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SMUD Residential Electrification Project Costs

Additional submitted attachment is included below.

SMUD Electrification Installation Costs

Sacramento Municipal Utility District (SMUD) has been running a heat pump water heater (HPWH) rebate program since 2018 and a space heating heat pump program since late 2019. Gas water heaters and furnaces being converted to heat pumps are funded through the SMUD building electrification efforts, while the electric resistance water heaters and space heaters being replaced are funded through the SMUD energy efficiency efforts. As the programs have grown, enough project cost data has been collected to produce program-wide aggregated average costs for HPWH and space heating heat pump installations.

Heat Pump Water Heaters

The gas-to-electric HPWH rebate was set at \$3,000/unit in May 2018 and was reduced to \$2,500/unit as of April 2020, which is noted in Figure 1. The electric-to-electric HPWH rebate is currently \$500/unit. The data in Table 1 is separated by 50-gallon storage units and 65- & 80-gallon storage units to show potential cost increase of more storage as well as to note that most units being installed are 50-gallon. The “Cost/Unit” metric is simply the average cost for the specific technology per unit, with most installations including just one unit. The data in Figure 1 shows the monthly installations of just the 50-gallon gas-electric projects starting in May 2018, as well as the average cost/unit, maximum cost/unit, minimum cost/unit, and a standard deviation on either side of the average.

Table 1: HPWH Project Costs

SMUD Residential Heat Pump Water Heater Total Project Costs									
Technology		2018		2019		2020		Total	
		Cost/Unit	Count	Cost/Unit	Count	Cost/Unit	Count	Cost/Unit	Count
50-gal	Gas to Electric	\$ 3,763	114	\$ 4,291	1,005	\$ 3,983	531	\$ 4,155	1,650
	Electric to Electric	\$ 3,299	51	\$ 3,747	99	\$ 3,769	37	\$ 3,629	187
	All	\$ 3,619	165	\$ 4,242	1,104	\$ 3,969	568	\$ 4,101	1,837
65/80-gal	Gas to Electric	\$ 3,781	9	\$ 4,578	25	\$ 4,381	30	\$ 4,374	64
	Electric to Electric	\$ 3,813	3	\$ 3,806	12	\$ 4,003	6	\$ 3,863	21
	All	\$ 3,789	12	\$ 4,328	37	\$ 4,318	36	\$ 4,247	85

¹ Total project costs are assumed to include equipment, labor, permits, and profit, but these items are not collected by SMUD - some total costs may include additional costs or exclude some items.

² SMUD gas-to-electric HPWH incentive level of \$3,000/unit began in May 2018 and went down to \$2,500 in April 2020; the electric-to-electric incentive level is currently \$500/unit.

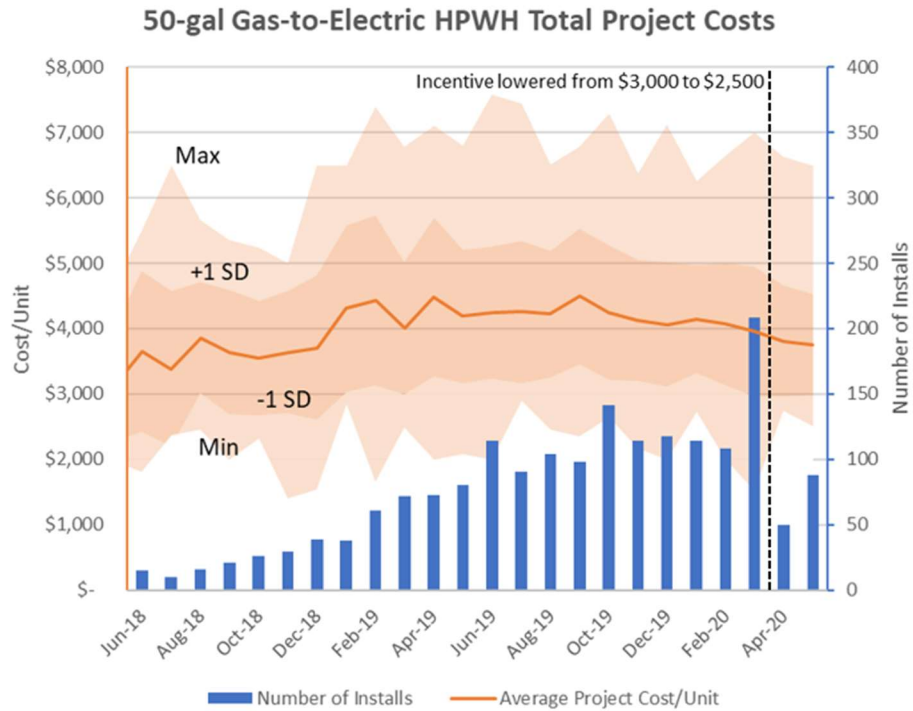


Figure 1: Monthly HPWH Installs and Project Costs

Space Heating Heat Pumps

The SMUD gas-to-electric HP for space heating rebate started at \$2,500 in late 2019, with an additional \$1,500 rebate for the air conditioning provided by the heat pump and a \$500 bonus rebate for airflow. Due to COVID-19-related economic considerations, the AC and airflow rebates were paused, but a \$500 rebate has since been reintroduced for the AC. The electric-to-electric rebate for space heating HP has remained at \$750 with the same additional rebate available as the gas-to-electric projects. The data in Table 2 is split into bins of efficiency (HSPF from 8 to 10 and HSPF greater than 10), technology (2-stage or variable), and equipment type (package, split or minisplit unit). The costs shown are average costs per ton of conditioning for the given HP, which allows comparison of different sized units. Generally, the units are from two to five tons.

It is important to note that the units eligible for this program exceed Title 24 standards, given that they must be 2+ stages or variable units. This may lead to higher costs than general heat pump installations statewide.

Table 2: Space Heating HP Project Costs by Technology

SMUD Residential Space Heating Heat Pump Total Project Costs/Ton					
Technology		Gas-to-Electric		Electric-to-Electric	
		Cost/Ton	Count	Cost/Ton	Count
HSPF 8 to 10, 2-stage	Package HP	\$5,194	119	\$4,279	49
	Split HP	\$4,652	206	\$4,706	88
HSPF ≥ 10, 2-stage	Split HP	\$5,198	32	\$4,713	11
HSPF 8 to 10, Variable	Split HP	\$5,953	79	\$5,331	18
	Minisplit HP	\$5,395	12	\$5,007	3
HSPF ≥ 10, Variable	Split HP	\$5,691	78	\$6,085	12
	Minisplit HP	\$5,464	54	\$5,319	3

¹ SMUD HP program requirements for split/minisplit: ≥2-stage (or variable), HSPF 8.2 or greater, must service entire home. Package: ≥2-stage (or variable), HSPF 8 or greater. These exceed Title 24 standards, and thus costs may not be comparable to other program/statewide estimates.

² Total project costs are assumed to include equipment, labor, permits, and profit, but these items are not collected by SMUD - some total costs may include additional costs or exclude some items.

³ Gas-to-electric rebate is \$2,500 and electric-to-electric is \$750. \$2,000 in additional rebates for AC & airflow have been reduced to \$500 as of Aug. 2020 due to COVID-19 economic considerations.