

2019-2021 DRAFT PLAN CONSULTANT REVIEW



► **May 16, 2018**

OUTLINE



- 1. High level observations and plan portfolio summary**
- 2. Electric program savings and costs**
- 3. Gas program savings and costs**
- 4. C&I plan summary and key considerations**
- 5. Residential and low income plan summary and key considerations**
- 6. Cross cutting key issues to address**
- 7. Conclusions and next steps**

HIGH LEVEL OBSERVATIONS

- ▶ **Plan is well written but lacks the detail needed to respond to many EEAC recommendations**
- ▶ **Benefits are \$1.6 billion lower than current plan**
- ▶ **Savings are lower than current plan while costs to achieve are higher than expected**
- ▶ **No large apparent change in program measure mix or delivery**
- ▶ **Active demand management included but limited energy storage**
- ▶ **Wide variation in planning assumptions among PAs indicates additional coordination across PAs would be useful**
- ▶ **Need to retain kWh and therm metrics in addition to MMBtu in order to track primary fuel impacts**
- ▶ **“Place holder” performance incentive is same as current plan**
- ▶ **There is a lot to do to get a final plan together**

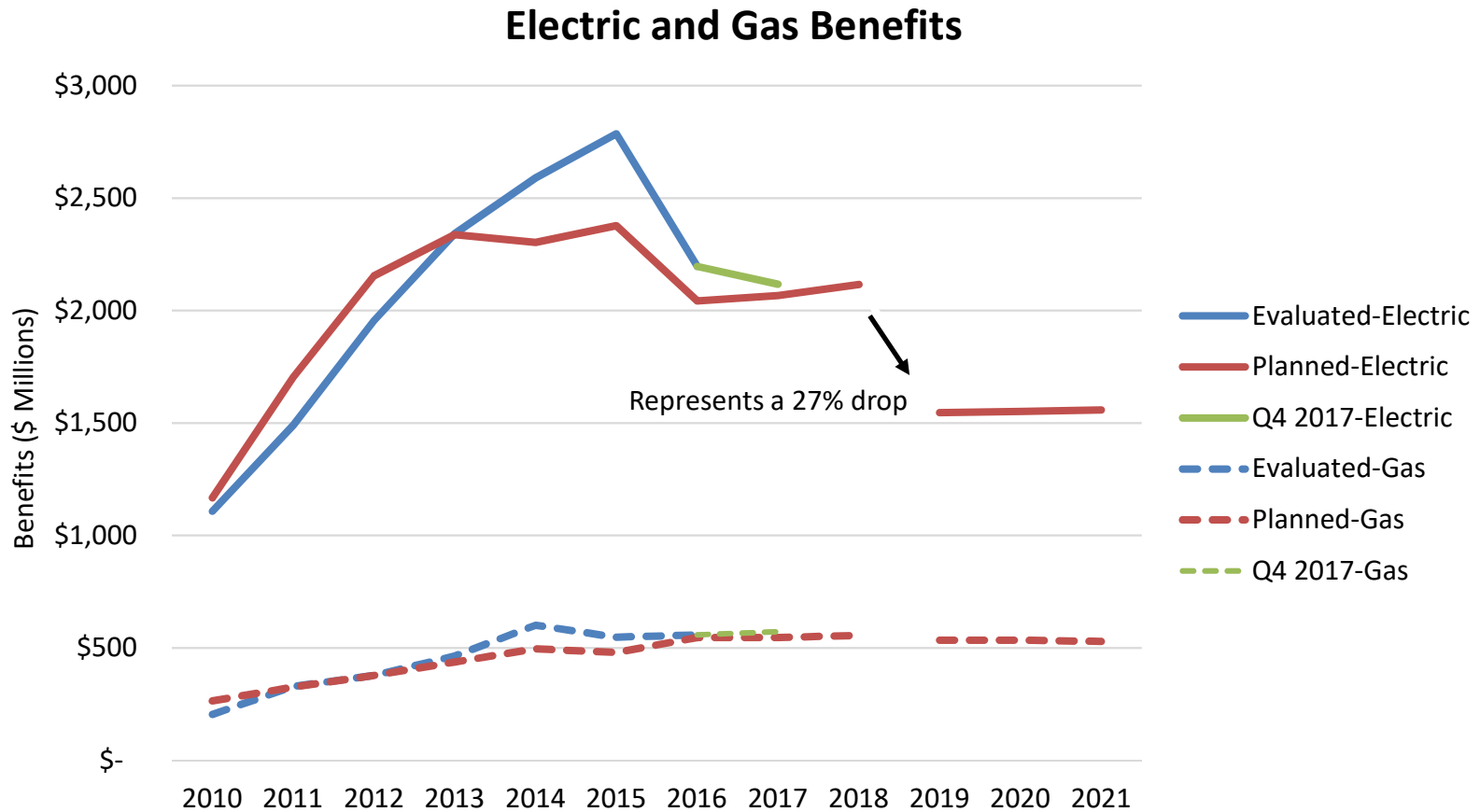
2019-2021 PLAN PORTFOLIO SUMMARY

Electric		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (MWh)	14,163,025	9,806,017	9,669,240	9,482,442	28,957,699
Lifetime Savings (MMBtu)	37,369,737	34,609,995	34,053,736	34,227,358	102,891,089	
Annual Savings (MWh)	1,574,249	1,005,330	978,631	955,022	2,938,982	
% of Annual Sales*	3.4%	2.2%	2.1%	2.0%	2.1%	
Summer Capacity Savings w/ ADM (kW)	228,530	180,711	208,371	242,295	631,377	
Benefits (\$ millions)	\$2,117	\$1,547	\$1,552	\$1,558	\$4,656	
Expenditures (\$ millions)	\$529	\$546	\$546	\$546	\$1,638	
Lifetime \$/kWh	\$0.037	\$0.056	\$0.056	\$0.058	\$0.057	

Gas		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (Therms)	368,345,795	342,404,319	343,333,276	339,424,887	1,025,162,483
Annual Savings (Therms)	26,621,107	26,654,591	26,810,531	26,682,210	80,147,332	
% of Annual Sales*	1.2%	1.1%	1.1%	1.1%	1.1%	
Benefits (\$ millions)	\$572	\$534	\$534	\$529	\$1,597	
Expenditures (\$ millions)	\$205	\$227	\$230	\$234	\$691	
Lifetime \$/therm	\$0.557	\$0.662	\$0.670	\$0.691	\$0.674	

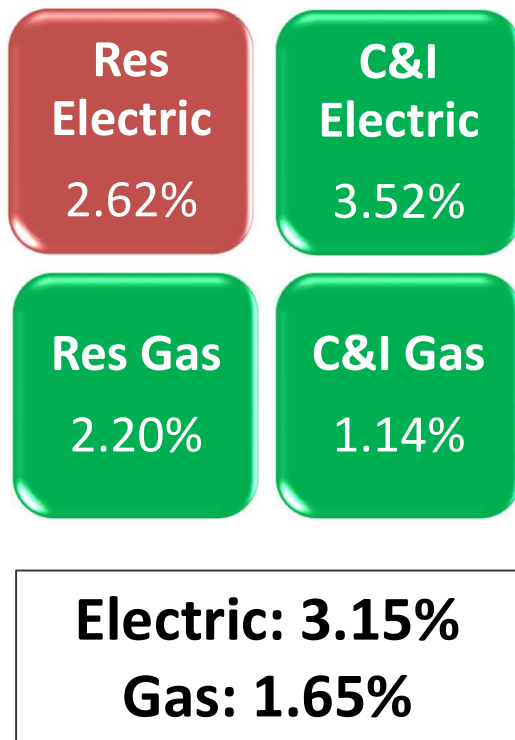
*Years 2019-2021 use 2018 as sales reference

