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February 3, 2015

VIA HAND DELIVERY

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor North
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Final Annual Report for Program Year 5 of PPL Electric Utilities Corporation's Act 129 Plan - Docket No. M-2012-2334388

Dear Secretary Chiavetta:

On November 14, 2014, PPL Electric Utilities Corporation ("PPL Electric") filed the Final Annual Report for Program Year 5 of PPL Electric's Act 129 Plan. Due to data issues and time constraints, the Residential Home Comfort Fuel Switching portion of the appendix was not included in the filed report. Attached, for filing, is the Fuel Switching part of the appendix.

If you have any questions concerning this matter, please do not hesitate to contact me.

Respectfully submitted,

Devin Ryan

DTR/jl
Enclosure

cc: Richard F. Spellman (*GDS Associates, Inc., Act 129 Statewide Evaluator*)

2015

PY5 Annual Report - Fuel Switching

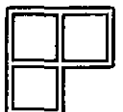
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Appendix A. Fuel Switching

A-1 Fuel Switching Reporting and Results

On October 26, 2009, the Pennsylvania PUC entered an opinion and order approving PPL Electric Utilities' Act 129 plan. In the order, the PUC required PPL Electric Utilities to track and report the frequency of customers switching to electric appliances from non-electric appliances. In addition, PPL Electric Utilities offered a fuel switching pilot program for the first time, offering rebates to the first 100 applicants (residential and nonresidential) in three programs—Residential Home Comfort, Residential Retail, and Prescriptive Equipment.

This appendix summarizes results from these two analyses. The first analyzes data collected by PPL Electric Utilities from PY5 rebate forms and presents additional research about fuel switching undertaken by the EM&V CSP. The second analysis summarizes results from the pilot program.

A-2 Fuel Switching Reported on Rebate Forms

The independent evaluation concludes about 1.0% of rebated appliances in the Residential Retail program indicated fuel switching. Note that many customers left the fuel switching data fields blank on the rebate form. If these customers are added, the maximum count of fuel switchers increases to 4.5%. However, many of the blank responses *likely* indicate non-fuel switching actions.

Similarly, about 3.0% of participants submitting appliance rebates in the Residential Home Comfort program indicated fuel switching. If unanswered rebate responses are added as an indication of fuel switching, the upper bound of fuel switchers increases to 14.7%. However, survey responses show blank responses *likely* indicate non-fuel switching activity.

Residential Retail

In PY5, PPL Electric Utilities issued 908 rebates for heat pump water heaters, the only available fuel-switching measure. Of those, only nine (1.0%) were reported by customers as replacing non-electric equipment. The number of fuel switchers was calculated by first determining the count of customers with a natural gas distribution system. Of these customers, the number of applicants indicating non-electric equipment replacement was recorded.

Note that many customers left the fuel switching data fields blank on the rebate form. If these customers are added to the analysis as *fuel switchers*, the *upper bound of fuel switchers increases 41 (4.5%)*. The EM&V CSP fielded a survey to these 41 customers to confirm whether they replaced a non-electric water heater and why.

Table A-1 summarizes the count of non-electric equipment replaced.

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Table A-1: PY5 Fuel Switching Rebate Forms: Summary of Non-Electric Equipment Replaced

Non-Electric Equipment	Non-Electric Equipment Replaced	Percentage of Total Replacement Units
Oil Water Heater	16	39%
No Response on Rebate Form	13	32%
Natural Gas Water Heater	5	12%
Other	3	7%
Propane Water Heater	2	5%
No Previous Water Heating	2	5%
TOTAL	41	100%

Most customers replaced an oil system and only five customers (0.55% of the 908 rebates) replaced a natural gas water heater.

Table A-2 shows the population, completions, and reasons for incomplete surveys of customers who replaced a non-electric water heater. Seven of 41 customers completed the survey.

Table A-2: Residential Retail Fuel Switching Customer Survey Disposition

Disposition Description	Frequency
Population (number of heat pump water heater rebates)	908
Survey sample frame (records sent to survey subcontractor): Includes those who indicated fuel switching on the rebate and potential fuel switchers who left the fuel switching data fields blank on the rebate form.	41
Removed from survey sample: already contacted for another PPL Electric Utilities survey	8
Removed: inactive account	3
Survey sample frame (records sent to survey subcontractor)	30
Records attempted	30
Nonworking number	3
Wrong number, business	2
Refusal	5
No answer/answering machine/phone busy	9
Non-specific or specific callback scheduled	3
Partial complete	1
Completed survey	7
TOTAL	41

Five of the seven respondents confirmed that a non-electric unit was replaced. One said an electric device was removed and one said the new rebated equipment was "an addition." Table A-3 compares survey responses on equipment type replacement to information recorded on the rebate form. With the exception of one blank rebate form, most responses matched, meaning rebate form responses are a proper indication of fuel switching activity.

