

# Beneficial Electrification & Building Decarbonization - You Can't Have One Without The Other!

Patrick McCoy, Sacramento Municipal Utility District  
November 4<sup>th</sup>, 2019

# Sacramento Municipal Utility District (SMUD)

Electric utility

Community-owned not-for-profit

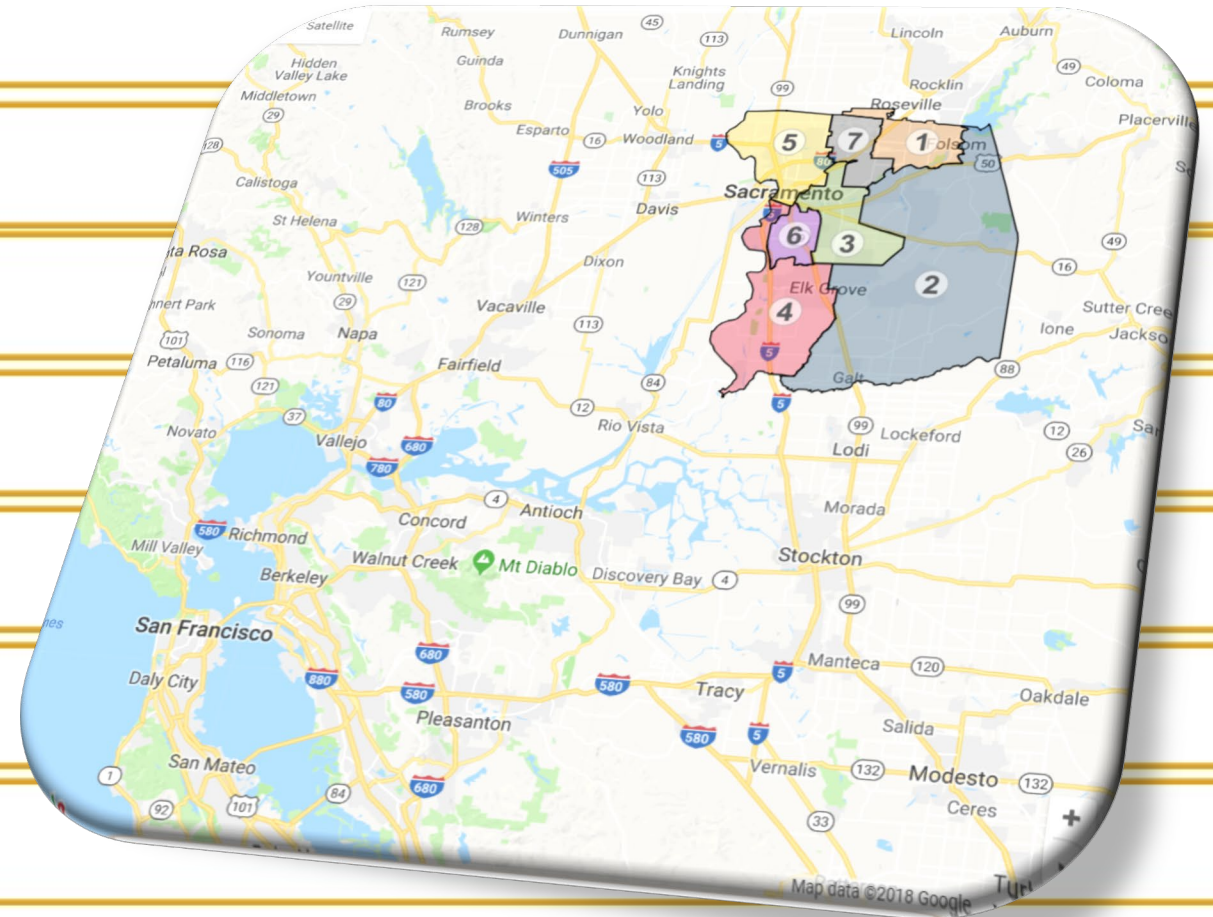
Established 1946

Population 1.5 million

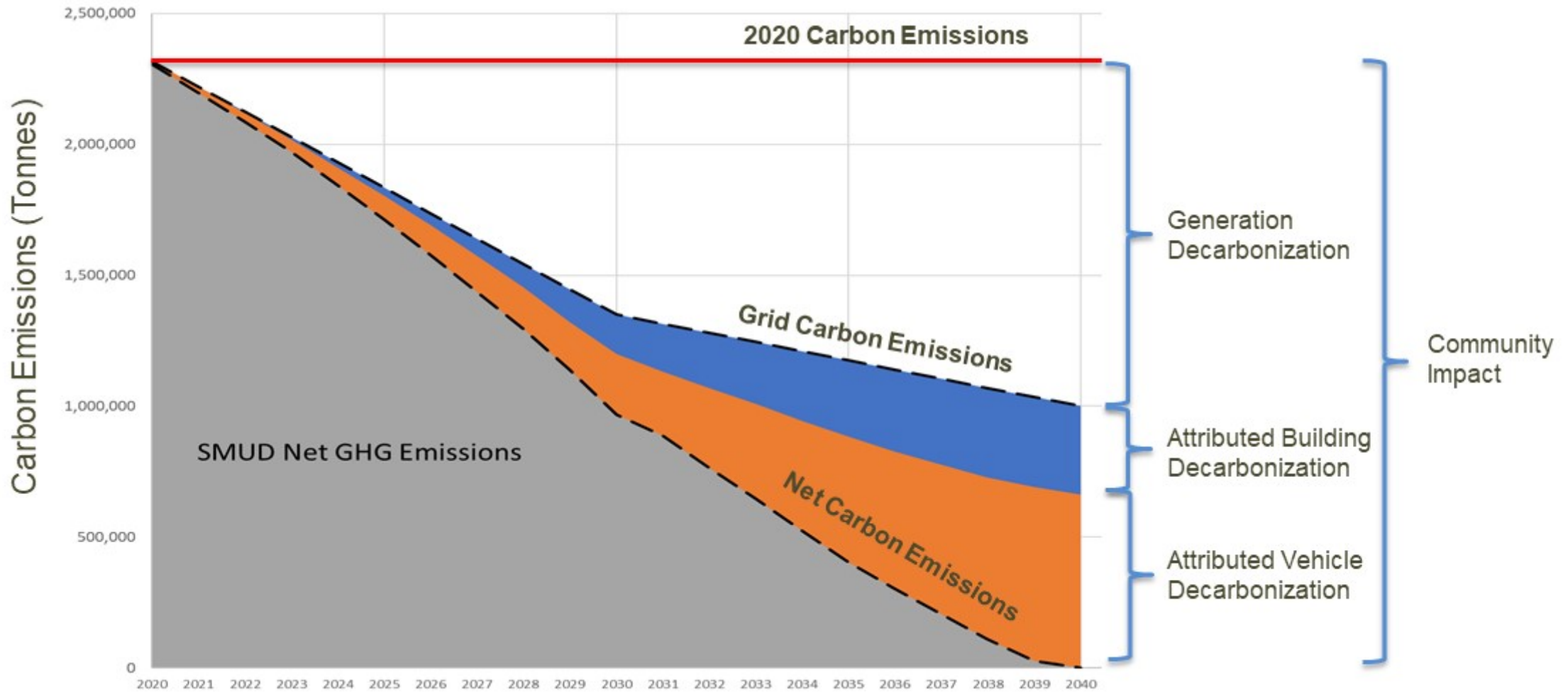
2,219 employees

50% carbon free electricity

626,460 accounts



# SMUD's Net Zero Carbon Plan



# Path to Electrification Programs

## 1) Calculate the carbon equivalence between electricity and gas

- Use to claim electrical savings from electrification

## 2) Calculate the value of electrification to the utility

- Hint, it is much more than net revenue times new load
- With this, set incentives