PORTFOLIO BENEFITS ARE LOWER THAN RECENT YEARS

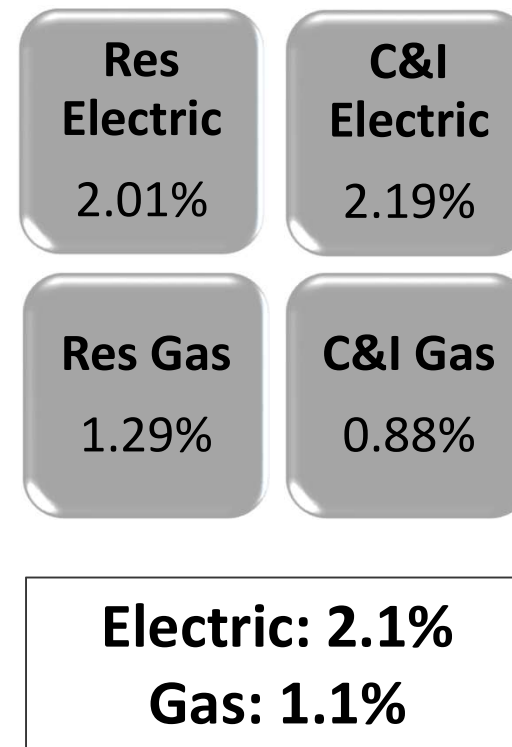


PA PLAN ANNUAL SAVINGS AS A % OF SALES ARE LOWER THAN CONSULTANT ASSESSMENT OF POTENTIAL

Consultant Team Assessment of Potential



PA Draft Plan



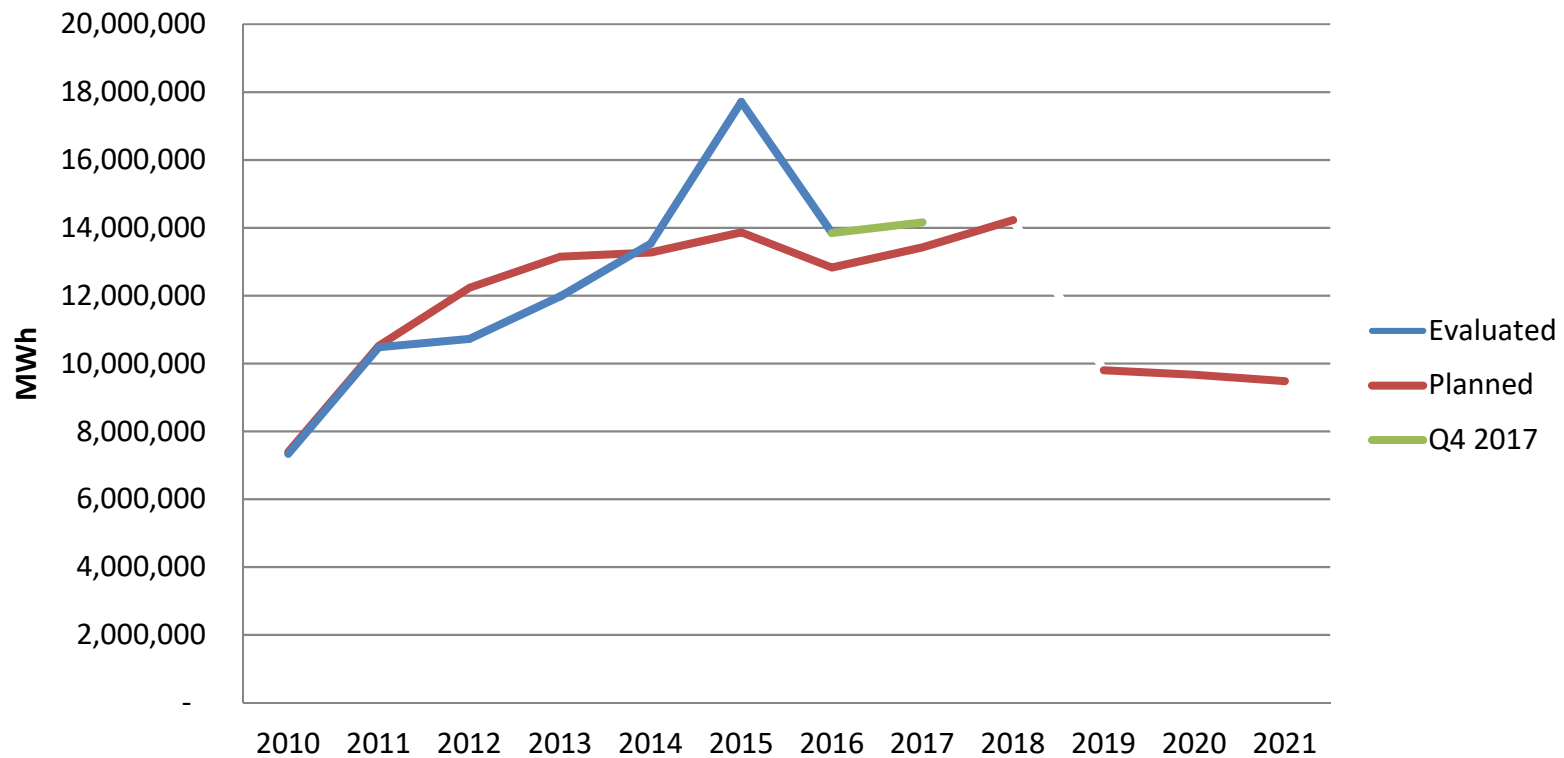
Note: 2018 used as sales reference for PA Plan



