Appliance Recycling

The overall objective is to promote the removal and retirement of inefficient appliances.

Target Market

All residential and small commercial customers.

Program Description

The program incentivizes residential customers to remove inefficient refrigerators and freezers from the electric system and dispose of them in an environmentally safe and responsible manner. The refrigerator/freezer must be in working conditioner and a minimum of 10 cubic feet in size.[11] The refrigerators and freezers are picked-up at no cost to the customer.

Implementation Strategy

KPCO should select an implementation contractor that demonstrates a record of providing the services offered and responsibly disposing appliances. Implementation contractor responsibilities include:

- Scheduling pickups from customer homes, verification of customer eligibility, verification of appliance qualification, appliance removal from customer homes as well as recycling / responsibility disposing of appliances.
- Rebate processing.
- Program tracking.
- Periodically reporting progress towards program goals and opportunities for improvement.
- Marketing plan and services to achieve program goals.

The implementation contractor will develop innovative and creative marketing strategies and materials. Marketing may include, but not be limited to, bill inserts, newspaper/community newsletter advertisements, community events, billboards, radio advertisements and Kentucky Power's DSM website. The program includes an educational component that informs customers about the benefits of recycling their inefficient appliances and environmentally responsible disposal of appliances.

Risk Management

Experience at other utilities suggests that program cost-effectiveness hinges on volume due to high unit disposal costs that can be reduced by ensuring higher volumes. The implementation contractor will need to use extensive and effective marketing to obtain the volumes.

Actual energy and demand savings could be lowered if a customer recycles a secondary appliance and begins utilizing their former primary unit as a secondary unit. The educational component attempts to influence consumer behavior by encouraging customers to avoid replacing recycled secondary refrigerators or freezers.

Appliance recycling programs typically have higher free ridership rates than other programs, primarily due to:

- Customers that were planning to replace their appliance prior to participating in the program.
- Customers that were not using their appliance prior to participating in the program.

In an effort to reduce free ridership, the implementation contractor should emphasize and enforce the requirement that the appliance is plugged in and in operating condition at the time of pick-up. In

[11] Only residential size appliances qualify.

an effort to increase spillover, the program should be cross-marketed with other residential programs.

Change from Current Program

The proposed program design decreases participation goals based upon the market research conducted.

Measures & Incentives

The measures and incentives were set for planning purposes and may be modified to reflect market conditions.

Appliance Recycling - Eligible Measures and Incentives

	Unit	Average Incentive per Unit		
		Low	Mid	High
Refrigerator Recycle	per Unit	$50	$50	$70
Freezer Recycle	per Unit	$50	$50	$70

Estimated Participation

Appliance Recycling - Estimated Participation, Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	300	315	330	345	345	345	345	345	345	345
Freezer Recycle	100	105	110	115	115	115	115	115	115	115

Appliance Recycling - Estimated Participation, Mid Scenario[12]

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	450	465	480	495	495	495	495	495	495	495
Freezer Recycle	125	130	135	140	140	140	140	140	140	140

Appliance Recycling - Estimated Participation, High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	550	565	580	595	595	595	595	595	595	595
Freezer Recycle	150	155	160	165	165	165	165	165	165	165

Projected Net Energy & Demand Savings

Appliance Recycling - Projected Net Savings per Measure

	Unit	Net kWh Savings per Unit	Net Summer Peak kW Savings per Unit	Net Winter Peak kW Savings per Unit
Refrigerator Recycle	per Unit	574	0.071	0.071
Freezer Recycle	per Unit	512	0.060	0.060

Appliance Recycling - Incremental Net Energy Savings (MWh), Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	172	181	190	198	198	198	198	198	198	198
Freezer Recycle	51	54	56	59	59	59	59	59	59	59
Total	**223**	**235**	**246**	**257**	**257**	**257**	**257**	**257**	**257**	**257**

Appliance Recycling - Incremental Net Energy Savings (MWh), Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	258	267	276	284	284	284	284	284	284	284
Freezer Recycle	64	67	69	72	72	72	72	72	72	72
Total	**322**	**334**	**345**	**356**	**356**	**356**	**356**	**356**	**356**	**356**

[12] Program participation is based on market potential study results and KPCO market characteristics assuming a certain percentage of customers will retire their appliance per yet.

