

City of Piedmont COUNCIL AGENDA REPORT

DATE: March 21, 2022

TO: Mayor and Council

FROM: Sara Lillevand, City Administrator

SUBJECT: Receipt of Energy Use Report for the Piedmont Community Pool
Conceptual Design

EXECUTIVE SUMMARY

As part of the Schematic Design (SD) package for the Piedmont Community Pool, potential electrification of the approved conceptual design was analyzed for feasibility and cost. The Energy Use Report (Report) from Guttman & Blaevoet Consulting Engineers is attached to this report. While we are not aware of any municipality currently heating its pools with electricity, the analysis indicates that it is feasible to electrify the entire facility with a combination of electric heat pumps, photovoltaic/thermal (PVT) panels, and integration with the clean electrical grid. It is not feasible for this project to generate all of its electricity needs on-site and the project would require reliance on the grid to heat the pools. The upfront construction cost for electrification, in excess of traditional natural gas heating, was estimated in February at roughly \$500,000 which is reflected in the Report. With final SD cost estimates received in March, the upfront additional construction cost to go all-electric could be as high as \$600,000. While difficult to predict gas and electricity costs in to the future, current projections via a 25-year life cycle cost analysis project a payback period of 15.8 years for full electrification. Regardless of the utility rates over the lifetime of the pool, the upfront construction costs for an all-electric facility are substantial, especially considering the SD estimates for the entire project which were discussed in the previous agenda item.

BACKGROUND

CLIMATE ACTION PLAN

On March 19, 2018, the City Council adopted the Piedmont Climate Action Plan 2.0 (CAP 2.0), which includes the goal of reducing in-territory greenhouse gas (GHG) emissions (i.e., emissions occurring within City limits) 40% below 2005 levels by 2030 and 80% below 2005 levels by 2050. Piedmont's progress toward achieving its GHG emission reduction targets is measured on an annual basis and summarized in an emissions inventory. The inventory includes estimates for both municipal (i.e., City Government) and community GHG emissions (municipal GHG emissions + community GHG emissions = in-territory GHG emissions). Since the City began conducting GHG inventories over a decade ago, municipal GHG emissions have consistently comprised between two (2) and four (4) percent of Piedmont's total in-territory emissions.

Compared to overall community emissions, municipal emissions (city buildings and facilities, employee commute, vehicle fleet, streetlights and traffic signals, and solid waste) are a very small share of Piedmont's total in-territory GHG emissions.

The majority of municipal GHG emissions are attributed to transportation-related activities (i.e., vehicle fleet and employee commute), while buildings and facilities contribute less than a third of municipal emissions. Of the emissions from municipal buildings and facilities, natural gas use is the largest contributor in this sector. Historically, the overwhelming majority (>75%) of natural gas use in municipal buildings and facilities came from heating the old Community Pool at 777 Magnolia Avenue. Nonetheless, the old Community Pool consistently contributed less than 20% of total municipal emissions and less than 1% of total emissions contributed by the Piedmont community's residential sector.

In 2018, all municipal and residential accounts were enrolled into Alameda County's local community choice aggregator, East Bay Community Energy's (EBCE), "100% Renewable" energy service plan. This has resulted in a significant reduction in both municipal and community wide GHG emissions associated with electricity. However, it does not affect natural gas use, which has been incrementally increasing over the last several years. In order for Piedmont to meet its CAP 2.0 goals, natural gas use in all homes and buildings throughout the community will need to be significantly reduced.

ENERGY USE REPORT

The Report documents the energy and facility performance metrics for the Community Pool schematic design. The Report provides detailed life cycle cost analysis (LCCA) estimates for two major options for the facility: a gas fired system and an all-electric heat pump system. In both options the building is fully electric, and the fuel source changes for the pools which represent over 80% of the total site energy. Additionally, both options are presented with and without solar PVT panels, which are designed to produce both electrical and thermal energy. The solar PVT panels are estimated to yield 63 kilowatts of power and occupy 37% of the building's rooftop area. Unsurprisingly, the report estimates the inclusion of solar PVT panels in either the gas fired system, or all electric system will yield lower energy consumption levels, measured in therms and kWh respectively. The associated costs with either electricity or natural gas consumption are based on East Bay Community Energy and Pacific Gas and Electric rates. The estimated GHG emissions for the various options are notable, ranging from 260 MT CO₂e estimated for the gas fired system with no solar PVT panels to zero MT CO₂e for the all-electric solution. The GHG emissions estimated for the gas fired system (with or without solar PVT panels) in the new Aquatic Facility will be nearly 1.5 times greater than the old Community Pool, while the GHG emissions for the all-electric system will reflect a 100% decrease.

COST ANALYSIS GAS vs. ELECTRIC

High level 25-year life cycle cost analysis of all electric versus gas heated pools is illustrated below. The cost data presented to the Pool Advisory Committee (PAC) on February 17, 2022 and reflected in the Energy Use Report is now outdated. Updated information will be available before April 4, 2022.

	HYBRID Gas Pools + Electric Building with Solar PVT Panels		ALL-ELECTRIC Electric Pools + Electric Building with Solar PVT Panels	
	2/17/2022 PAC meeting estimate	3/3/2022 updated Estimate	2/17/2022 PAC meeting estimate	3/3/2022 updated Estimate
Upfront Construction Cost (Labor + Materials)	\$870,000	\$1,000,000	\$1,340,000	\$1,600,000
25 Year Total Estimated Life Cycle Cost (includes upfront construction costs)	\$3,050,000	TBD	\$2,600,000	TBD
Total Lifecycle Cost Savings (as compared to gas pools and electric building without PVT)	\$699,000	TBD	\$1,783,000	TBD
Payback Period	8.4 years	TBD	15.8 Years	TBD

Financial calculations in the Report are based on the current City of Piedmont Electricity rates from East Bay Community Energy (Energy Commodity), Pacific Gas & Electric electricity (Transmission & Distribution), and Pacific Gas & Electric gas rates from the 2019 existing site bills. The life cycle cost analysis is completed for a 25-year period with 3% real discount rate, 2% escalation on electricity, and 8% escalation on natural gas rates. This comes at a time when the natural gas market has grown increasingly volatile, with gas prices reaching record levels, thus causing electricity rates to increase as well. It is expected that California's regulatory market for decarbonization will drive fossil fuel energy rates even higher than the 8% estimate. Electricity rates are traditionally less volatile than natural gas but still difficult to predict and likely to escalate.

The analysis indicates the all-electric facility which will require an additional \$600,000 in upfront cost, provides approximately \$1,000,000 more cost savings over the 25-year period studied as compared to the hybrid option, while also reducing carbon equivalent emissions to zero. The payback period for the all-electric facility is anticipated at 15.8 years as compared to 8.4 years for the hybrid facility.

NEXT STEPS

In order to proceed most efficiently through the design development process during this time of extreme inflationary pressure, it would be wise to make a determination soon relative to pool heating. Staff intends to update the lifecycle costs and cost savings as well as projected payback period based on the design revisions presented under the previous agenda item. Staff will present to the Council an associated revised cost estimate that is currently in progress at your next regular meeting of April 4th for consideration of a decision on whether to proceed with natural gas or electricity for heating the pools.