ELECTRIC

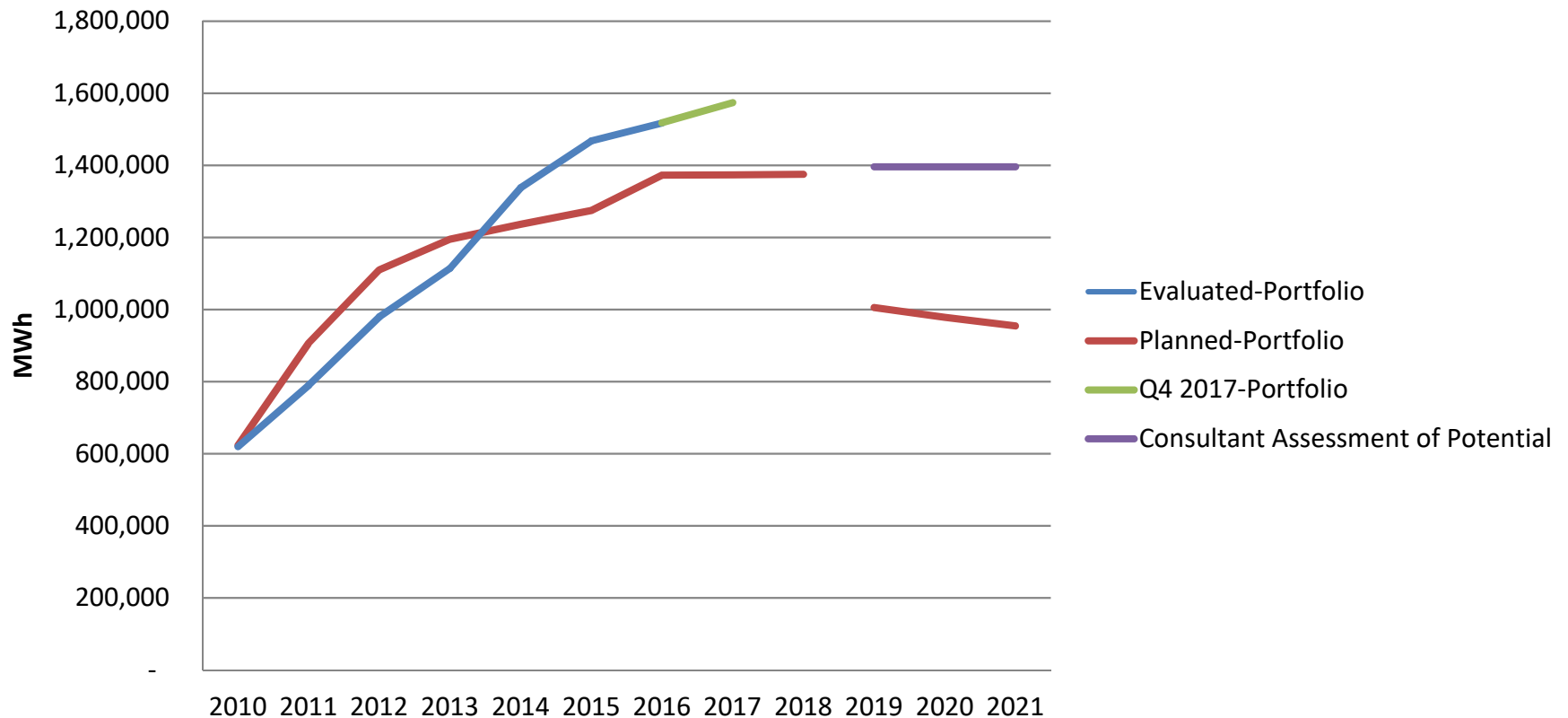
PLANNED LIFETIME ELECTRIC SAVINGS ARE LOWEST SINCE 2010

Portfolio Lifetime Electric Savings



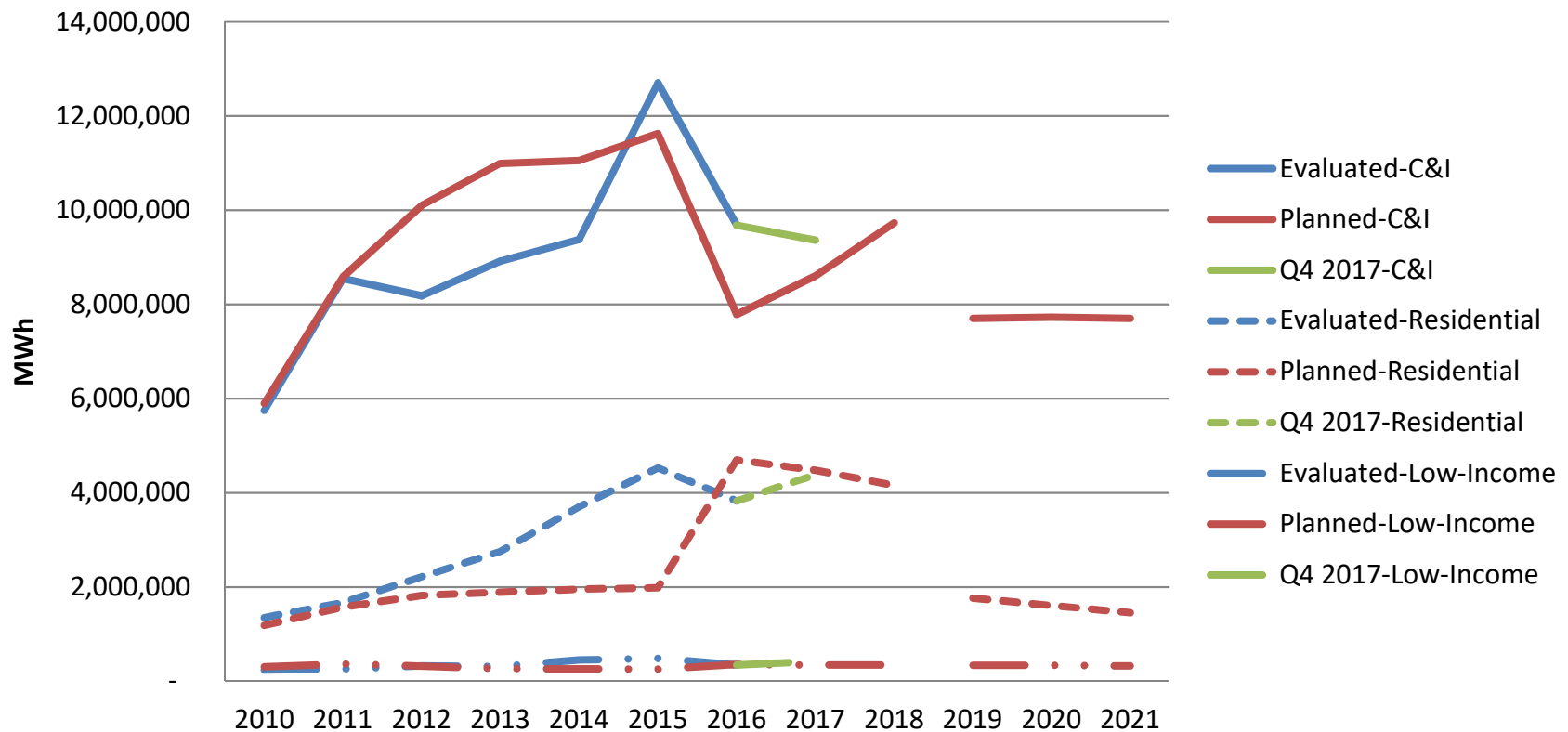
ANNUAL ELECTRIC SAVINGS LOWER THAN RECENT YEARS AND LOWER THAN CONSULTANT ASSESSMENT OF POTENTIAL