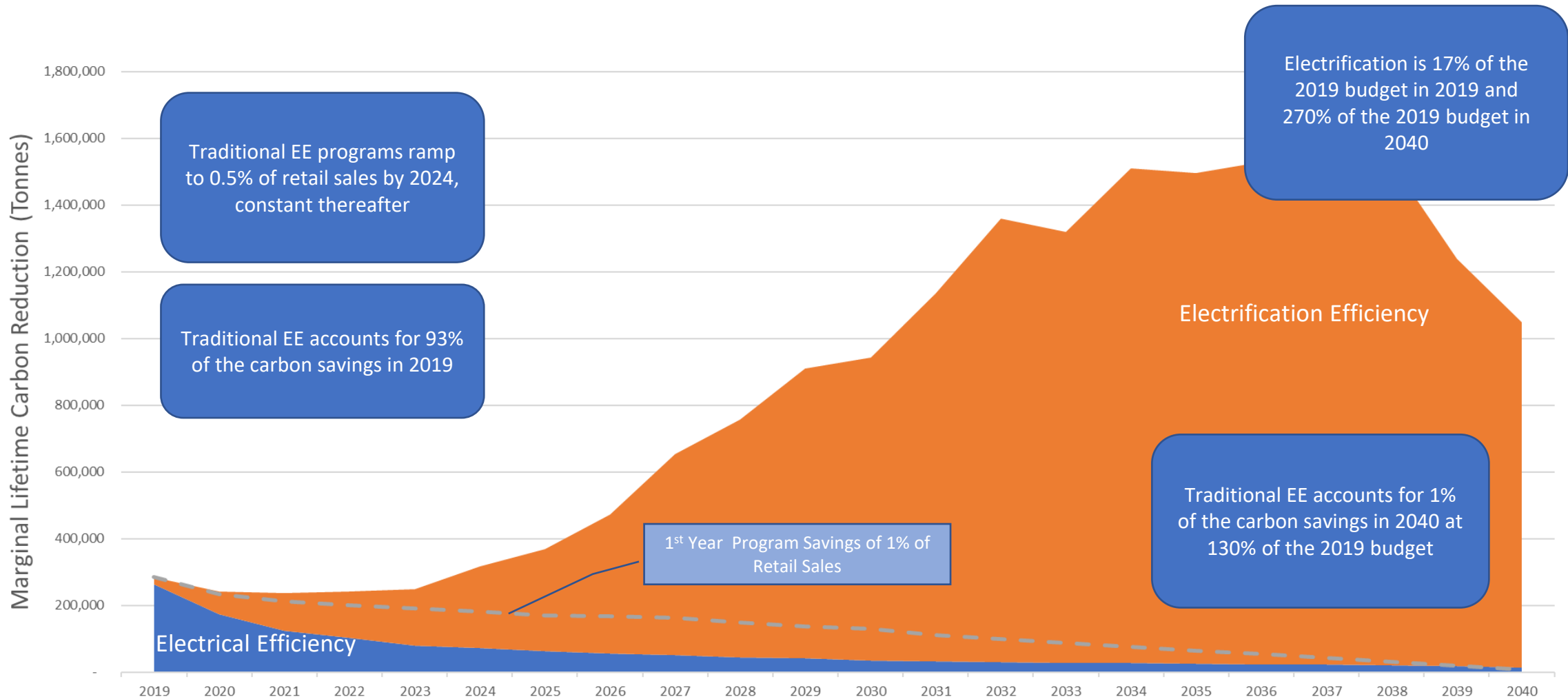
## 3) Calculate the hourly long term marginal emissions