ATTACHMENTS

- A) Energy Use Report

ENERGY USE REPORT

For the

Piedmont Aquatics Center



March 4, 2022

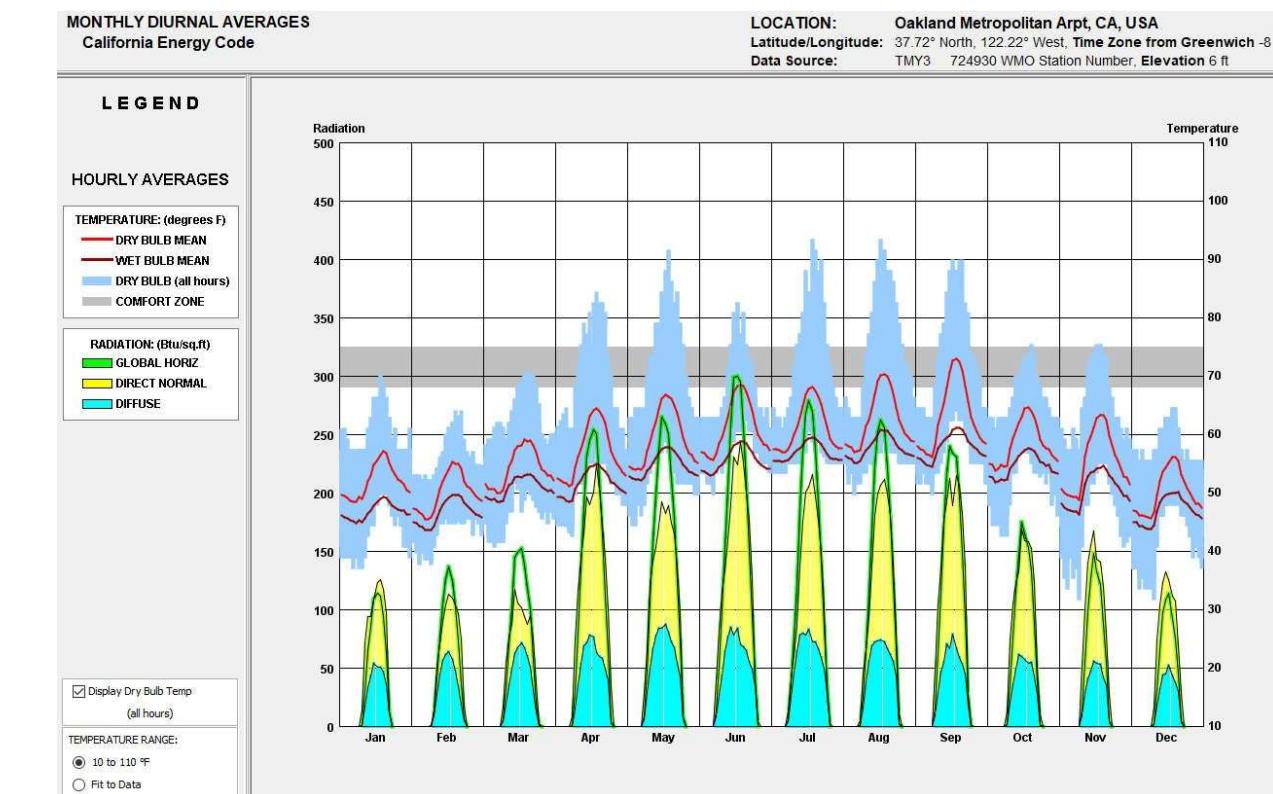
1.0 Executive Summary

This report has been prepared by Guttmann & Blaevoet Consulting Engineers under contract with ELS Architecture to document the energy and building performance metrics for the Piedmont Community Pool Center in Piedmont CA. This is the preliminary report summarizing the facility performance statistics from the Schematic Design level documents and supporting design narratives from the ELS Design team. The detailed life cycle cost analysis (LCCA) estimates for the design options for the project are outlined in this report. The LCCA report investigates two major options for the pools, a gas fired system and an all-electric heat pump solution. In both options the building is fully electric and the fuel source changes only for the pools which represent over 80% of the total site energy. These two options are shown with and without the solar photovoltaic and thermal panels (PVT) to lay out the case for solar separately. The summary of findings provides a reasonable payback for the photovoltaic systems on either the gas or electrified facility.

1.1 Climate Considerations:

The City of Piedmont's climate zone is considered for the facility design including surrounding structures and potential for natural ventilation in the design. The site is relatively unobstructed from solar gains with only slight impact to the site from surrounding structures for wind potential.

The CA Climate zone 3 (closest to available data from the Oakland Airport) shows the potential spread of outdoor temperature conditions for natural ventilation, or economizing hours for the building. While this metric of "hours within a temperature range" is useful to determine outdoor conditions for natural ventilation or economizing potential it will not consider interior thermal gains that may impact comfort. The weather files utilized in the simulation for the energy use models are an average of temperatures over a 10 year period for simulation purposes and differ than the temperatures of a typical year or what is used for system sizing in load calculation. The peak design temps for load sizing are listed in the Basis of Design documents and noted below for reference.



MECH BOD: HVAC Design Criteria

1. Outdoor Design Criteria:
 - a) Summer Outdoor Design Conditions (0.4%) – 86°F DB, 66°F WB
 - b) Design Wet Bulb (0.5%) - 66°F WB
 - c) Winter Outdoor Design Conditions (Medium of Extremes) - 30°F DB
2. Indoor Design Criteria:
 - a) Heating Indoor Design Temperature - 68°F DB
 - b) Cooling Indoor Design Temperature - 74°F DB

1.4 Energy Projections for Schematic Design Package:

The energy use projections for the pools were simulated with the 100% schematic design layout and the mechanical, electrical, and plumbing basis of design documents produced by the design team. The assumptions for the whole facility simulation models are outlined in Appendix A for the SD package and will be updated as the design progresses through design development and final construction documents. The facility simulation schedules for the models are outlined in Appendix B and follow the occupant patterns outlined by the Isaac Sports Group who is estimating programming for the new Piedmont Pool. The pool heaters, pumps, and associated equipment are estimated based on typical operational schedules and follow the seasonal patterns for the pool heating.

The facility simulation engine EnergyPro Version 8.2 was used for the facility simulation and to estimate the pool energy use schedules and power consumption. The simulation engine for the conditioned spaces take into account the energy use from the architectural system impacts on mechanical, lighting, and electrical loads based on the operation schedules for the facility. This simulation process is similar to energy code (Title-24 Part 6) compliance but is simulated in the “non-compliance” calculation engine so that the actual schedules of operation can be used in place of code required daytime only occupancy. The occupancy schedule assumptions are again shown in more detail in Appendix B.

The energy use estimates for the pool heating were sequenced to follow typical seasonal outdoor temperature profiles for heating use impacts on the heat pump array. There is no commercially available energy simulation tools for pools of this size and scale with heat pump sources of energy so the energy estimates are designed to mimic the energy use patterns and kW draw of the heat pump arrays to meet the heating needs of the pools. The energy use estimates take into account pool surface loss, makeup water due to splash & evaporation, and the heat loss to ambient conditions at night considering the pools are covered each night with minimal surface covers. The heat pump arrays for the pools are designed to elevate the entire pool temperature to the operational temperature when the pools are originally filled or refilled for maintenance. The typical operation of the array is expected to be at most 60-70% of the total array capacity in a regular operation even in extreme temperatures as low as 32F once the pool volume is brought to operating temperature originally. For this reason the simulation tools utilize a “percent of total” capacity factor for energy use simulation purposes. The schedules estimated are included in Appendix B and create a reasonable expectation of energy use. Energy use estimates may vary depending on occupancy use patterns, such as increased filter loading or excessive water loss from splashing, or neglecting to install pool covers at night.

Two general options are considered for this life cycle cost analysis (LCCA) and each are shown with and without the contributions of the solar systems. The base design parameters for the building remain the same, the only difference between the two options shown below are for the energy source for the pools. Both basis of

designs for the gas fired pool and the heat pump arrays are outlined in Appendix A below. The solar options for the site include a 4800 SF array considering the DualSun Photovoltaic/Thermal panels that are designed to produce both electrical and thermal energy. The thermal energy is converted in both of these pool design options, gas fired boilers and heat pumps, into the equivalent thermal energy source, in this case therms for gas, and kWh for the heat pumps.

The financial calculations are based on the current City of Piedmont Electricity rates from East Bay Community Energy (Energy Commodity), Pacific Gas & Electric electricity (Transmission & Distribution), and Pacific Gas & Electric gas rates from the 2019 existing site bills. The life cycle cost analysis is completed for a 25-year period with 3% real discount rate, 2% escalation on electricity, and 8% escalation on natural gas rates. We provide an alternate calculation with the Department of Energy Fuel Escalation rates for the US energy sector as a conservative comparison but they have been historically low compared to California's energy sector. We expect that California's regulatory market for decarbonization will also drive fossil fuel energy rates much higher than the 8% estimation in this report due to emerging Cap & Trade pricing among other rate hikes for the fossil fuel sector. Historical prices in California are estimated below for the last few years as evidence that the 2% electricity and 8% escalation for natural gas are conservative for this project considering on site renewable energy will be designed as part of the project further stabilizing electricity rates for the site.