Portfolio Annual Electric Savings

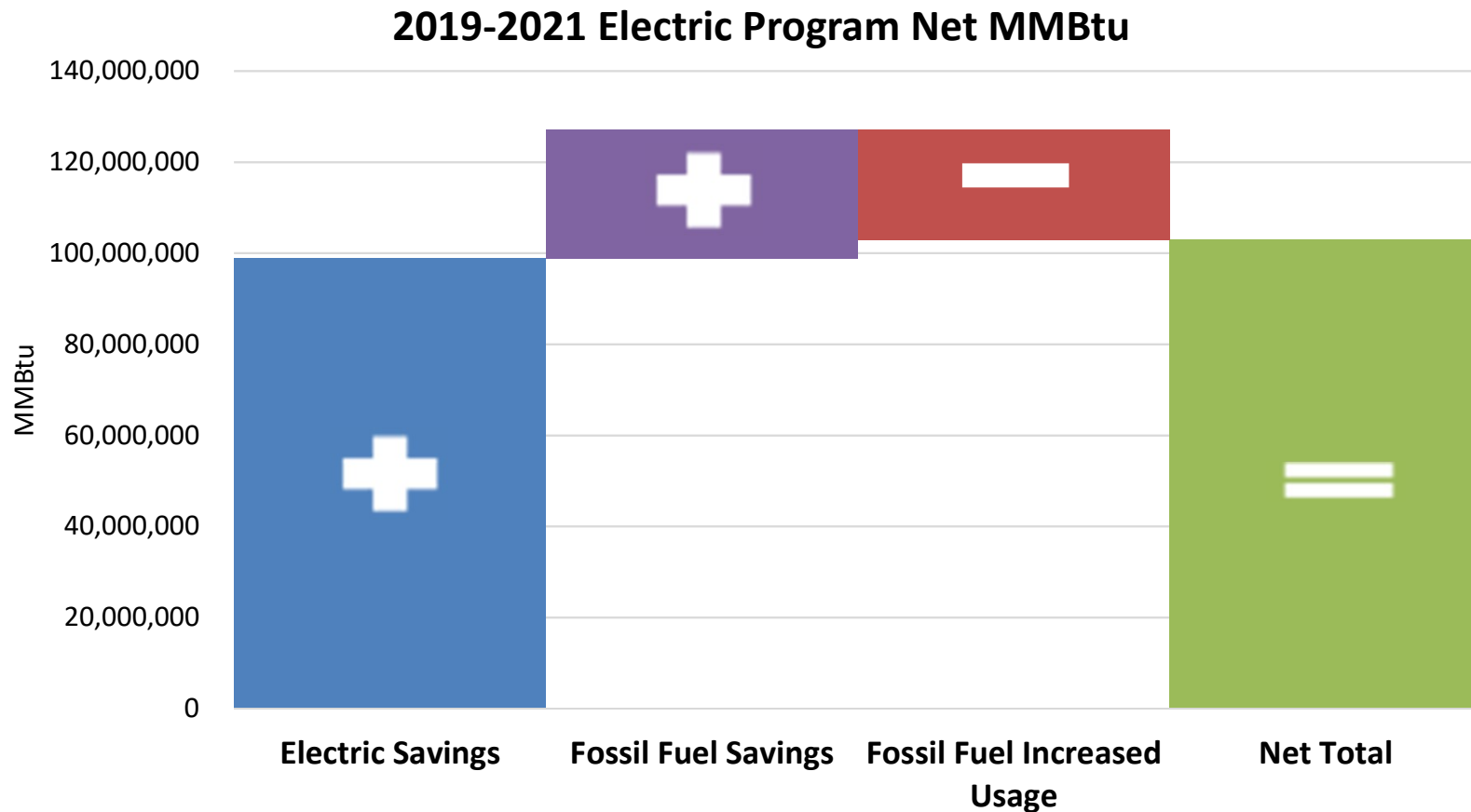


LIFETIME ELECTRIC SAVINGS LOWER THAN PREVIOUS PLAN FOR ALL SECTORS; BIGGEST DROP FOR RESIDENTIAL

Lifetime Electric Savings by Sector

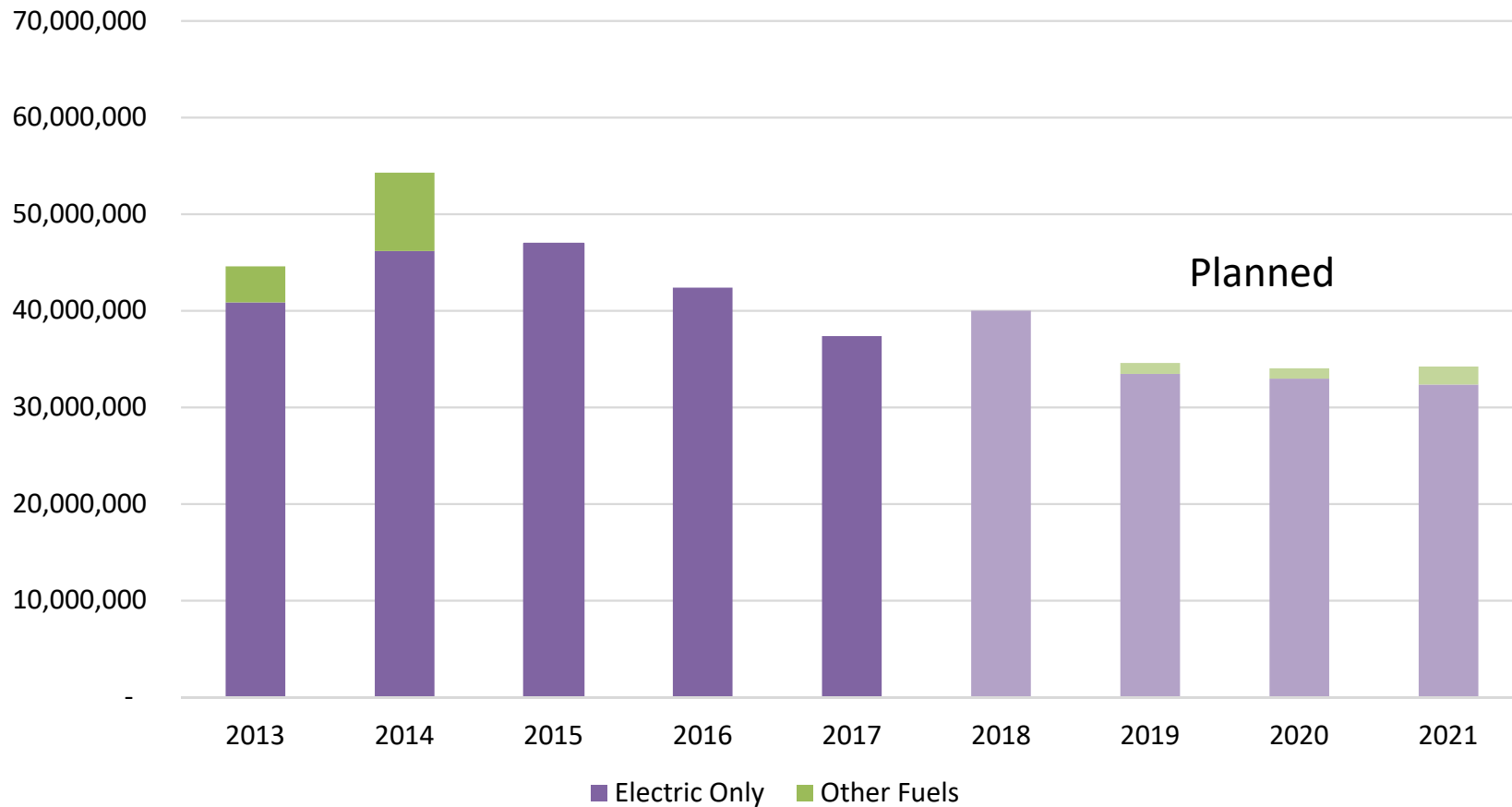


2019-2021 NET MMBTU SAVINGS ARE SUM OF THREE COMPONENTS

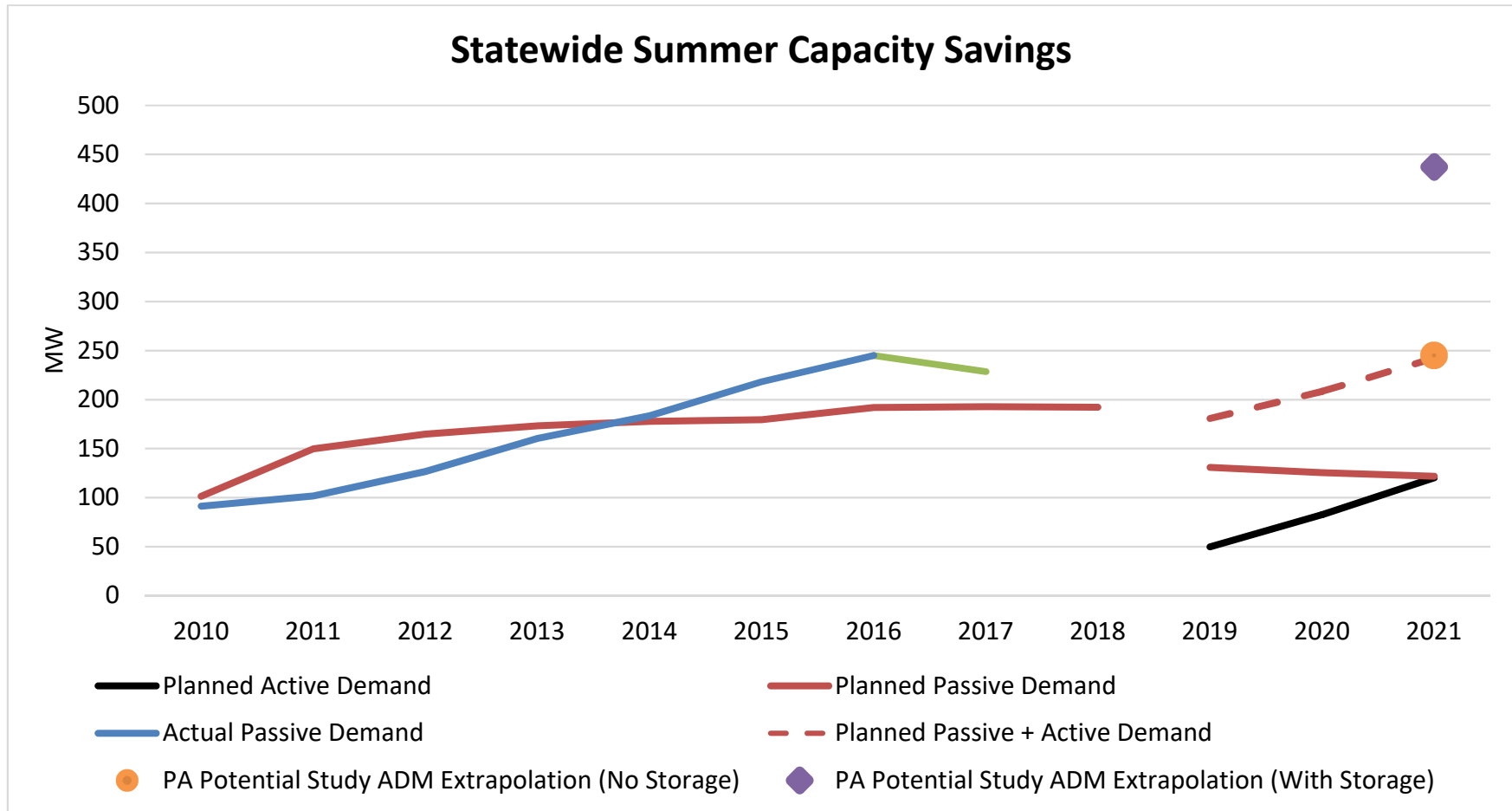


PLANNED MMBTU SAVINGS ARE LOW; OTHER FUEL IMPACTS ON NET ELECTRIC PROGRAM SAVINGS VARY

Electric Program Lifetime Savings (MMBtu)