- Use to change the metric used to manage EE programs

# SMUD Electrification Programs

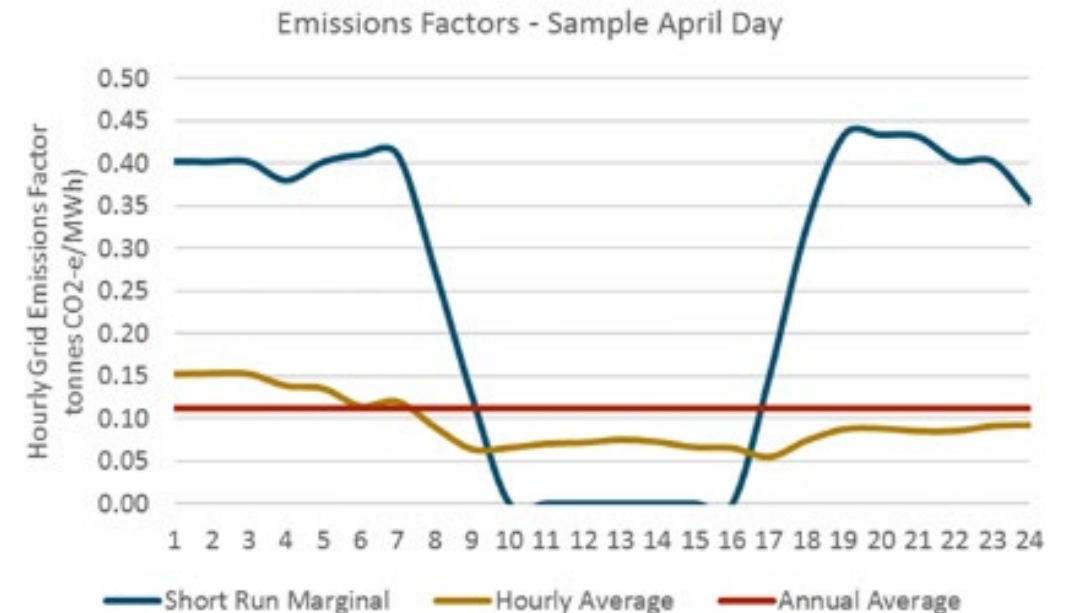
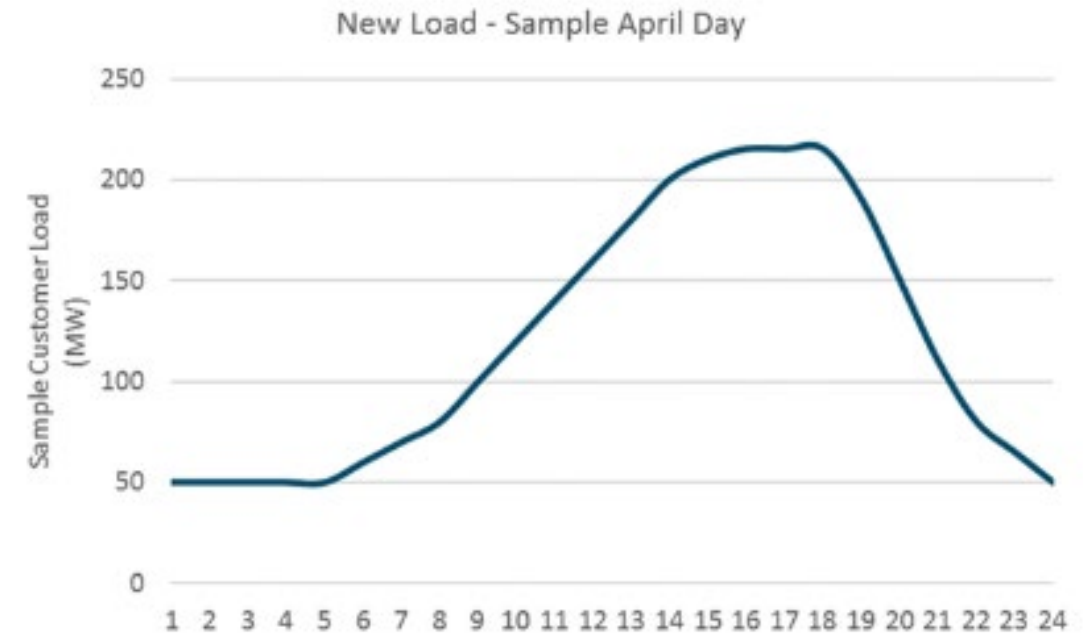
	Launch Date	Total Possible Incentive	Base Incentive	HP-HVAC	HPWH	Induction	Bonus
<b>Single Family New Construction</b>	March 2018	<b>\$7,000</b>	\$4,000	Inc	Inc	\$1,000	\$2,000
<b>Multifamily New Construction</b>	March 2018	<b>\$1,750</b>	\$1,250	Inc	Inc	\$500	x
<b>Single Family Existing</b>	May 2018	<b>\$10,500</b>	n/a	\$4,500	\$3,000	\$500	\$2,500 <sup>1</sup>
<b>HPWH Equipment Efficiency</b>	June 2018	<b>\$3,000</b>	\$3,000	n/a	Inc	n/a	x
<b>Multifamily Existing</b>	December 2018	<b>\$2,500</b>	n/a	\$1,000	\$1,000	\$500	x
<b>HPWH Direct Install Program</b>	3 <sup>rd</sup> Quarter 2019	<b>\$3,000</b>	n/a	n/a	n/a	n/a	x
<b>HP-HVAC Equipment Efficiency</b>	3 <sup>rd</sup> Quarter 2019	<b>\$4,500</b>	\$1,500	\$2,500	n/a	n/a	\$500 <sup>2</sup>

# Programmatic Building Carbon Reduction



# Temporal Aspects of EE

- Traditional EE and Electrification EE measures operate in hours both above and below the annual average emissions intensity target
- Programmatic Carbon: the summation of hourly marginal carbon savings for every year of the measure's life



# Carbon Savings Over Time

Programmatic Carbon is the lifetime long term marginal emission carbon reduction

Measure Installed in 2020	Carbon Reduction (tonnes)		First Year kWh Savings
	Annual Average	Programmatic	
Whole House Fan	1.43	2.85	567
HPWH	11.55	11.00	3,751
Heat Pump HVAC	25.38	22.81	8,212
AC - 16 SEER	1.09	1.74	513