Construction Costs:

Base Design Gas Fired Pools (MEP Costs Only): \$550,750

Option 1: Gas Fired Pools + Photovoltaic/Thermal Panels: \$870,750

Option 2: All Electric Pool: \$1,008,525

Option 3: All Electric Pool + Photovoltaic/Thermal Panels: \$1,338,525

LIFE CYCLE COSTING SUMMARY								LCC-1		
Project Name Piedmont Pool LCCA								Date 3/4/2022		
ANNUAL ENERGY USE AND COST										
Option	Description	Electricity			Natural Gas		Simple Payback (years)			
		Consumption (kWh)	Demand (kW)	Cost (\$)	Consumption (therms)	Cost (\$)				
Base	Base Gas Fired Pool & Electric Building	350,922	0	\$64,533	42,627	\$54,406	N/A			
1	Base Gas Fired Pool & Electric Building + PVT	226,530	0	\$33,418	37,334	\$47,651	8.4			
2	All Electric Pool + Electric Building	688,807	0	\$115,126	0	\$0	120.1			
3	All Electric Pool + Electric Building + PVT	508,015	0	\$68,968	0	\$0	15.8			
LIFE CYCLE COST PRESENT VALUE										
Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacem. Costs	Residual Value	Total LCC	Savings
Base	\$550,750	\$0	\$0	\$1,424,670	\$2,668,657	\$0	\$0	\$0	\$4,644,078	\$0
1	\$870,750	\$0	\$0	\$737,756	\$2,337,319	\$0	\$0	\$0	\$3,945,826	\$698,252
2	\$1,008,525	\$0	\$0	\$2,541,593	\$0	\$0	\$0	\$0	\$3,550,118	\$1,093,960
3	\$1,338,525	\$0	\$0	\$1,522,580	\$0	\$0	\$0	\$0	\$2,861,105	\$1,782,972
Study Parameters				LIFE CYCLE COST SAVINGS						
Study Period: 25 years				\$2,000,000						
Real Discount Rate: 3.0%				\$1,600,000						
<input type="checkbox"/> DOE/FEMP Escalation Rates Region: N/A				\$1,200,000						
Fuel Sector: N/A				\$800,000						
<input checked="" type="checkbox"/> Uniform Escalation Rates Electricity: 2.0%				\$400,000						
Natural Gas: 8.0%				\$0						

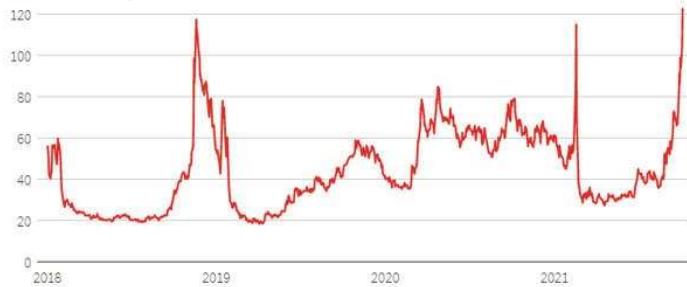
LIFE CYCLE COSTING SUMMARY								LCC-1									
Project Name: Piedmont Pool LCCA								Date 3/4/2022									
ANNUAL ENERGY USE AND COST																	
Option			Description			Electricity		Natural Gas									
Option			Consumption (kWh)	Demand (kW)	Cost (\$)	Consumption (therms)	Cost (\$)	Simple Payback (years)									
Base	Base Gas Fired Pool & Electric Building		350,922	0	\$64,533	42,627	\$54,406	N/A									
1	Base Gas Fired Pool & Electric Building + PVT		226,530	0	\$33,418	37,334	\$47,651	8.4									
2	All Electric Pool + Electric Building		688,807	0	\$115,126	0	\$0	120.1									
3	All Electric Pool + Electric Building + PVT		508,015	0	\$68,968	0	\$0	15.8									
LIFE CYCLE COST PRESENT VALUE																	
Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacem. Costs	Residual Value	Total LCC	Savings							
Base	\$550,750	\$0	\$0	\$1,157,774	\$1,147,843	\$0	\$0	\$0	\$2,856,367	\$0							
1	\$870,750	\$0	\$0	\$599,546	\$1,005,328	\$0	\$0	\$0	\$2,475,624	\$380,743							
2	\$1,008,525	\$0	\$0	\$2,065,453	\$0	\$0	\$0	\$0	\$3,073,978	(\$217,611)							
3	\$1,338,525	\$0	\$0	\$1,237,342	\$0	\$0	\$0	\$0	\$2,575,867	\$280,500							
Study Parameters				LIFE CYCLE COST SAVINGS													
Study Period: 25 years Real Discount Rate: 3.0% <input checked="" type="checkbox"/> DOE/FEMP Escalation Rates Region: Western US Fuel Sector: Commercial <input type="checkbox"/> Uniform Escalation Rates Electricity: N/A Natural Gas: N/A				<table border="1"> <thead> <tr> <th>Option</th> <th>Life Cycle Cost Savings (\$)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>~\$300,000</td> </tr> <tr> <td>2</td> <td>~-100,000</td> </tr> <tr> <td>3</td> <td>~\$250,000</td> </tr> </tbody> </table>						Option	Life Cycle Cost Savings (\$)	1	~\$300,000	2	~-100,000	3	~\$250,000
Option	Life Cycle Cost Savings (\$)																
1	~\$300,000																
2	~-100,000																
3	~\$250,000																

Fuel Escalation

Natural gas volatility surges to a record

The natural gas market is experiencing a series of wild swings as power crunches in Asia and Europe spur panicked buying to secure supply.