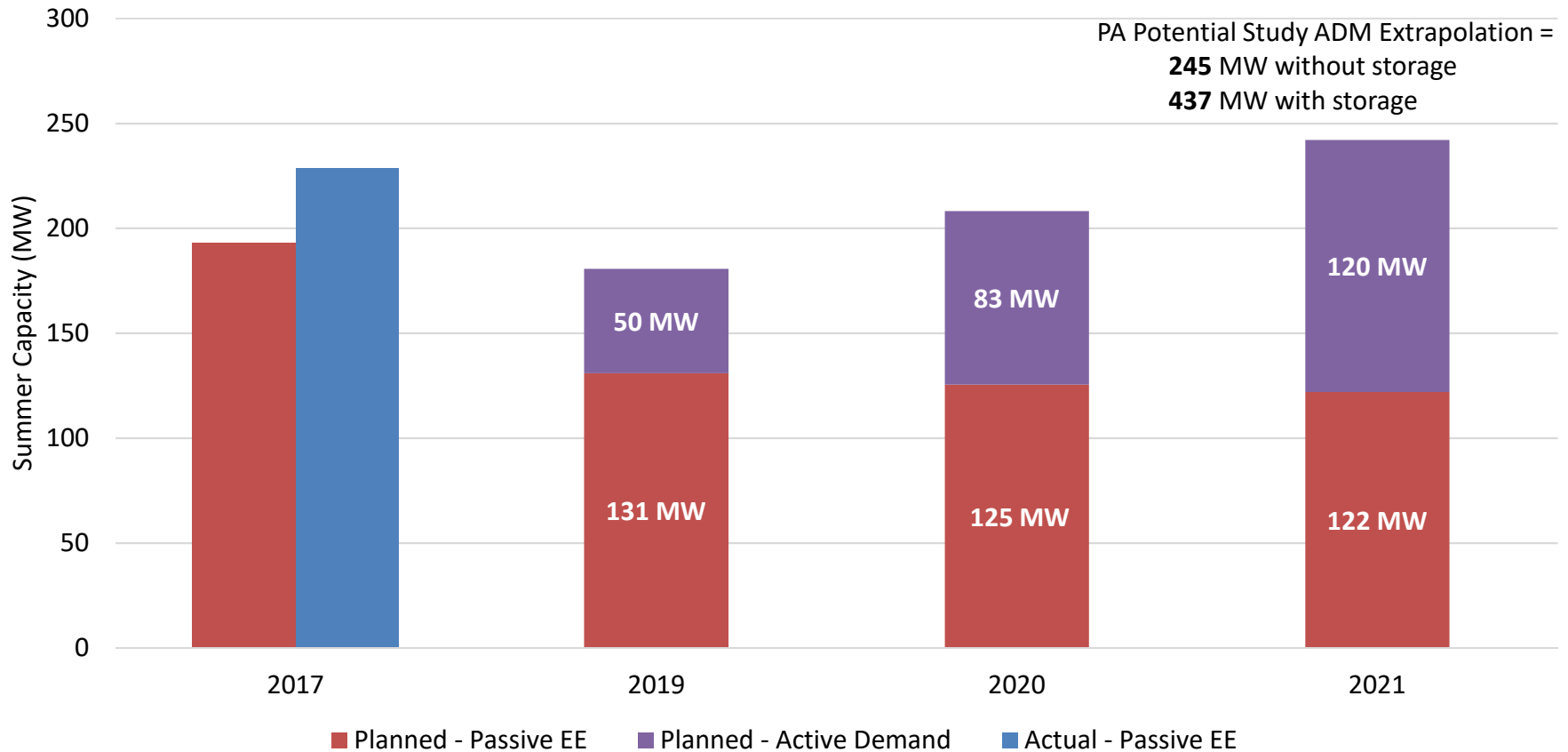


PASSIVE DEMAND SAVINGS LOWER THAN TRENDS; PROPOSED ACTIVE DEMAND LOWER THAN POTENTIAL



PASSIVE DEMAND SAVINGS DECLINE OVER 100 MW; ACTIVE DEMAND MANAGEMENT GROWS, BUT IS LOWER THAN POTENTIAL

Passive (EE) and Active Demand Impacts



ACTIVE DEMAND MANAGEMENT VARIES SIGNIFICANTLY ACROSS PAS AND YEARS

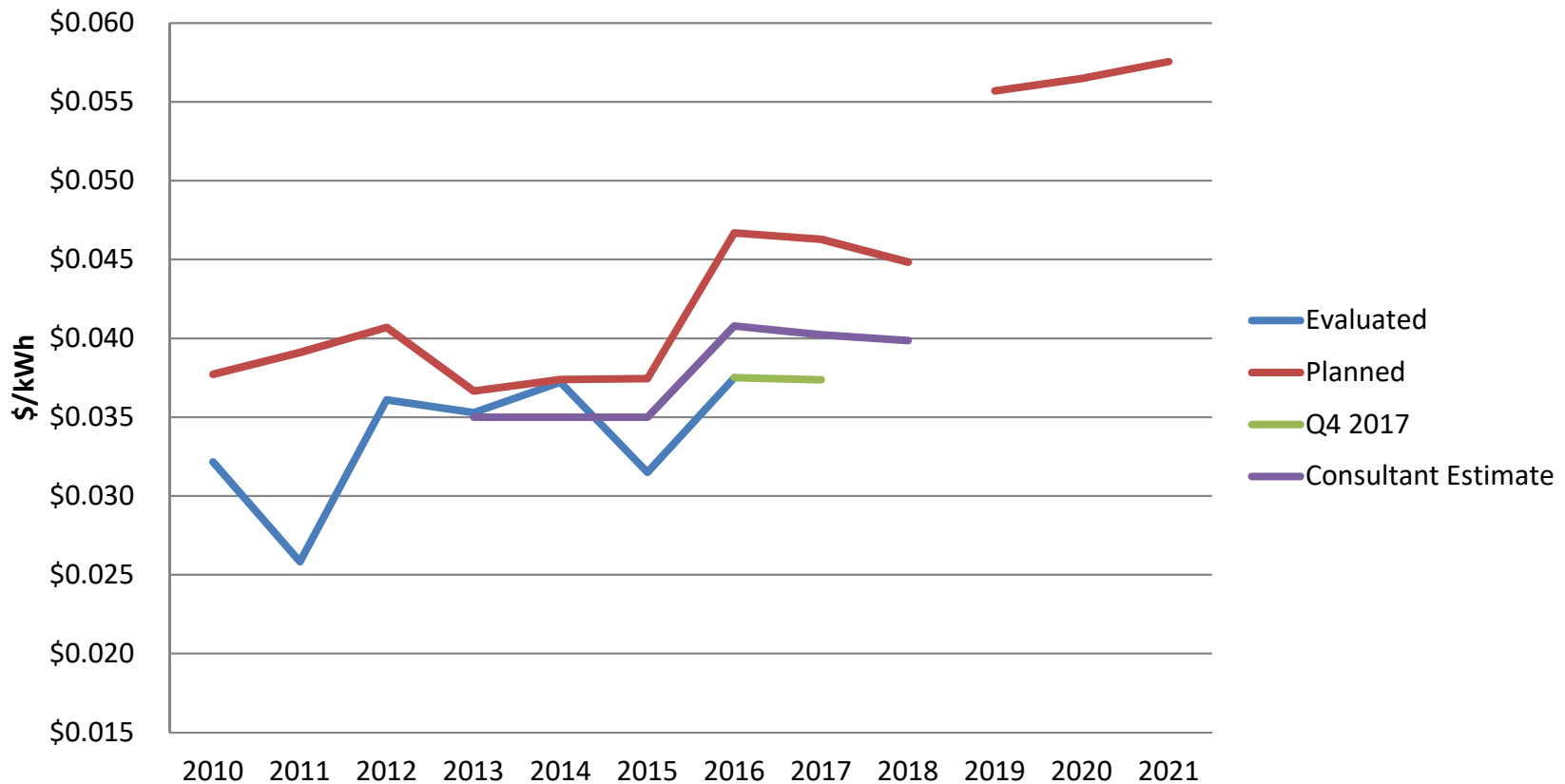
	CLC	Eversource	National Grid	Unitil	Statewide
Residential ADM (MW)					
2019	0.6	1.4	3.6	0.1	5.7
2020	5.3	1.7	4.9	0.1	12.0
2021	5.5	2.1	5.6	0.1	13.3
C&I ADM (MW)					
2019	0.2	8.8	35.0	0.2	44.1
2020	0.6	33.1	36.8	0.2	70.6
2021	0.6	67.6	38.6	0.2	107.0
Total ADM (MW)					
2019	0.8	10.2	38.6	0.3	49.8
2020	5.9	34.8	41.7	0.3	82.7
2021	6.1	69.7	44.2	0.3	120.2
% of Peak Demand (MW)					
2019	0.2%	0.2%	0.9%	0.3%	0.5%
2020	1.3%	0.7%	1.0%	0.3%	0.9%
2021	1.3%	1.4%	1.1%	0.3%	1.3%

ADM STRATEGIES AND PURPOSES: WHAT SHOULD BE IN 2019-2021 PLAN?

- ▶ **Plan should include several kinds of active demand management (ADM) to address several objectives**
 - ADM useful for ramping, operational needs, shortage events in addition to peak demand reductions
 - Not limited solely to products bid into markets
- ▶ ***Winter* peak demand important in addition to summer**
- ▶ **Automation and advances in technology enable customers to manage load in new ways**
- ▶ **Plan needs to consider new and broader purposes**
- ▶ ***Key questions:***
 - *How much ADM does MA need/want, when, and why (for which purposes)?*
 - *What ADM is needed/valuable in addition to system peak reduction?*

2019-2021 PLANNED LIFETIME ELECTRIC COST TO ACHIEVE ARE MUCH HIGHER THAN PREVIOUS YEARS

Portfolio Lifetime Electric Cost to Achieve



ELECTRIC SAVINGS AS A % OF SALES VARY BY PA AND SECTOR

Electric					
	CLC	Eversource	National Grid	Unitil	Statewide
Total					
2019	1.43%	2.17%	2.23%	1.39%	2.16%
2020	1.36%	2.16%	2.12%	1.42%	2.10%
2021	1.31%	2.09%	2.09%	1.43%	2.05%
2019-2021	1.37%	2.14%	2.15%	1.41%	2.10%
Residential					
2019	1.01%	1.92%	2.56%	1.34%	2.18%
2020	0.86%	1.76%	2.37%	1.49%	2.01%
2021	0.78%	1.59%	2.20%	1.46%	1.85%
2019-2021	0.88%	1.76%	2.38%	1.43%	2.01%
Low Income					
2019	3.55%	2.09%	1.34%	0.18%	1.61%
2020	3.51%	2.04%	1.35%	0.20%	1.60%
2021	3.32%	2.00%	1.34%	0.20%	1.57%
2019-2021	3.46%	2.04%	1.35%	0.19%	1.59%
C&I					
2019	1.78%	2.28%	2.11%	1.70%	2.19%
2020	1.81%	2.33%	2.06%	1.68%	2.19%
2021	1.80%	2.31%	2.09%	1.71%	2.19%
2019-2021	1.80%	2.31%	2.09%	1.70%	2.19%