Table A-3: Survey Response Compared to Rebate Response: Equipment Type Replaced

Survey Respondent	Survey Response: Equipment Type Replaced	Rebate Response: Equipment Type Replaced	Survey Response and Rebate Forms Match?
Survey Respondent 1	Other: New equipment was "an addition"	Oil Water Heater	No
Survey Respondent 2	Oil Water Heater	Oil Water Heater	Yes
Survey Respondent 3	Oil Water Heater	Oil Water Heater	Yes
Survey Respondent 4	Propane Water Heater	Propane Water Heater	Yes
Survey Respondent 5	Electric Water Heater	No response on rebate form	No
Survey Respondent 6	Oil Water Heater	Oil Water Heater	Yes
Survey Respondent 7	Oil Water Heater	Oil Water Heater	Yes

Although responses varied, most survey participants said they replaced broken and old units, with the intent to obtain efficient equipment (Table A-4).

Table A-4: Summary of Reasons for Replacing Equipment

Gas Device	Number Replaced
Broken/Failed	3
To get more efficient equipment	3
Cost of Oil	2
Availability of Rebate	1
Other ⁽¹⁾	2
NOTES:	
⁽¹⁾ Other reasons include: "didn't replace [equipment], but bypassed it" and "did not want to put oil back in there."	

N=7, multiple responses allowed

Corroborating the results above, the four respondents who said the old equipment was *not* in need of repair also said the replaced device was in working conditioning when replaced.

In general, the EM&V CSP found that survey results matched responses on the rebate form. On the application for a heat pump water heater rebate, about 1.0% of customers reported they switched fuels. If blank responses are added, the upper bound of fuel switchers increases to 4.5%. However, many of the blank responses *likely* indicate non-fuel switching actions. Because the number of survey completions are low, the EM&V CSP could not concretely determine if blank responses should, or should *not*, be added to the count of fuel switchers. Only one of the seven survey respondents (survey respondent 5 in Table A-3) did not answer the fuel switching fields on the rebate; this participant did not switch fuels.

Residential Home Comfort

PPL Electric Utilities offered two fuel switching measures through their Residential Home Comfort Program: air source heat pumps (ASHP) and ductless mini-split heat pumps (DMS). In PY5, rebates were issued for 578 air source heat pumps (ASHP) and 1258 ductless mini-split heat pump outdoor units

(DMS). Of the total applicable fuel switching units installed in the program (1836), 3.0% (55) customers reported they replaced non-electric equipment. Of the 55, twelve were ASHP (1.0% of the 1258 rebated units) and 43 were DMS rebate applications (7.4% of the 578 applications).

On the rebate form, customers reported whether replaced equipment was in working order. Table A-5 details the response for the fuel switching customers.

Table A-5: Condition of Replaced Equipment Reported by 55 “Fuel Switchers”

Condition of Replaced Equipment	ASHP Frequency	DMS Frequency	Total
Replaced Equipment in Working Condition	6	24	30
Replaced Equipment Broken/Failed	4	5	9
No Response on Rebate Form	2	14	16
TOTAL	12	43	55

Although 29% of the fuel switching customers did not respond to the field on the rebate form asking if replaced equipment was in working order, the majority of customers (71%) explicitly noted that replaced equipment was working and not in need of repair.

Note that similar to heat pump water heater rebates, many (269) customers did not answer the fuel switching data fields on the rebate form. If these customers are added to the analysis and counted as customers who switched fuels, the upper bound of fuel switching increases to 269 (14.7%). More specifically, the count would rise to 132 (10.5%) for ASHP and 137 (23.7%) for DMS. The table below details the total count of non-electric equipment replaced in Residential Home Comfort.

Table A-6: PY5 Fuel Switching Rebate Forms: Summary of Non-Electric Equipment Replaced

Non-Electric Equipment	Count: Non-Electric Equipment Replaced	Percentage of Total Replacement Units
Unanswered	200	74%
Other	22	8%
Oil Furnace	18	7%
Natural Gas Furnace	17	6%
No Previous Heating System	11	4%
Propane Furnace	1	0%
TOTAL	269	100%

Analyzing gas replacement alone, only 17 customers (0.92% of the 1836 rebates) replaced a natural gas unit.

To verify fuel switching actions listed on the rebate form, the EM&V CSP surveyed a random sample of Residential Home Comfort’s PY5 1904 prescriptive equipment participants (inclusive of ASHP, DMS, and pool pumps). The sample size was determined to reach the 90/10 confidence/precision for the program.