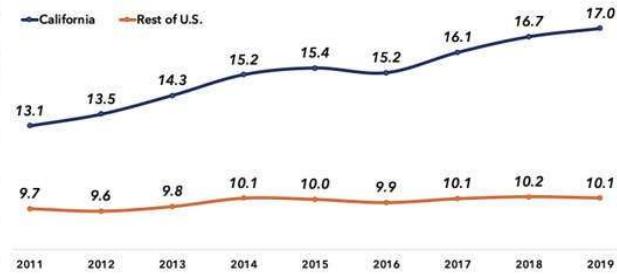
— Nat Gas Volatility



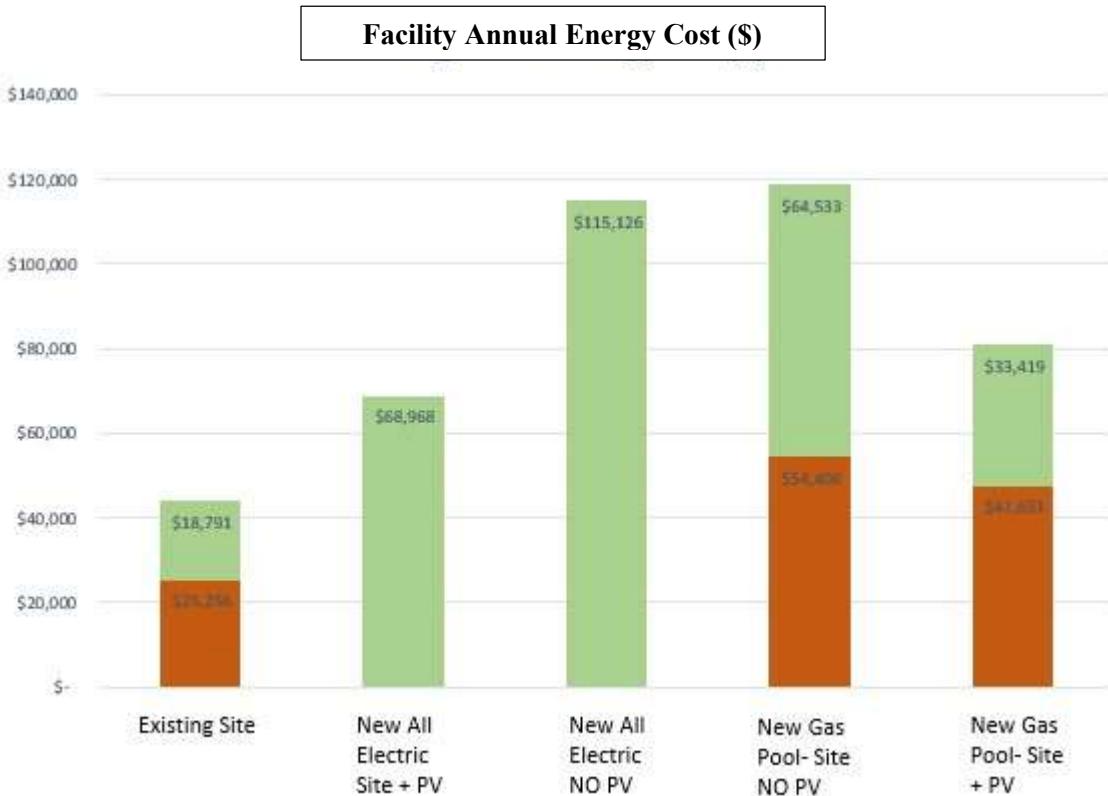
Note: Henry Hub natural gas futures implied volatility
Source: Refinitiv Eikon

Gas Escalation 2018 high to 2022 high = 200% in 4 years (50% year over year volatility)

California Electricity Prices vs. Rest of United States, 2011-19 (cents per kilowatt-hour)



California Electricity Escalation 2001 high to 2019 high = 22.9% higher over 9 years (2.5% year over year escalation)

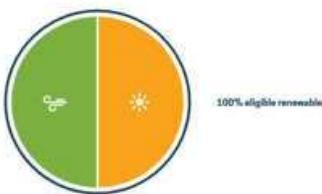


Facility Annual Emissions (Tons)



Existing Piedmont Pool Site Proposed New Site All Electric Proposed New Site All Electric NO SOLAR Proposed New Site Gas/Electric NO SOLAR Proposed New Site Gas/Electric

Facility Annual Emissions (Tons)



Existing Piedmont Pool Site Proposed New Site All Electric Proposed New Site All Electric NO SOLAR Proposed New Site Gas/Electric NO SOLAR Proposed New Site Gas/Electric

APPENDIX A: Building Assumptions

Architectural

- **Walls:**
 - R-21 Wood Framed Walls 16" On Center overall U-Factor of 0.071
 - Underground Walls, 6" Concrete overall U-Factor of 0.775
- **Roof:** R-38 Wood Framed Roof U-Factor of 0.025
- **Windows:** Solarban 70XL or equivalent insulated glass unit in thermally broken metal or non-metal framing (Ufactor of 0.45 or better, SHGC of 0.27 or better).
- The base case envelope assumes no significant operable windows or ventilation openings in the façade or energy savings due to natural ventilation controls.

Base Case Lighting:

- The Allowed Lighting power density for Title-24-2019 Standards is uses in these model options.
- The proposed operational lighting power density is 0.65 W/sf for the building.

Base Case Ventilation:

- Ventilation is modeled using the Title-24-2019 default ventilation requirement for each of the individual occupancies. Areas like the restrooms require more ventilation than normal and these areas have been adjusted to meet the minimum air change requirements outlined in the Basis of Design (BOD).
- Total Air Change Rates (ACH) are higher in Locker rooms at 6 total ACH

Base Case Occupant Density:

- Occupant density is currently defaulted to the Title-24-2019 occupancies defined by the California Energy Commission.

Base Case DHW Loads:

- Domestic hot water loads are assumed to be the default CEC allowances per space type defined.
- Proposed DHW system is based on the air to water heat pump systems.

Base Case Mechanical Systems -

- Offices, Reception & Lockers: Air-to-Air Energy Recovery Variable Refrigerant Volume VRF Heat Pump System.
- VRF air source energy recovery heat pump system (Daikin, Mitsubishi City-Multi, LG or equal).
- The condenser units can be mounted at grade or on the roof on a concrete base. Alternatively, the condensers could be mounted in the mechanical room space permitted.
- Fan Coil Units (FCU's) shall be required as follows:
 - Pool office (Ceiling cassette type)
 - Life Guard (Ceiling cassette type)
 - Staff area (Ducted type)
 - Entrance Lobby (Ceiling cassette type)
 - Elec/Telecom room (Wall mounted type).

Locker rooms (100% OSA ducted type) Base

Case Pool Heating Systems:

- Base Design: Aquatic Design Group are analyzing traditional gas fired boiler plus heat exchanger per pool.
 - Two (2) of gas fired high efficiency condensing boilers for the base case comparison:
 - 2,000,000 Btu's for the Yard Pool ○ 1,500,000 Btu's for the Activity Pool ○ Titanium plate and frame heat exchanger per pool design.
 - HEX-1 Bell & Gossett GPX Model #P64 Titanium Plate HEX 250 GPM.
 - HEX-2 Bell & Gossett GPX Model #P64 Titanium Plate HEX 205 GPM. ▪ Dedicated pumps per pool by ADG.
- Option-1: The G&B team are analyzing a solar thermal and photovoltaic system with hybrid heat pump including supplemental electric booster when needed.
 - The hybrid heat pump will be twenty-two (22) off hybrid heaters providing 100% of the steady state load during. Each heater will be equal to the Samsung model AG015KSVAJH/AA. 18kW for each of the units totaling 396kW for the heat pump array at full capacity.
 - Combination solar photovoltaic panels will provide 100% of the summer peak load. DualSun PVT panels or equal to produce 4,800 SF of available roof area. Thermal Energy Production shall be roughly 124,400 kWh/Year. PV Production (First Year) shall be 56,400 kWh/Year of equivalent thermal output for the pools.
 - Titanium plate and frame heat exchangers.
- HEX-1 Bell & Gossett GPX Model #P64 Titanium Plate HEX 250 GPM.
- HEX-2 Bell & Gossett GPX Model #P64 Titanium Plate HEX 110 GPM.
- HEX-3 Bell & Gossett GPX Model #P64 Titanium Plate HEX 190 GPM. ▪ HEX-4 Bell & Gossett GPX Model #P64 Titanium Plate HEX 205 GPM.

Base Case Energy Rates:

- Rate Schedule A1X Small General Time of Use/Brilliant 100
- PG&E GNR-1 Gas Rate

Base Case Emission Rates:

- East Bay Community Energy Emission Rate for Bright Choice: 0.5906 lbs of CO2e/kWh
- East Bay Community Energy Emission Rate for 100 Renewable Choice: 0.0 lbs of CO2e/kWh ▪ Pacific Gas & Electric Gas Emission Rate: 13.46 lbs of CO2e/Therm

Base Case Schedules of Operation:

- Schedules of operation follows the patterns noted by Stuart Isaac of the Isaac Sports Group noted below and modeled as such in the Appendix B simulation schedules.