Appliance Recycling - Incremental Net Energy Savings (MWh), High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	316	325	333	342	342	342	342	342	342	342
Freezer Recycle	77	79	82	84	84	84	84	84	84	84
Total	**393**	**404**	**415**	**426**	**426**	**426**	**426**	**426**	**426**	**426**

Appliance Recycling - Incremental Net Summer Peak Savings (kW), Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	21.3	22.3	23.4	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Freezer Recycle	6.0	6.3	6.6	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Total	**27**	**29**	**30**	**31**	**31**	**31**	**31**	**31**	**31**	**31**

Appliance Recycling - Incremental Net Summer Peak Savings (kW), Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	31.9	33.0	34.0	35.1	35.1	35.1	35.1	35.1	35.1	35.1
Freezer Recycle	7.5	7.8	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4
Total	**39**	**41**	**42**	**43**	**43**	**43**	**43**	**43**	**43**	**43**

Appliance Recycling - Incremental Net Summer Peak Savings (kW), High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	39.0	40.0	41.1	42.2	42.2	42.2	42.2	42.2	42.2	42.2
Freezer Recycle	9.0	9.3	9.6	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Total	**48**	**49**	**51**	**52**	**52**	**52**	**52**	**52**	**52**	**52**

Appliance Recycling - Incremental Net Winter Peak Savings (kW), Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	21.3	22.3	23.4	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Freezer Recycle	6.0	6.3	6.6	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Total	**27**	**29**	**30**	**31**	**31**	**31**	**31**	**31**	**31**	**31**

Appliance Recycling - Incremental Net Winter Peak Savings (kW), Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	31.9	33.0	34.0	35.1	35.1	35.1	35.1	35.1	35.1	35.1
Freezer Recycle	7.5	7.8	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4
Total	**39**	**41**	**42**	**43**	**43**	**43**	**43**	**43**	**43**	**43**

Appliance Recycling - Incremental Net Winter Peak Savings (kW), High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	39.0	40.0	41.1	42.2	42.2	42.2	42.2	42.2	42.2	42.2
Freezer Recycle	9.0	9.3	9.6	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Total	**48**	**49**	**51**	**52**	**52**	**52**	**52**	**52**	**52**	**52**

Projected Gross Energy & Demand Savings

Appliance Recycling - Projected Gross Savings per Measure

	Unit	Gross kWh Savings per Unit	Gross Summer Peak kW Savings per Unit	Gross Winter Peak kW Savings per Unit
Refrigerator Recycle	per unit	821	0.101	0.101
Freezer Recycle	per unit	731	0.086	0.086

Appliance Recycling - Incremental Gross Energy Savings (MWh), Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	246	258	271	283	283	283	283	283	283	283
Freezer Recycle	73	77	80	84	84	84	84	84	84	84
Total	**319**	**335**	**351**	**367**	**367**	**367**	**367**	**367**	**367**	**367**

Appliance Recycling - Incremental Gross Energy Savings (MWh), Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	369	382	394	406	406	406	406	406	406	406
Freezer Recycle	91	95	99	102	102	102	102	102	102	102
Total	**461**	**477**	**493**	**509**	**509**	**509**	**509**	**509**	**509**	**509**

Appliance Recycling - Incremental Gross Energy Savings (MWh), High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	451	464	476	488	488	488	488	488	488	488
Freezer Recycle	110	113	117	121	121	121	121	121	121	121
Total	**561**	**577**	**593**	**609**	**609**	**609**	**609**	**609**	**609**	**609**

Appliance Recycling - Incremental Gross Summer Peak Savings (kW), Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	30.4	31.9	33.4	34.9	34.9	34.9	34.9	34.9	34.9	34.9
Freezer Recycle	8.6	9.0	9.4	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Total	**39**	**41**	**43**	**45**	**45**	**45**	**45**	**45**	**45**	**45**

Appliance Recycling - Incremental Gross Summer Peak Savings (kW), Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	45.6	47.1	48.6	50.1	50.1	50.1	50.1	50.1	50.1	50.1
Freezer Recycle	10.7	11.2	11.6	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Total	**56**	**58**	**60**	**62**	**62**	**62**	**62**	**62**	**62**	**62**

Appliance Recycling - Incremental Gross Summer Peak Savings (kW), High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	55.7	57.2	58.7	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Freezer Recycle	12.9	13.3	13.7	14.2	14.2	14.2	14.2	14.2	14.2	14.2
Total	**69**	**71**	**72**	**74**	**74**	**74**	**74**	**74**	**74**	**74**

Appliance Recycling - Incremental Gross Winter Peak Savings (kW), Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	30.4	31.9	33.4	34.9	34.9	34.9	34.9	34.9	34.9	34.9
Freezer Recycle	8.6	9.0	9.4	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Total	**39**	**41**	**43**	**45**	**45**	**45**	**45**	**45**	**45**	**45**