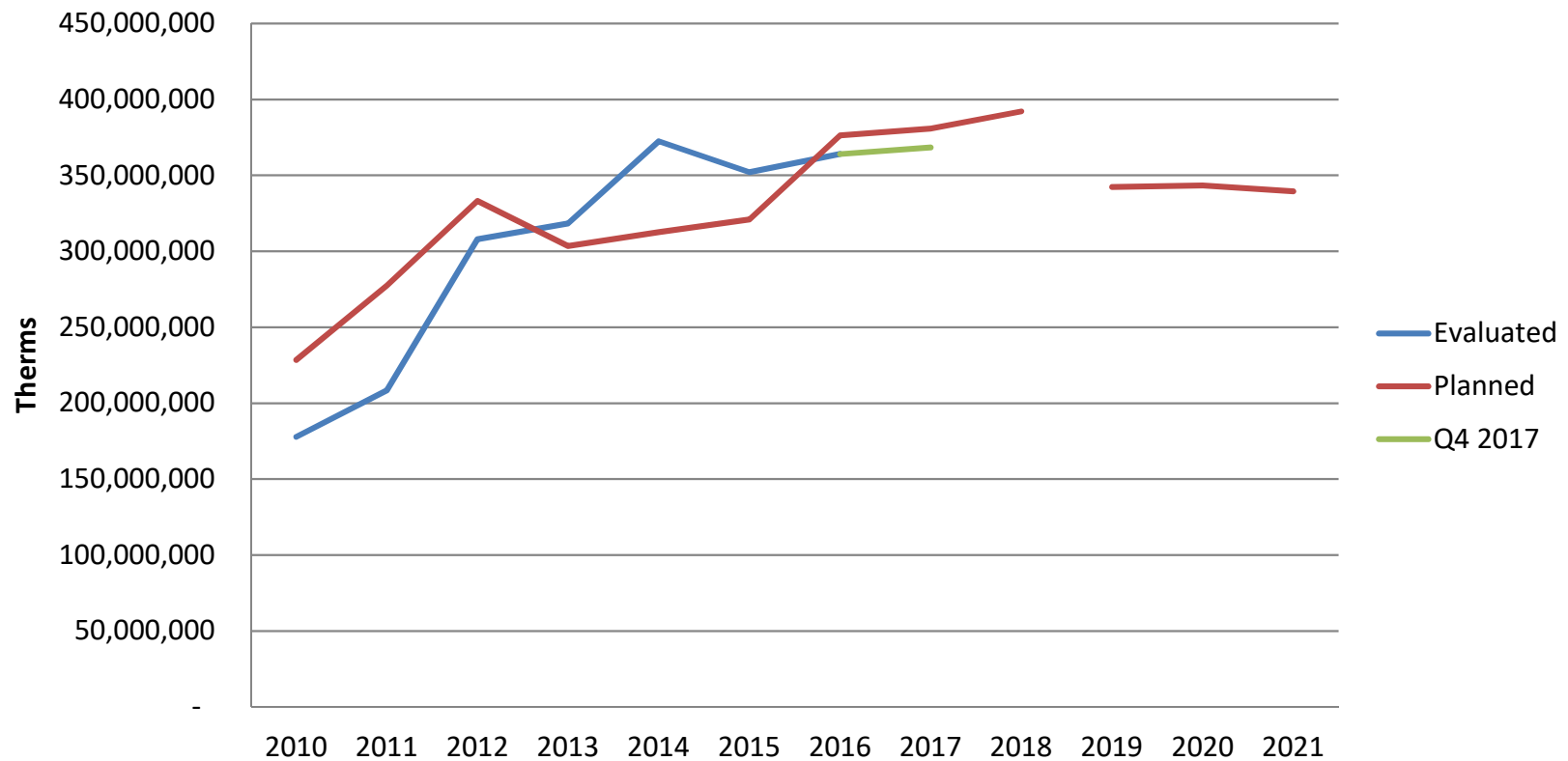
Note: Years 2019-2021 use 2018 as sales reference



