	10,781	0.3
HVAC	4,947	89,050	2.6
TOTAL	34,269	401,586	9.8

*Savings are adjusted for line losses (Energy 7.0%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Costs incurred for this program during this Reporting Period are shown in Tables 2b and 2c.

Service Plan Education Initiative

In accordance with Decision No. 76295, APS spent approximately \$1.6 million, during the reporting period, on new service plan education. The service plan education initiative includes funding for enabling technology in the form of more than 10,000 smart thermostats to be distributed to residential customers in first half of 2018 who proactively selected from the new demand and TOU service plans. The service plan education initiative also provides for an extensive awareness campaign which consists of radio, print, outdoor and digital media as well as over 2.2 million direct mail letters, including customized 'best plan' letters, transition notifications, and Welcome Kits, to help educate and guide residential customers in selecting new service plans. The initiative supported additional customer outreach in 2017 including customer bill inserts and newsletters, community events, and educational materials, much of which will carry over into 2018. APS will spend the balance of the \$5 million in 2018, as contemplated by the Settlement Agreement, during the service plan transition and beyond.

IX. Financing Programs

Non-Residential Energy Efficiency Financing

On January 26, 2010, the Commission issued Decision No. 71460, which approved the Non-Residential Customer Repayment Financing option. The option was approved for schools, municipalities and small businesses. Commission Decision No. 72088 expanded eligibility for the financing program to include all Non-Residential customers.

APS has partnered with National Bank of Arizona ("NBAZ") to offer this financing option. More than half of the program trade allies have participated in financing training. The program developed educational materials for bankers, customers and trade allies to facilitate the process. Non-Residential loans made in 2017 are summarized below:

Table 54 – Non-Residential Financing Programs

Category	Number of Loans	Total Loan Value	Amount in Default
Large Existing	0	\$0	0
Small	0	\$0	0
Schools	0	\$0	0
Total	0	\$0	0

Residential Energy Efficiency Financing

On September 1, 2010, the Commission issued Decision No. 71866, which approved the Residential Energy Efficiency Financing ("REEF") Program. Through this program, APS customers who participate in the Home Performance with ENERGY STAR® program can gain access to financing for energy efficient home improvements.

Launched in February 2011, APS partnered with NBAZ to deliver the REEF program throughout the APS territory.

No customers defaulted in 2017 and APS will continue to monitor defaults closely. Residential loans are summarized below:

Table 55 – Residential Financing Programs

Category	Number of Loans	Total Loan Value
Loans issued Jan - Dec. 31, 2017	4	\$24,536.93
Jobs in default	0	0
Jobs deemed unrecoverable	0	0

X. Measurement Evaluation and Research

Description

Navigant Consulting provides MER Services for APS's DSM programs. These Measurement and Evaluation activities include, but are not limited to:

- Performing process evaluation research to indicate how well programs are working to achieve their objectives;
- Performing impact evaluation research to verify that energy-efficient measures are installed as expected; measure savings on installed projects to monitor the actual program savings that are achieved; and conduct research activities to refine savings and cost benefit models and identify additional opportunities for EE;
- Tracking and verifying savings measurements to monitor the actual program savings that are achieved;
- Researching additional opportunities for DSM measures and programs.
- Conducting updates and maintenance of Measure Analysis Spreadsheets and Analytic Databases for all APS programs and measures. Updates include calculation of electric energy and demand impacts, hourly end-use load-shapes, natural gas impacts, water impacts, incremental equipment costs, and operation & maintenance (O&M) cost impacts.
- Providing support for program design options to be included in the annual DSM Program Portfolio including program design, technology research, energy efficiency measure analysis, and cost-effectiveness analysis.
- Updating the Technical Reference Manual (TRM) detailing savings algorithms, performance variables, and incremental cost assumptions for new and existing measures rebated through APS DSM programs.
- Modeling the percentage of savings occurring during on and off peak time periods for all DSM measures to understand their contribution to mitigating Duck Curve-related issues.
- Developing a methodology and model framework to quantify the locational benefits of measures within the portfolio at the feeder or substation level, and recommend an optimally cost-effective portfolio of DER tailored to the net load at specific locations.

The approach for measurement and evaluation of the DSM programs is to integrate data collection and tracking activities directly into the program implementation process.

The APS MER Verification Report for 2017, prepared by Navigant Consulting, will be provided as a separate filing.

**CERTIFICATION BY APS OF DSM ANNUAL PROGRESS REPORT FOR THE PERIOD:
JANUARY THROUGH DECEMBER 2017**

Pursuant to Decision No. 67744 (April 7, 2005), I certify that to the best of my knowledge and based on the information made available to me, the DSM Annual Progress Report is complete and accurate in all material respects.

March 1, 2018
Date



Stacy Derstine
Vice President Customer Service and Chief Customer Officer