Appliance Recycling - Incremental Gross Winter Peak Savings (kW), Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	45.6	47.1	48.6	50.1	50.1	50.1	50.1	50.1	50.1	50.1
Freezer Recycle	10.7	11.2	11.6	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Total	**56**	**58**	**60**	**62**	**62**	**62**	**62**	**62**	**62**	**62**

Appliance Recycling - Incremental Gross Winter Peak Savings (kW), High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Refrigerator Recycle	55.7	57.2	58.7	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Freezer Recycle	12.9	13.3	13.7	14.2	14.2	14.2	14.2	14.2	14.2	14.2
Total	**69**	**71**	**72**	**74**	**74**	**74**	**74**	**74**	**74**	**74**

Estimated Annual Program Budget

Appliance Recycling - Estimated Annual Budget, Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Incentives	$20,000	$21,000	$22,000	$23,000	$23,000	$23,000	$23,000	$23,000	$23,000	$23,000
Delivery	$34,000	$35,700	$37,400	$39,100	$39,100	$39,100	$39,100	$39,100	$39,100	$39,100
Marketing	$8,100	$8,505	$8,910	$9,315	$9,315	$9,315	$9,315	$9,315	$9,315	$9,315
IT Reporting	$6,000	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Evaluation	$3,405	$3,335	$3,491	$3,646	$3,646	$3,646	$3,646	$3,646	$3,646	$3,646
Total	**$71,505**	**$70,040**	**$73,301**	**$76,561**	**$76,561**	**$76,561**	**$76,561**	**$76,561**	**$76,561**	**$76,561**

Appliance Recycling - Estimated Annual Budget, Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Incentives	$28,750	$29,750	$30,750	$31,750	$31,750	$31,750	$31,750	$31,750	$31,750	$31,750
Delivery	$48,875	$50,575	$52,275	$53,975	$53,975	$53,975	$53,975	$53,975	$53,975	$53,975
Marketing	$11,644	$12,049	$12,454	$12,859	$12,859	$12,859	$12,859	$12,859	$12,859	$12,859
IT Reporting	$6,000	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Evaluation	$4,763	$4,694	$4,849	$5,004	$5,004	$5,004	$5,004	$5,004	$5,004	$5,004
Total	**$100,032**	**$98,567**	**$101,828**	**$105,088**	**$105,088**	**$105,088**	**$105,088**	**$105,088**	**$105,088**	**$105,088**

Appliance Recycling - Estimated Annual Budget, High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Incentives	$49,000	$50,400	$51,800	$53,200	$53,200	$53,200	$53,200	$53,200	$53,200	$53,200
Delivery	$59,500	$61,200	$62,900	$64,600	$64,600	$64,600	$64,600	$64,600	$64,600	$64,600
Marketing	$16,275	$16,740	$17,205	$17,670	$17,670	$17,670	$17,670	$17,670	$17,670	$17,670
IT Reporting	$6,000	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Evaluation	$6,539	$6,492	$6,670	$6,849	$6,849	$6,849	$6,849	$6,849	$6,849	$6,849
Total	**$137,314**	**$136,332**	**$140,075**	**$143,819**	**$143,819**	**$143,819**	**$143,819**	**$143,819**	**$143,819**	**$143,819**

Cost-Effectiveness

Appliance Recycling - Cost-Effectiveness, Low Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TRC Test	1.01	1.10	1.12	1.15	1.17	1.20	1.22	1.22	1.22	1.22
RIM Test	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.34	0.33	0.33
Utility Cost Test	1.20	1.32	1.35	1.38	1.41	1.44	1.47	1.47	1.47	1.47
Participant Cost Test	7.93	8.14	8.34	8.55	8.77	8.99	9.22	9.46	9.70	9.95

Appliance Recycling - Cost-Effectiveness, Mid Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TRC Test	1.04	1.11	1.13	1.16	1.18	1.21	1.23	1.23	1.23	1.23
RIM Test	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.34	0.33	0.33
Utility Cost Test	1.24	1.34	1.37	1.39	1.42	1.45	1.48	1.48	1.48	1.48
Participant Cost Test	7.96	8.16	8.37	8.58	8.80	9.02	9.25	9.49	9.73	9.98

Appliance Recycling - Cost-Effectiveness, High Scenario

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TRC Test	1.03	1.09	1.11	1.14	1.16	1.18	1.20	1.21	1.21	1.21
RIM Test	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.32	0.32
Utility Cost Test	1.10	1.17	1.20	1.22	1.25	1.27	1.29	1.30	1.30	1.30
Participant Cost Test	8.20	8.40	8.61	8.82	9.04	9.26	9.49	9.73	9.97	10.22