GAS

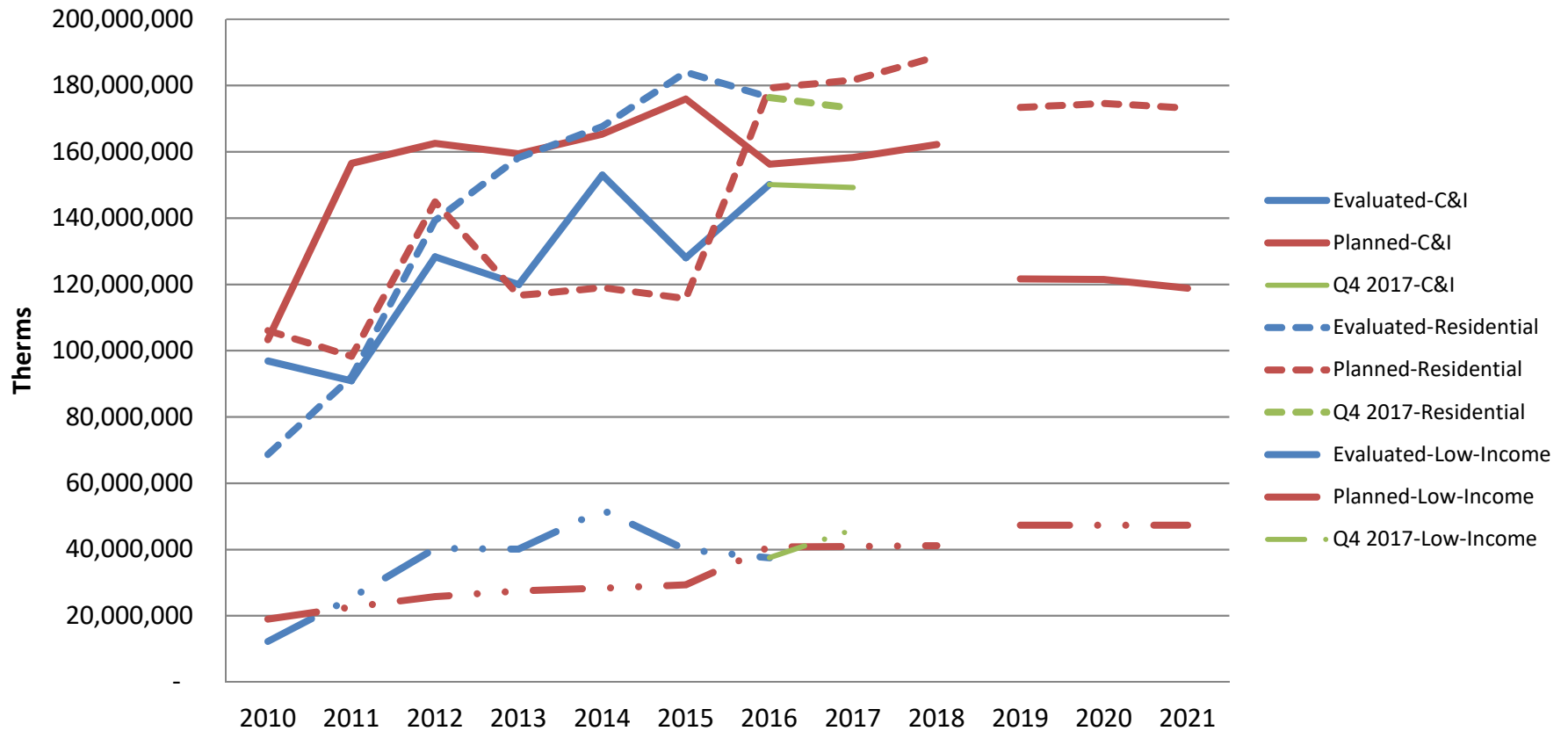
LIFETIME GAS SAVINGS ARE LOWER THAN PREVIOUS PLAN

Portfolio Lifetime Gas Savings

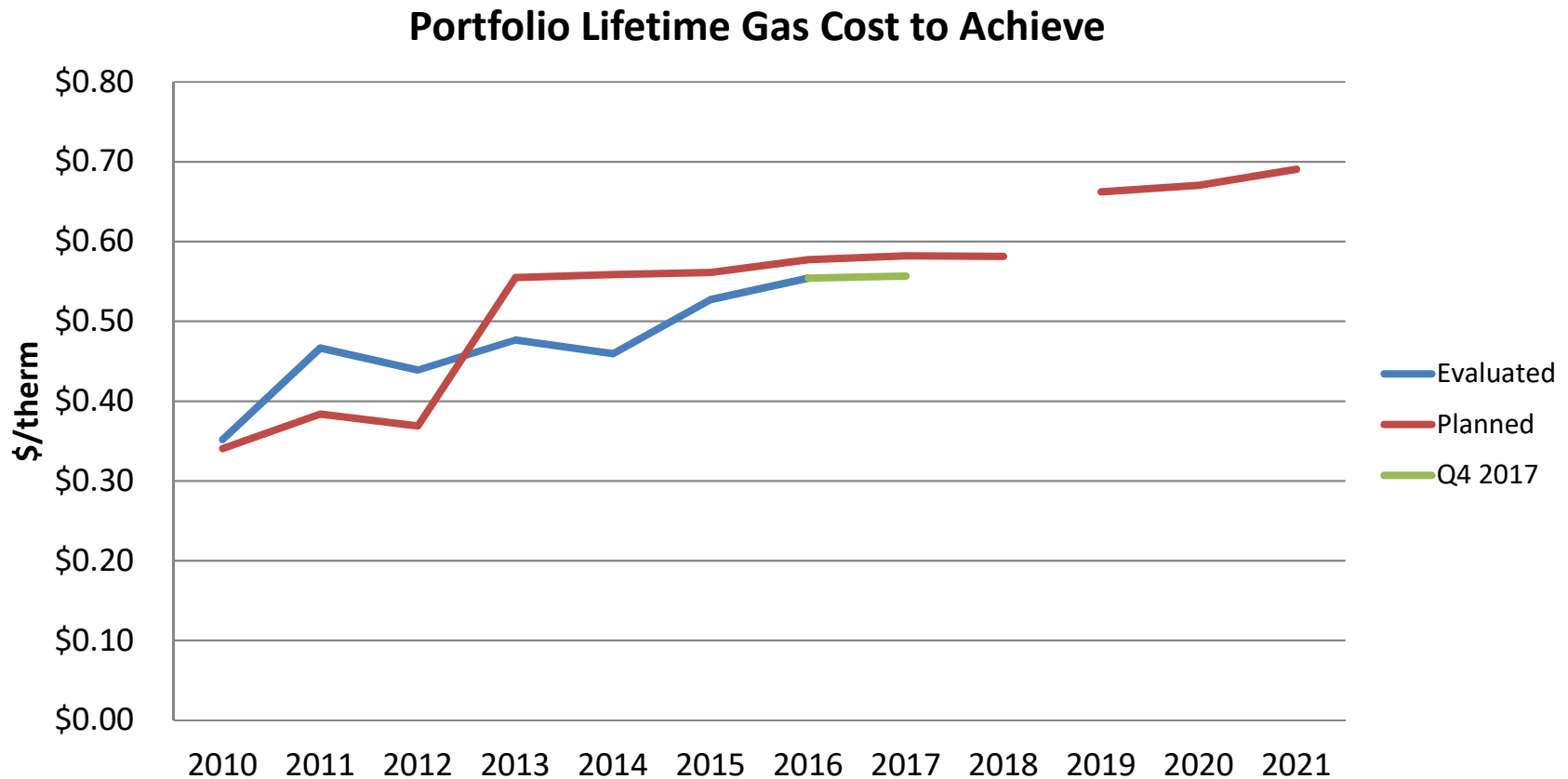


LIFETIME GAS SAVINGS LOWER THAN PREVIOUS PLAN FOR RES AND C&I; BIGGEST DROP FOR C&I

Lifetime Gas Savings by Sector



LIFETIME GAS COST TO ACHIEVE IS HIGHER THAN PREVIOUS YEARS



GAS SAVINGS AS A % OF SALES VARY BY PA AND SECTOR

Gas							
	Berkshire	CMA	Eversource	Liberty	National Grid	Unitil	Statewide
Total							
2019	0.38%	1.32%	1.29%	0.61%	1.11%	0.84%	1.14%
2020	0.37%	1.32%	1.29%	0.60%	1.12%	0.87%	1.15%
2021	0.38%	1.33%	1.29%	0.60%	1.11%	0.87%	1.14%
2019-2021	0.38%	1.32%	1.29%	0.60%	1.12%	0.86%	1.14%
Residential							
2019	0.38%	1.04%	1.39%	0.71%	1.40%	1.17%	1.29%
2020	0.37%	1.05%	1.39%	0.72%	1.40%	1.26%	1.29%
2021	0.37%	1.06%	1.39%	0.73%	1.38%	1.25%	1.29%
2019-2021	0.37%	1.05%	1.39%	0.72%	1.39%	1.23%	1.29%
Low Income							
2019	0.58%	1.21%	1.73%	0.34%	3.50%	0.77%	2.09%
2020	0.58%	1.21%	1.73%	0.34%	3.50%	0.77%	2.09%
2021	0.58%	1.21%	1.73%	0.34%	3.50%	0.77%	2.09%
2019-2021	0.58%	1.21%	1.73%	0.34%	3.50%	0.77%	2.09%
C&I							
2019	0.35%	1.96%	1.18%	0.58%	0.63%	0.65%	0.88%
2020	0.35%	1.96%	1.18%	0.55%	0.65%	0.66%	0.89%
2021	0.35%	1.96%	1.18%	0.53%	0.64%	0.66%	0.89%
2019-2021	0.35%	1.96%	1.18%	0.55%	0.64%	0.66%	0.88%

Note: Years 2019-2021 use 2018 as sales reference



C&I

2019-2021 PLAN C&I SAVINGS SUMMARY

Electric		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (MWh)	9,363,881	7,703,829	7,726,675	7,703,217	23,133,721
Lifetime Savings (MMBtu)	16,860,477	18,167,271	18,170,346	18,436,441	54,774,058	
Annual Savings (MWh)	693,842	632,194	632,531	634,110	1,898,835	
% of Annual Sales	2.4%	2.2%	2.2%	2.2%	2.2%	
Summer Capacity Savings w/ ADM (kW)	99,940	116,981	141,646	177,468	436,095	
Benefits (\$ millions)	\$1,216	\$916	\$918	\$933	\$2,767	
Expenditures (\$ millions)	\$237	\$257	\$264	\$269	\$790	
Lifetime \$/kWh	\$0.025	\$0.033	\$0.034	\$0.035	\$0.034	

Gas		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (Therms)	149,214,169	121,655,134	121,449,800	118,891,357	361,996,290
Annual Savings (Therms)	10,481,087	9,452,799	9,553,141	9,514,981	28,520,920	
% of Annual Sales*	1.0%	0.9%	0.9%	0.9%	0.9%	
Benefits (\$ millions)	\$159	\$134	\$134	\$131	\$399	
Expenditures (\$ millions)	\$44	\$45	\$46	\$47	\$138	
Lifetime \$/therm	\$0.295	\$0.372	\$0.378	\$0.392	\$0.381	

*Years 2019-2021 use 2018 as sales reference

C&I KEY CONSIDERATIONS



▶ **Lighting savings**

- Maximize lighting savings by supporting fixtures with controls
- Drive increased specification and controls installation

▶ **HVAC and Controls/Hot water**

- Revisit Upstream program
- Increase RCx and MCx
- Better integrate gas and electric savings