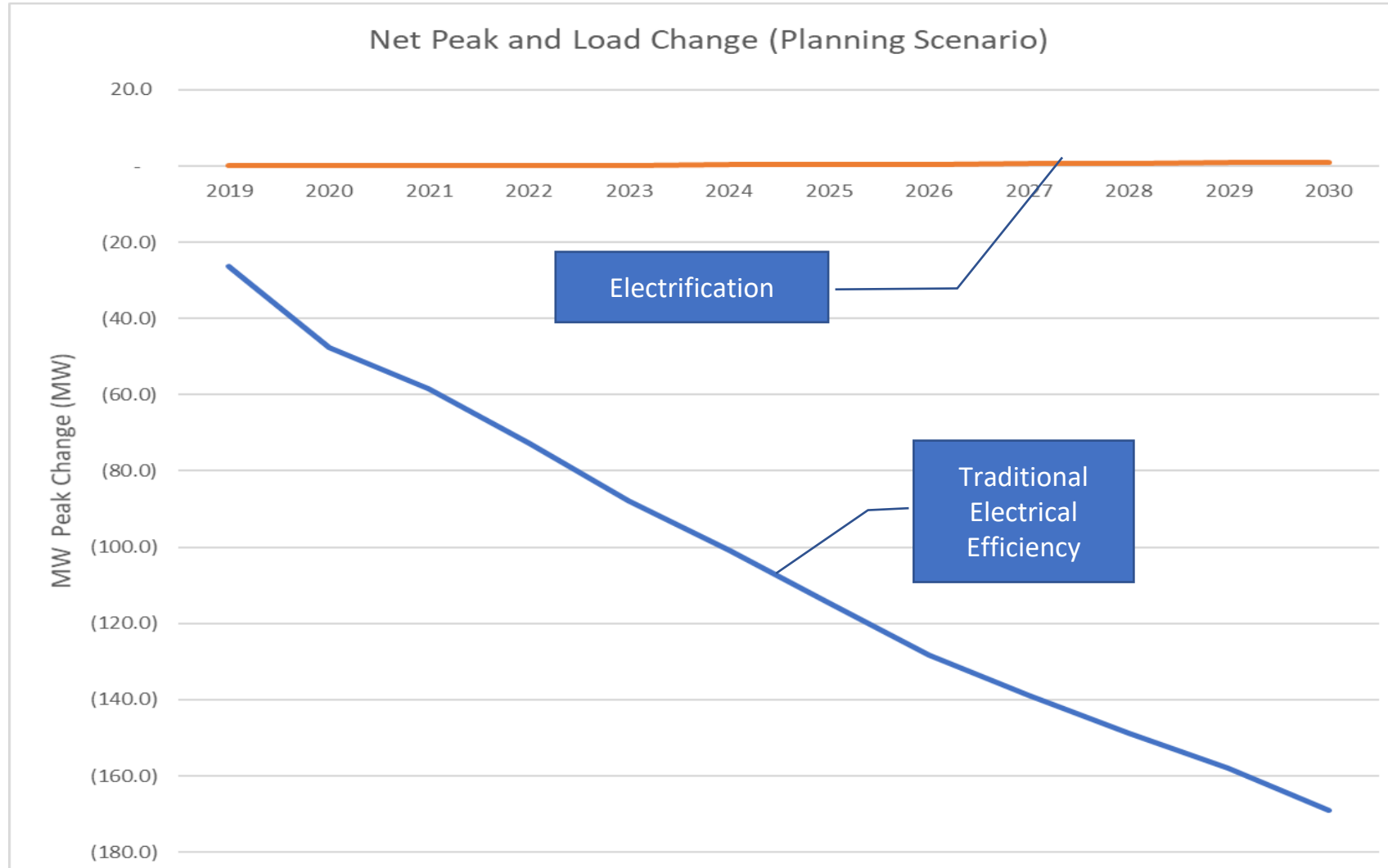
Measure Installed in 2040	Carbon Reduction (tonnes)		First Year kWh Savings
	Annual Average	Programmatic	
Whole House Fan	0.23	0.86	567
HPWH	12.75	12.97	4,129
Heat Pump HVAC	27.93	28.96	9,040
AC - 16 SEER	0.21	0.34	513



# Existing Building Program Outcomes

	Incentive	2018 (7 mo.)	2019 (to date)	2020	2021
HPWH – Total	\$3,000	150	722	1,000	1,500
HPWH - Plumbers		99	624		
HPWH - GCs		51	98		
HP-HVAC - Total	\$4,500	162	399	1,750	2,500
HP-HVAC - C20s		<i>n/a</i>	5*		
HP-HVAC - GCs		162	394		
Single Family New	\$5,000	35	63	550	850
Multifamily New	\$1,750	0	16	175	300

# Peak and Load Factor Changes



Grid Utilization  
Increases 9%

Load factor improves and peak decreases

# Future Outlook

*We have always forecasted demand and managed supply, we see the future as forecasting supply and managing demand.*

# Thank You!

Patrick McCoy  
Patrick.McCoy@smud.org