SCHOOL YEAR-Weekdays

5:30 TO 6:00AM	15%
6-7	45%
7-8	45%
8-9	40%
9-10	35%
10-11	40%

11-12	50%
12-1PM	50%
1-2	50%
2-3	65%
3-4	85%
4-5	95%
5-6	95%
6-7	95%
7-8	80%
8-9	50%
9-9:30	25%

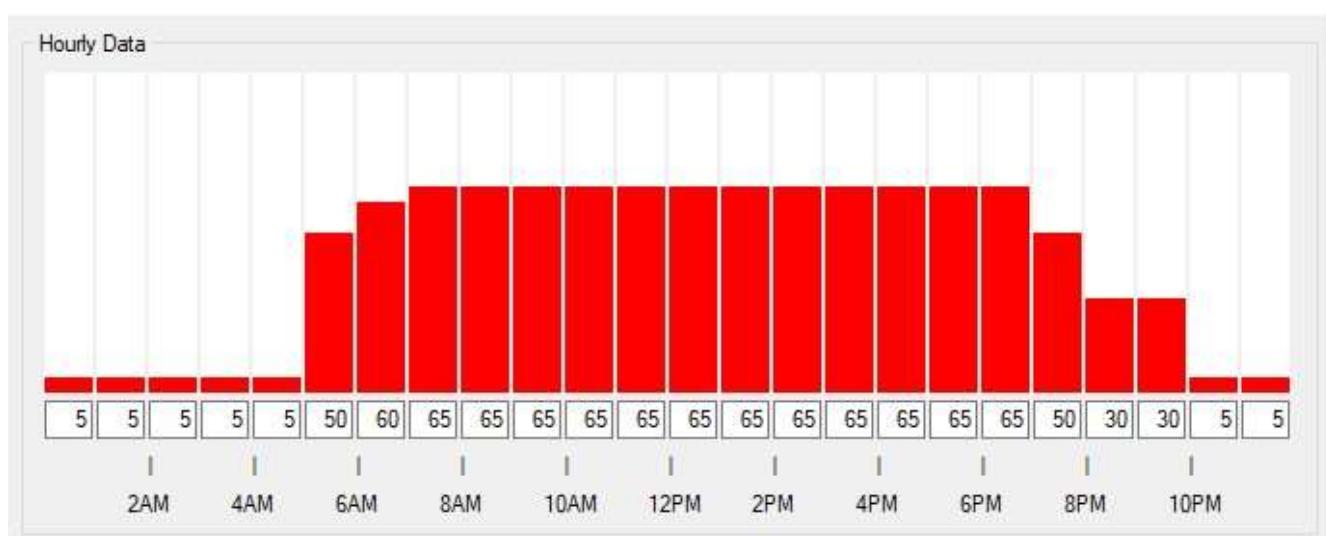
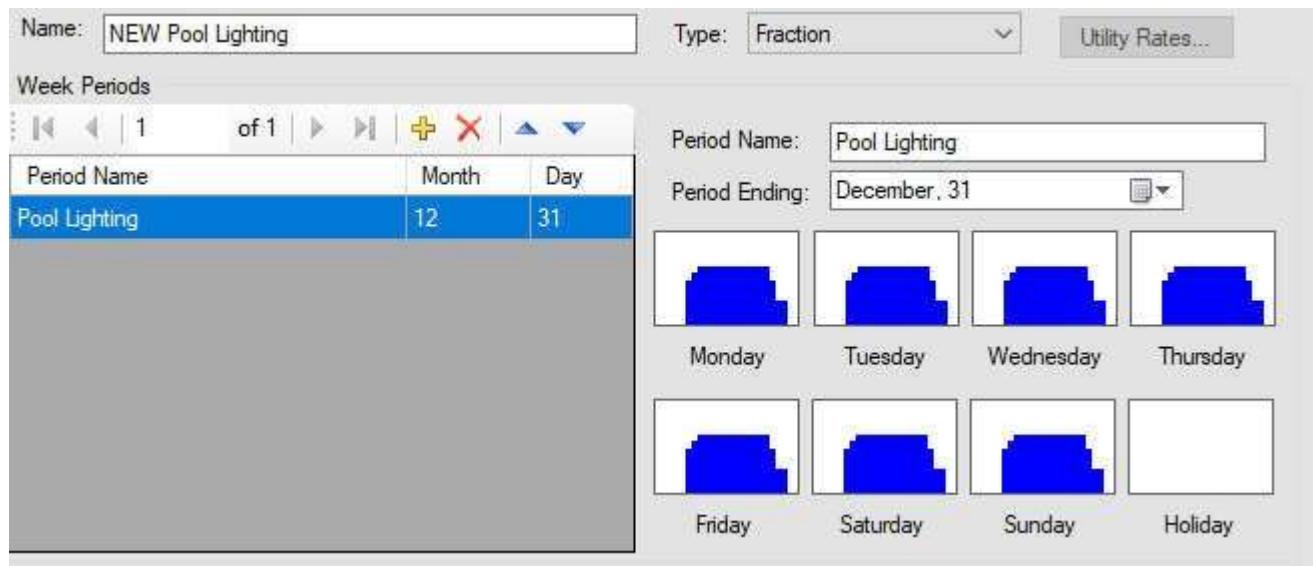
SUMMER-Weekdays

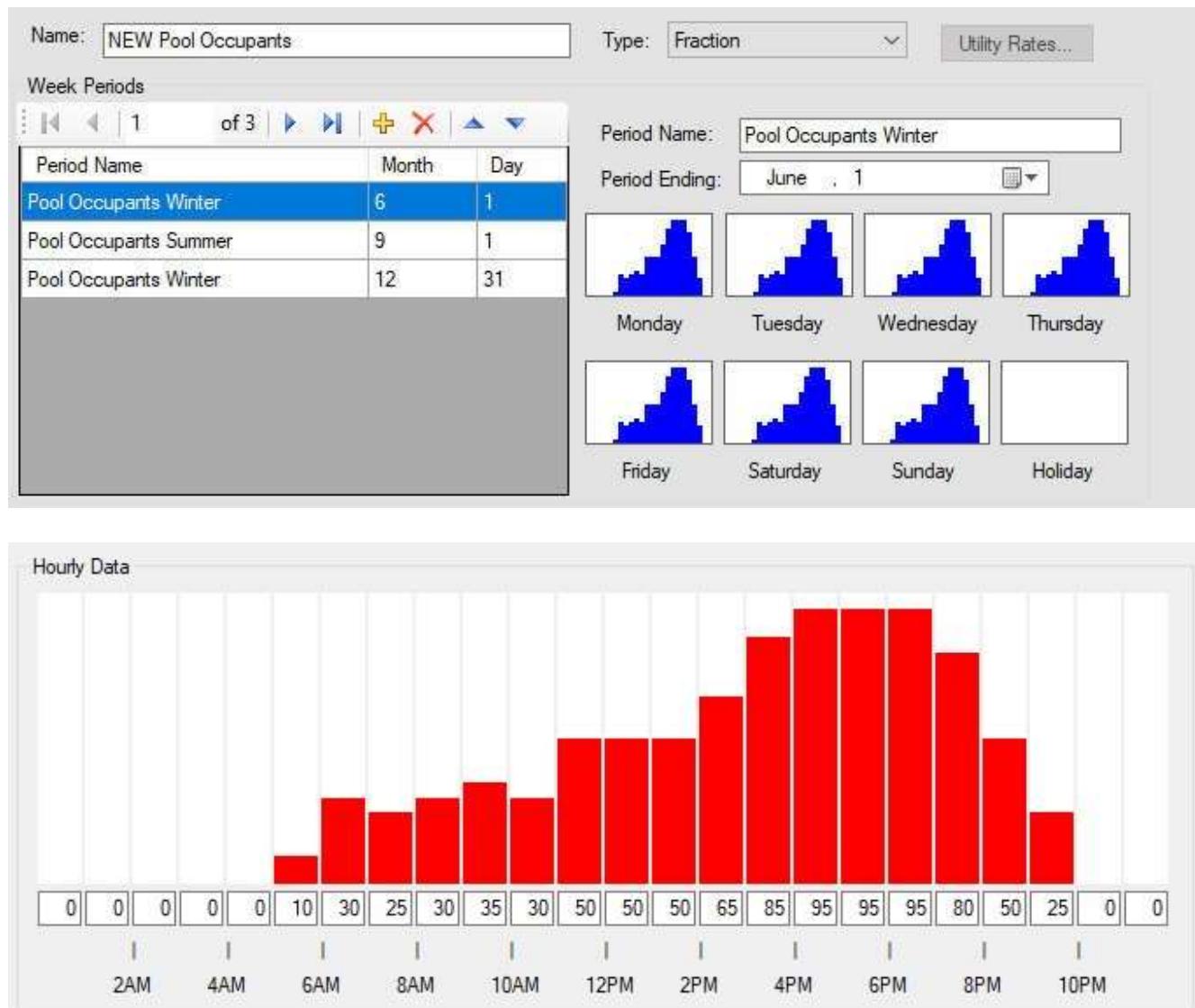
5:30 TO 6:00AM	10%
6-7	30%
7-8	35%
8-9	60%
9-10	90%
10-11	90%
11-12	90%
12-1PM	90%
1-2	80%
2-3	80%
3-4	80%
4-5	90%
5-6	90%
6-7	75%
7-8	60%
8-9	40%
9-9:30	5%