The survey included other questions for the program’s process and impact evaluations, in addition to the questions related to fuel switching. The sample target was reached: 75 participants completed the survey. Of those 75, 64 participants installed fuel switching measures and were asked the fuel switching survey battery. Table A-7 shows the population, completes and reasons for incompletes for the 64 participants who installed either an ASHP or DMS.

Table A-7: Residential Home Comfort Switching Customer Survey Disposition

Disposition Description	Frequency (ASHP)	Frequency (DMS)
Population (number of ASHP and DMS rebates)	578	1258
Survey sample frame (records sent to survey subcontractor) ^[1]	276	234
Removed because business records	1	0
Removed because duplicate	0	1
Records not attempted ^[2]	50	58
Records attempted	225	175
Nonworking number	4	4
Wrong number, business	2	4
Language barrier	0	1
Refusal	56	38
PPL Electric or market research employee	4	7
Did not participate in program	0	4
No answer/answering machine/phone busy	103	68
Non-specific or specific callback scheduled	17	13
Partial complete	3	8
Completed survey	36	28
^[1] Random sample of 276 ASHP rebates and 234 DMS rebates.		
^[2] Survey calls ended once overall target of 36 ASHP and 28 DMS rebates was met so 50 ASHP records and 58 DMS records were not attempted as part of the survey activity.		

Only one of the 64 survey participants confirmed fuel switching. In addition, Residential Home Comfort survey results corroborated fuel switching activities listed on the rebate form. Survey responses matched the rebate form in all but three cases, meaning rebate form responses are a proper indication of fuel switching activity. In one case where the form did not match the survey response, the survey participant confirmed switching fuels. This survey respondent stated a non-electric ductless mini-split system was replaced to save money and replace a broken unit. However, on the rebate form, this customer stated the replaced unit was in working condition and the previous heating type was electric. The other two mismatches also occurred with DMS equipment. In both these instances, the customer surveyed stated they did not replace non-electric equipment. However, in the first instance, “natural gas furnace” was listed as the replaced equipment type on the rebate form. In the second instance, the customer input “other,” without detailing the replaced equipment heating type, on the rebate form.

In conclusion, 3.0% of customers reported they switched fuel on the rebate form; survey responses confirm rebate responses are appropriate indicators of fuel switching activity. However as noted above, many customers left the fuel switching questions unanswered on the rebate form; if unanswered responses are added, the percentage of potential fuel switchers increases to 14.7%. Because all surveyed participants with unanswered rebate forms (6) confirmed non-fuel switching activity, many of the unanswered responses *likely* indicate non-fuel switching actions. As with Residential Retail, because a low number of customers with unanswered rebate forms were surveyed, the EM&V CSP could not concretely determine if blank responses should, or should not, be added to the count of fuel switchers.

A-3 Fuel Switching Pilot Program

In PY5, PPL Electric Utilities offered a fuel switching pilot program for the first time. This program offered rebates to customers who used electric space or water heat and installed new efficient non-electric space or water heating. These rebates were limited to the first 100 applicants (residential and nonresidential) in three programs—Residential Home Comfort, Residential Retail, and Prescriptive Equipment. Only three customers in the Residential Retail Program participated in the pilot program and only two of these were available for a follow-up phone survey.

Two of the three fuel switching pilot participants were available for a follow-up phone survey. One installed a propane water heater and one installed a natural gas water heater. The participant who did not complete the follow-up phone survey installed a natural gas water heater.

One survey respondent first learned of the pilot program from his or her contractor. The other first learned of the program from the PPL Electric Utilities' website and then called a contractor. Both survey participants gave these two reasons for replacing the equipment:

1. Although still functioning, the equipment was old and in need of repair.
2. They wished to save money.

One participant even noted that the contractor suggested switching to a propane water heater in order to reduce the electric bill.

These responses largely match replacement reasons listed in the three rebate forms. See below.

Table A-8: Summary of Reasons for Replacing Equipment

Replacement Reason	Count
Less costly to operate	2
Electric equipment did not work/was too costly to repair	2
Better comfort/convenience/features	1

N=3, multiple responses allowed

Lastly, one customer said the pilot's rebate availability was *very influential* in the decision to switch fuels; the other said the rebate was only *somewhat influential* in the decision to switch fuels. See Table

A-9 for further detail on PPL Electric Utilities' influence on the customers' decision. However, all three customers stated on the actual rebate form that they would have still purchased the equipment regardless of an available rebate.

Table A-9: PPL Electric Utilities' Influential on Replacement Decision

Level of Influence	PPL Electric Utilities' Marketing	PPL Electric Utilities' Information About Energy Efficiency
1 – No Influence	1	
2		1
3	1	1
4		
5 – Extremely Influential		

The analysis concludes that the availability of the pilot program has a very minimal impact on the customer decision to switch from an electric to non-electric counterpart.