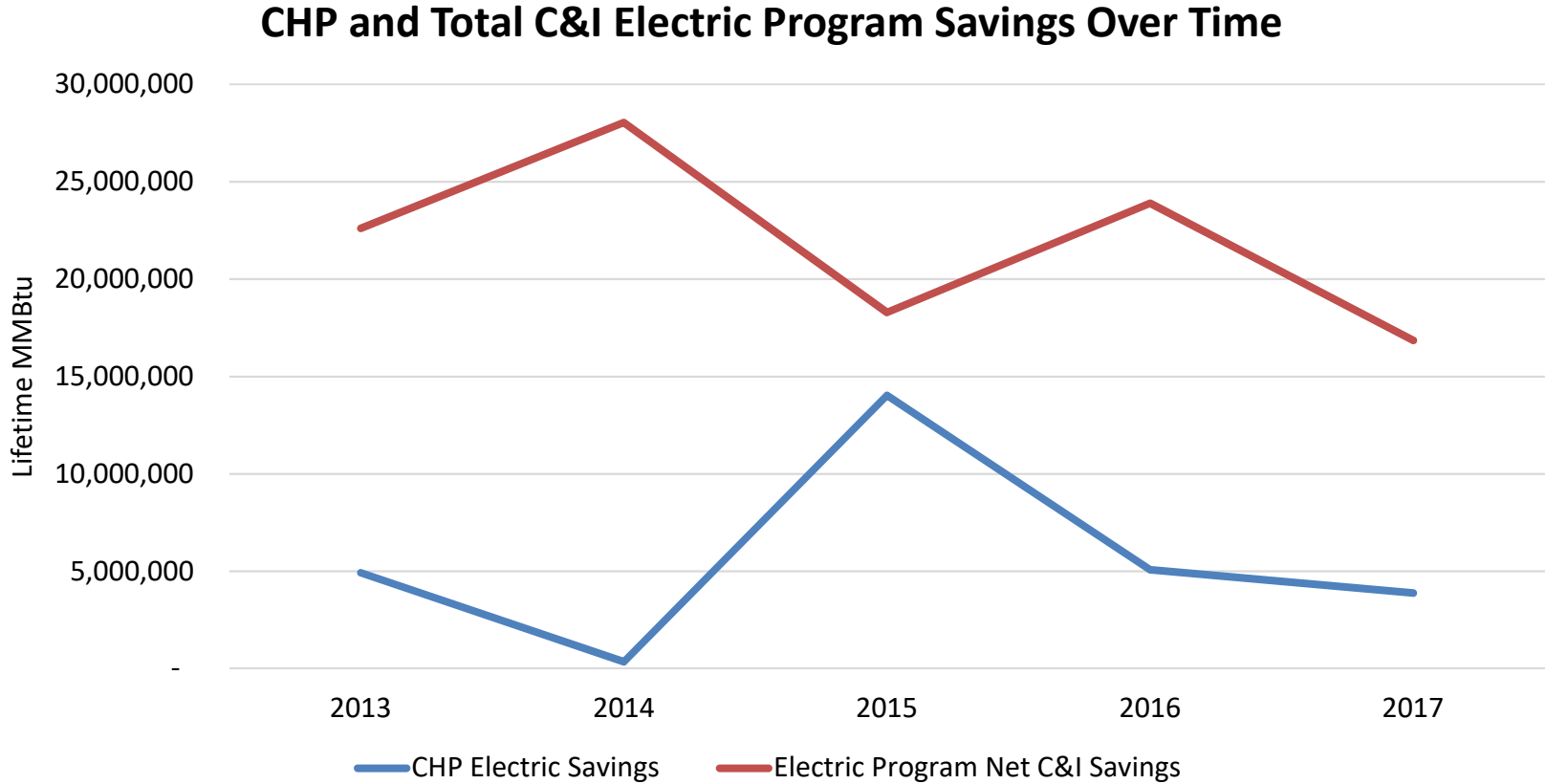
▶ **Process savings**

- Increase Industrial Initiative capacity and approaches

▶ **CHP**

- Identify and weight three-year pipeline
- MMBtu metric impact

CHP SAVINGS TRACK IN OPPOSITE DIRECTION AS TOTAL C&I ELECTRIC PROGRAM SAVINGS





RESIDENTIAL AND LOW INCOME

2019-2021 PLAN RESIDENTIAL SAVINGS SUMMARY

Electric		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (MWh)	4,380,416	1,763,658	1,604,768	1,452,466	4,820,892
Lifetime Savings (MMBtu)	17,408,892	13,766,317	13,200,174	13,132,553	40,099,043	
Annual Savings (MWh)	835,748	337,802	310,956	286,332	935,090	
% of Annual Sales*	5.4%	2.2%	2.0%	1.9%	2.0%	
Summer Capacity Savings w/ ADM (kW)	122,421	58,399	61,738	59,999	180,136	
Benefits (\$ millions)	\$756	\$503	\$507	\$498	\$1,509	
Expenditures (\$ millions)	\$228	\$221	\$212	\$207	\$640	
Lifetime \$/kWh	\$0.052	\$0.125	\$0.132	\$0.142	\$0.133	

Gas		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (Therms)	173,103,171	173,435,584	174,568,609	173,218,664	521,222,857
Annual Savings (Therms)	13,869,444	14,842,835	14,898,435	14,808,274	44,549,544	
% of Annual Sales*	1.2%	1.3%	1.3%	1.3%	1.3%	
Benefits (\$ millions)	\$320	\$307	\$307	\$306	\$920	
Expenditures (\$ millions)	\$115	\$132	\$134	\$137	\$403	
Lifetime \$/therm	\$0.666	\$0.760	\$0.769	\$0.791	\$0.773	

*Years 2019-2021 use 2018 as sales reference

2019-2021 PLAN LOW INCOME SAVINGS SUMMARY

Electric		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (MWh)	418,727	338,530	337,797	326,759	1,003,086
Lifetime Savings (MMBtu)	3,100,369	2,676,407	2,683,216	2,658,365	8,017,988	
Annual Savings (MWh)	44,659	35,335	35,143	34,579	105,058	
% of Annual Sales*	2.1%	1.6%	1.6%	1.6%	1.6%	
Summer Capacity Savings w/ ADM (kW)	6,170	5,331	4,988	4,828	15,146	
Benefits (\$ millions)	\$146	\$127	\$127	\$126	\$380	
Expenditures (\$ millions)	\$64	\$68	\$69	\$70	\$208	
Lifetime \$/kWh	\$0.153	\$0.202	\$0.206	\$0.214	\$0.207	

Gas		2017 (Preliminary)	2019	2020	2021	2019-2021
	Lifetime Savings (Therms)	46,028,455	47,313,601	47,314,867	47,314,867	141,943,335
Annual Savings (Therms)	2,270,577	2,358,956	2,358,956	2,358,956	7,076,868	
% of Annual Sales*	2.0%	2.1%	2.1%	2.1%	2.1%	
Benefits (\$ millions)	\$93	\$93	\$93	\$92	\$278	
Expenditures (\$ millions)	\$46	\$50	\$50	\$51	\$150	
Lifetime \$/therm	\$0.993	\$1.049	\$1.059	\$1.072	\$1.060	

*Years 2019-2021 use 2018 as sales reference

RES/LOW INCOME KEY CONSIDERATIONS



- ▶ **Residential existing buildings program**
 - Audit process
 - Role of technology in 2019-2021 for res customers
 - Behavior program assumptions
 - Co-delivery of PV, EV
- ▶ **Lighting assumptions across programs and over time**
- ▶ **Other ratepayer parity considerations**
 - Multi-family, moderate income, renters, other hard to find/reach/serve ratepayers
- ▶ **Low income**
 - PA differences
 - Details on market rate alignment
 - Data collection and management



CROSS-CUTTING

CROSS-CUTTING KEY CONSIDERATIONS



- ▶ **Goals and goals framework (MMBTUs & primary fuel)**
- ▶ **Energy optimization, fuel switching**
- ▶ **Demand and active demand management**
 - Goal(s)
 - Strategic positioning and value, for which purposes
 - Customer-facing program delivery (integrated EE and ADM)
- ▶ **Application of 2018 AESC study results in MA**
 - Avoided cost of GWSA compliance (MA analysis)
 - Pool Transmission Facility T&D, and utility system T&D
 - Rest-of-pool (ROP) DRIPE in addition to in-state DRIPE
- ▶ **Market transformation/market effects credit**
- ▶ **Performance incentive**
- ▶ **Application of EM&V results (Net-to-Gross, baselines)**

CONCLUSIONS AND NEXT STEPS

- ▶ **More detail needed in Plan to respond to many EEAC recommendations**
- ▶ **Benefits and savings lower than current plan while costs to achieve are higher than expected**
- ▶ **No large change in program measure mix or delivery**
- ▶ **Variation in planning assumptions among PAs**
- ▶ **Need to retain kWh and therm metrics**
- ▶ **Performance incentive is the same as current plan**
- ▶ **ADM included but very limited energy storage**
- ▶ **There is a lot to do to get a final plan together**
- ▶ **Next step will be to engage in key drivers process which will require PA participation and commitment**

PROCESS AND TIMELINE FOR THE 2019-2021 PLAN

Process Steps	Date
PAs provide April 30 Draft Plan	April 30
EEAC review of Draft Plan	May-July
Council initial review	May 16
Council continued review, draft comments	June 20
Initial “key drivers” analysis of savings/goals and costs	May-July
EEAC final review and resolution on Draft Plan	July 18 (July 31)
Plan revisions and negotiations	August-Sept.
Finalize goals, costs, and term sheet	Sept. 19
PA provide Final Plan for EEAC review/approval	October ?
EEAC Resolution on the Final Plan for 2019-2021	Oct. 17 (Oct. 31)

THANK YOU

Questions?

LIFETIME COST TO ACHIEVE BY PA

Electric	\$/kWh				
		2019	2020	2021	2019-2021
	Cape Light Compact	\$0.124	\$0.137	\$0.139	\$0.134
	Eversource	\$0.052	\$0.052	\$0.054	\$0.053
	National Grid Electric	\$0.054	\$0.055	\$0.055	\$0.055
	Unitil Electric	\$0.080	\$0.080	\$0.079	\$0.080
	Total	\$0.056	\$0.056	\$0.058	\$0.057

Gas	\$/therm				
		2019	2020	2021	2019-2021
	Berkshire Gas	\$0.736	\$0.751	\$0.745	\$0.744
	Columbia Gas of MA	\$0.560	\$0.566	\$0.579	\$0.568
	Eversource	\$0.614	\$0.628	\$0.643	\$0.628
	Liberty Utilities	\$0.623	\$0.647	\$0.651	\$0.640
	National Grid	\$0.723	\$0.730	\$0.759	\$0.737
	Unitil	\$0.803	\$0.798	\$0.785	\$0.795
	Total	\$0.662	\$0.670	\$0.691	\$0.674