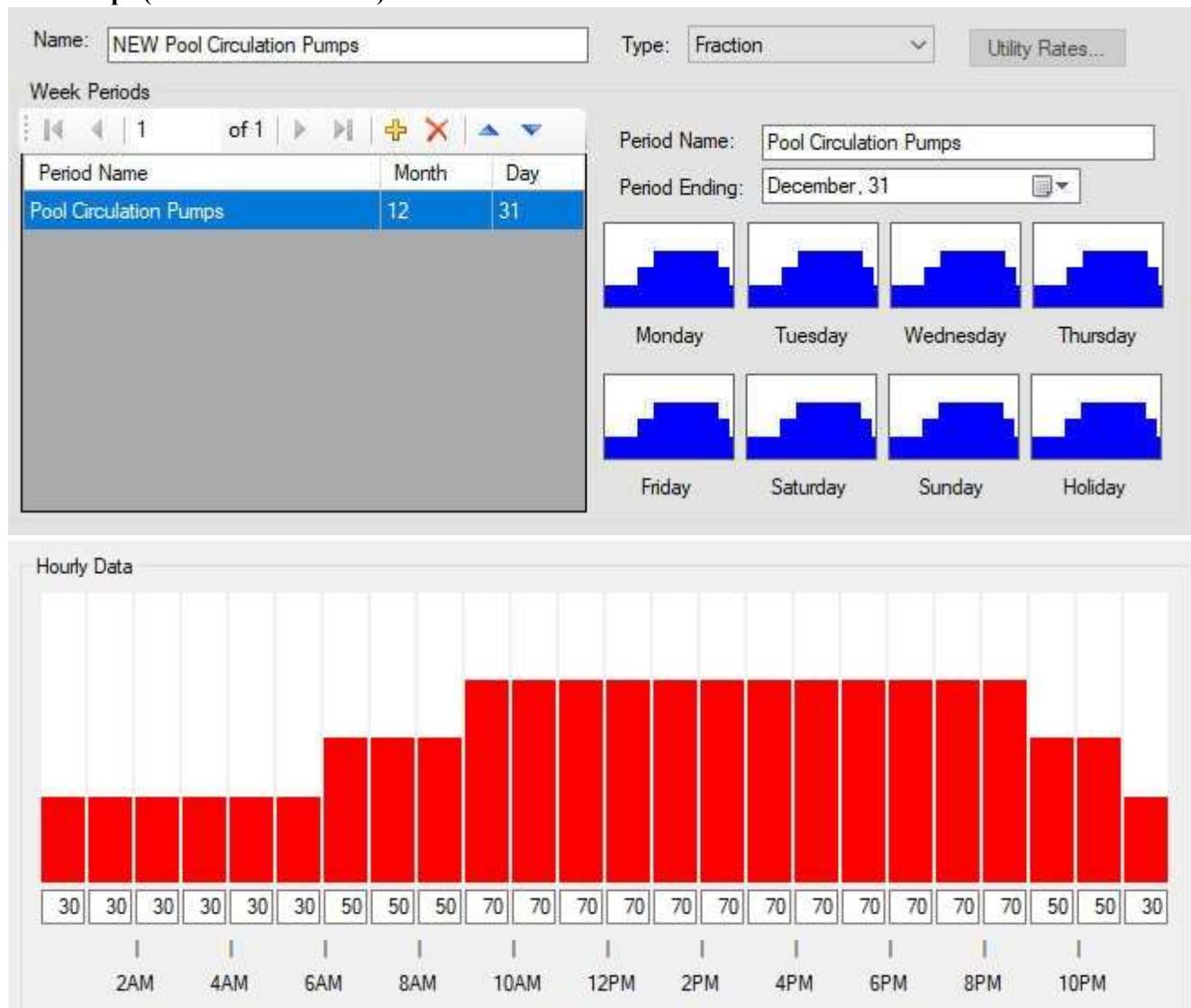
Process Energy Usage

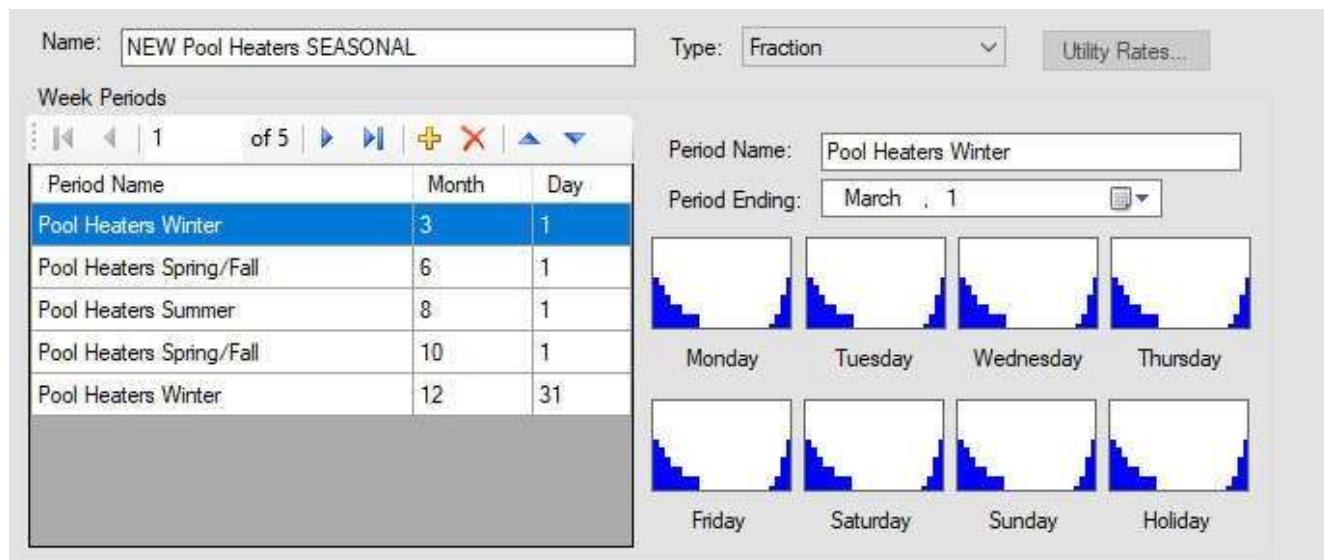
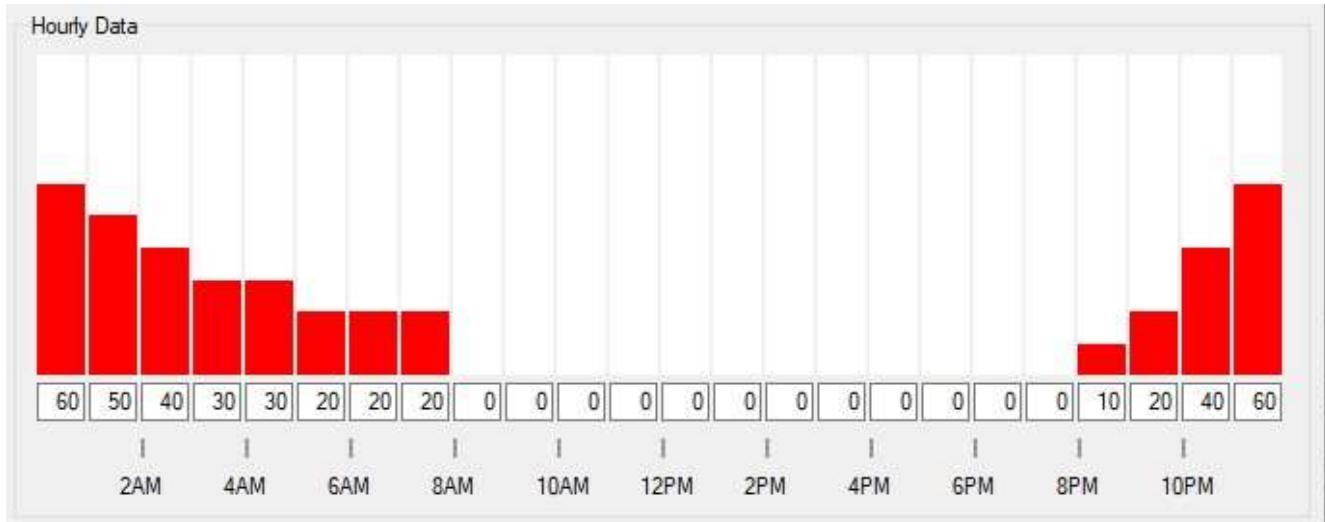
- Pool Pumps: 43kw running on Pump schedule outlined in Appendix B
- Pool Heaters: 396 kW running on Pool Heater schedule outlined in Appendix B **APPENDIX B: Simulation Schedules for occupancies:**

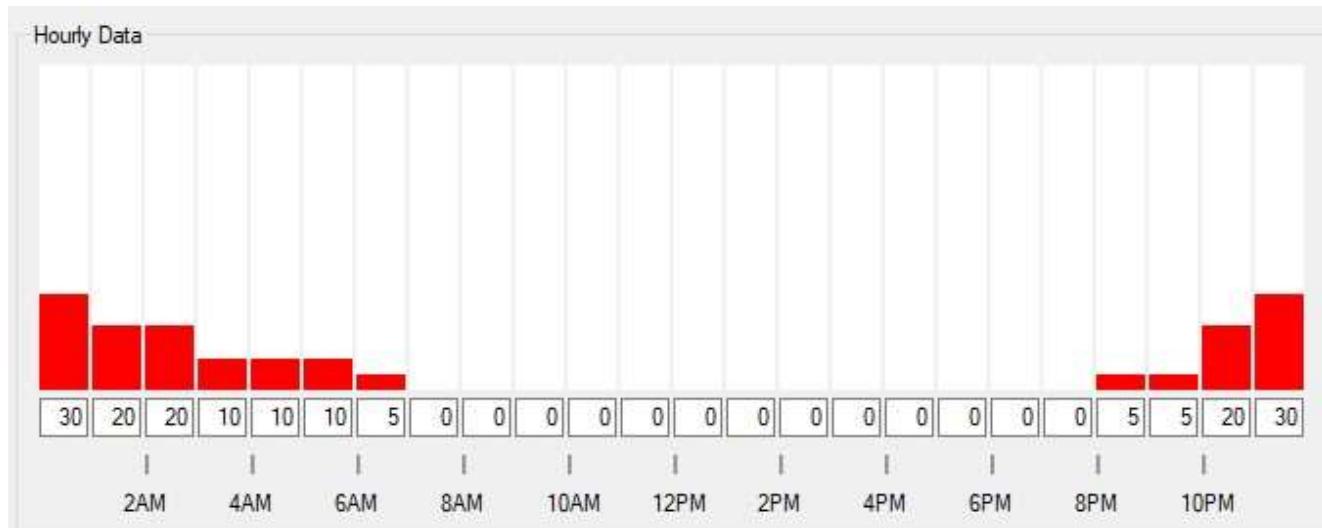
Lighting (Fractional Schedule):

**Occupants (Fractional Schedule):**



Pool Pumps (Fractional Schedule):

Pool Heater (Fractional Schedule):**Winter Schedule****Spring/Fall**



APPENDIX C: Energy Use Estimates Per Month:

Existing Site Usage					
Month	Site Electric Use (kWh)	Existing Site Electric Cost	Site Energy Gas	Existing Site Energy Gas Cost	
Jan-20	8313	\$ 1,456.79	2926	\$ 3,734.55	
Feb-20	8485	\$ 1,276.50	2028	\$ 4,061.26	
Mar-20	7153	\$ 1,328.50	2215	\$ 2,944.80	
Apr-20	7391	\$ 1,313.29	998	\$ 1,254.58	
(Missing) Est May	7391	\$ 1,313.29	998	\$ 1,254.58	
(Missing) Est June	7391	\$ 1,313.29	998	\$ 1,254.58	
Jul-19	9347	\$ 1,964.04	1167	\$ 1,179.76	
Aug-19	8414	\$ 1,843.40	795	\$ 855.89	
Sep-19	7892	\$ 1,749.36	826	\$ 859.15	
Oct-19	8709	\$ 1,866.77	1713	\$ 1,669.81	
Nov-19	8802	\$ 1,827.17	2815	\$ 2,964.31	
Dec-19	8793	\$ 1,538.51	2679	\$ 3,222.64	
Total	98081	\$ 18,790.91	20158	\$ 25,255.91	

PIEDMONT HEAT PUMP POOL

Site Usage			PV SYSTEM OUTPUT				Solar Thermal Output to Pools				Total PVT Energy Generated		Total Energy Site (kWh)		Proposed Energy Cost With Solar PVT
Month	Site Energy Use (kWh)	Proposed Energy Cost No Solar	Month	PV AC System Output(kWh)	Virtual Monthly Rate	Cost at Sim Virtual Rate	Solar Thermal (kBtu/month)	Thermal Output (kWh)	Virtual Monthly Rate	Cost at Sim Virtual Rate	kWh	\$	kWh	\$	
Jan	78,771	\$ 10,662.00	1	4977	\$0.17	\$846.09	5949	792	\$0.17	\$134.72	5769	\$980.81	73,002	\$ 9,681.19	
Feb	70,490	\$ 9,805.00	2	6305	\$0.18	\$1,134.90	9933	1323	\$0.18	\$238.18	7628	\$1,373.08	62,862	\$ 8,431.92	
March	50,635	\$ 7,808.00	3	9892	\$0.17	\$1,681.64	23618	3146	\$0.17	\$534.86	13038	\$2,216.50	37,597	\$ 5,591.50	
April	48,060	\$ 6,612.00	4	12517	\$0.17	\$2,127.89	33450	4456	\$0.17	\$757.52	16973	\$2,885.41	31,087	\$ 3,726.59	
May	49,676	\$ 9,676.00	5	14470	\$0.30	\$4,341.00	51874	6910	\$0.30	\$2,073.10	21380	\$6,414.10	28,296	\$ 3,261.93	
June	29,968	\$ 7,199.00	6	15435	\$0.29	\$4,476.15	65616	8741	\$0.29	\$2,534.88	24176	\$7,011.03	5,792	\$ 187.97	
July	30,596	\$ 6,615.00	7	15909	\$0.29	\$4,613.61	72093	9604	\$0.29	\$2,785.10	25513	\$7,398.71	5,083	\$ (783.71)	
Aug	50,221	\$ 9,779.00	8	13967	\$0.28	\$3,910.76	70169	9347	\$0.28	\$2,617.30	23314	\$6,528.06	26,907	\$ 3,250.69	
Sept	49,373	\$ 9,768.00	9	11485	\$0.29	\$3,330.65	55670	7416	\$0.29	\$2,150.65	18901	\$5,481.30	30,472	\$ 4,286.70	
Oct	77,554	\$ 14,755.00	10	8823	\$0.28	\$2,470.44	25864	3445	\$0.28	\$964.73	12268	\$3,435.17	65,286	\$ 11,319.83	
Nov	75,162	\$ 11,170.00	11	5876	\$0.21	\$1,233.96	6501	866	\$0.21	\$181.87	6742	\$1,415.83	68,420	\$ 9,754.17	
Dec	78,301	\$ 11,277.00	12	4736	\$0.20	\$947.20	2643	352	\$0.20	\$70.42	5088	\$1,017.62	73,213	\$ 10,259.38	
Total	688807	\$ 115,126.00	Total	124392		\$31,114.29		56400		\$15,043.33	180792	\$46,157.62	508,015	\$ 68,968.38	

PIEDMONT GAS FIRED POOL

Month	Site Usage		PV SYSTEM OUTPUT			Solar Thermal Output to Pools			Gas Fired Pool Costs			Total Energy				
	Site Energy Use (kWh)	proposed Energy Cost No Solar	Month	PV AC System Output(kWh)	Virtual Monthly Rate	Cost at Sim Virtual Rate	Solar Thermal (kBtu/month)	PVT Thermal Offset (Therms)	PVT Thermal Offset (\$)	Gas to New Pools	New Gas Cost	Gas Cost with PVT offset	kWh	Therms	\$	
Jan	29,796	\$ 4,158.00	1	4977	\$ 0.17	\$ 846	5949	74	\$ 95	6187	\$ 7,897	\$ 7,802	24819	6,113	\$ 11,114	
Feb	26,171	\$ 3,735.00	2	6305	\$ 0.18	\$ 1,135	9933	124	\$ 158	4288	\$ 5,474	\$ 5,315	19866	4,164	\$ 7,915	
March	29,520	\$ 4,179.00	3	9892	\$ 0.17	\$ 1,682	23618	295	\$ 377	4684	\$ 5,978	\$ 5,601	19628	4,389	\$ 8,099	
April	28,514	\$ 4,099.00	4	12517	\$ 0.17	\$ 2,128	33450	418	\$ 534	2110	\$ 2,694	\$ 2,160	15997	1,692	\$ 4,131	
May	29,524	\$ 6,403.00	5	14470	\$ 0.30	\$ 4,341	51874	648	\$ 828	2110	\$ 2,694	\$ 1,866	15054	1,462	\$ 3,928	
June	29,455	\$ 6,436.00	6	15435	\$ 0.29	\$ 4,476	65616	820	\$ 1,047	2110	\$ 2,694	\$ 1,647	14020	1,290	\$ 3,607	
July	30,778	\$ 6,645.00	7	15909	\$ 0.29	\$ 4,614	72093	901	\$ 1,150	2468	\$ 3,150	\$ 2,000	14869	1,567	\$ 4,031	
Aug	30,789	\$ 6,600.00	8	13967	\$ 0.28	\$ 3,911	70169	877	\$ 1,119	1681	\$ 2,146	\$ 1,026	16822	804	\$ 3,715	
Sept	29,943	\$ 6,583.00	9	11485	\$ 0.29	\$ 3,331	55670	696	\$ 888	1747	\$ 2,229	\$ 1,341	18458	1,051	\$ 4,594	
Oct	29,482	\$ 6,379.00	10	8823	\$ 0.28	\$ 2,470	25864	323	\$ 413	3622	\$ 4,623	\$ 4,211	20659	3,299	\$ 8,119	
Nov	27,682	\$ 4,597.00	11	5876	\$ 0.21	\$ 1,234	6501	81	\$ 104	5953	\$ 7,598	\$ 7,494	21806	5,871	\$ 10,857	
Dec	29,268	\$ 4,719.00	12	4736	\$ 0.20	\$ 947	2643	33	\$ 42	5665	\$ 7,231	\$ 7,188	24532	5,632	\$ 10,960	
Total	350922	\$ 64,533.00	Total	124392		\$ 31,114			\$ 5292	\$ 6,755	42627	\$ 54,406	\$ 47,651	226530	37,334	\$ 81,070

Item #5 – Energy Use Report for the Piedmont Community Pool Conceptual Design
Correspondence Received before Monday, March 21st at 3:00 p.m.

The council may want to ask ELS/Guttmann & Blaevoet about the noise level associated with the heat pump option.

Context: The report says:

The hybrid heat pump will be twenty-two (22) off hybrid heaters providing 100% of the steady state load during. Each heater will be equal to the Samsung model AG015KSVAJH/AA. 18kW for each of the units totaling 396kW for the heat pump array at full capacity.

The noise specification for each unit is 62dB. If my calculation is correct, 22 such units will generate a noise level of 75dB. The pumps have to be installed outside for proper operation. Depending on the location of the pumps, this may be an annoying noise level to the people using the pool.

Thank you for serving on the Council.

Sincerely

Bernard Pech

Note that the 22 pumps may have to be distributed across the site in order to achieve a better coefficient of performance (estimated at 3 as per study). This would also spread the noise around down to 62dB.

I hope I do not bug you by suggesting again the following based on my current understanding of the California grid and of its potential future evolution. Consultation with EBCE/CASIO would be a good idea to get their opinion, in particular as it relates to hydrogen and "demand request".

Given,

- 1- There are new budget constraints due to inflation.
- 2- Relative price evolution of electricity and natural gas is uncertain.
- 3- Natural gas prices are and are likely to stay very volatile .
- 4- Green hydrogen may become much cheaper due to the need to put to use the ever increasing amount of curtailed wind and solar energy (1.5TWh in 2021 or 2.6% of the State wind and solar yearly offer to the grid or 0.6% of the 250TWh load on the grid; refer to <http://www.caiso.com/informed/Pages/ManagingOversupply.aspx>), should storing excess energy with hydrogen be more economical than with grid batteries.
- 5- There is no known municipal pool using heat pumps.
- 6- The pool will have a lifetime of 25 years.

The council should consider instructing ELS to pursue the following approach:

- 1- Design a facility with much flexibility in the fuel used for power: natural gas, electricity (heat pump), hydrogen.

2- Initial configuration is all natural gas furnaces for pool heating with two installed heat pumps for experimentation and planning. No PV panels are installed. All wiring and piping for PV panels, future configuration modifications with heat pumps and/or hydrogen furnaces are in place to avoid large future retrofit costs.

3- Initial configuration includes a smart controller:

- instrumented to automatically monitor water temperature, water quality, and energy usage,
- with an interface to EBCE and/or CAISO for demand request and semi-real time energy cost,
- with control to dynamically switch between energy sources to heat the pool,
- with full logging capability to better understand and improve operations.

4- Make a deal with a UC Berkeley professor to assign a graduate student to run experiments under the direction of a pool committee and modify/maintain the controller program.

5- Overtime, purchase solar panels, extra heat pumps, possibly a hydrogen furnace, whatever makes sense at that time, avoiding unnecessary cost as all the needed piping, wiring, and switches are already in the ground.

Sincerely,

Bernard Pech

City Council:

City staff is recommending that significant modifications be made to the schematic design to reduce the cost of the new pool. The staff report and lifecycle analysis in the energy report show that the all-electric option is the best financial and environmental option for the pool so I encourage you to direct staff to redesign the pool based on the all-electric option. The lifecycle analysis shows that an all-electric pool saves the city \$1,000,000 over 25 years, probably an underestimate given state and federal restrictions that will drive up the price of natural gas over that time. Most importantly, the all-electric design will reduce GHG emissions compared to that from the existing pool, let alone the new pool. Such reduction is needed for the City to achieve its 2030 and 2050 reduction targets. More importantly, proceeding with the all-electric design will show the residents that City Council takes climate change seriously. Having restricted the installation of natural gas in new construction in Piedmont, the all-electric option will show the City's commitment to reducing its own GHG emissions and serve to motivate residents to take additional actions at reducing GHG emissions as well.

Electrifying the pool today is the single-most effective action the city can take to achieve the municipal GHG reduction targets set forth in CAP 2.0. The staff report implies that the current pool is less than 20% of municipal GHG emissions but that is biased by inclusion of employee commute as part of municipal emissions (figure 1), a GHG source City Council has little control over. Excluding employee commute from municipal emissions, facilities comprise 44% of city GHG emissions. And as figure 2 shows, city takeover of the pool in 2015 doubled municipal emissions – the pool is the single biggest municipal GHG emitter in town. A natural gas option for the new pool would more than double municipal facilities emissions. Achieving reductions in all municipal sectors is needed for the city to reach its GHG 2030 and 2050 targets and

building an all-electric pool now will result in the single largest step this Council can authorize towards achieving those goals.

Figure 1
Municipal GHG Inventory

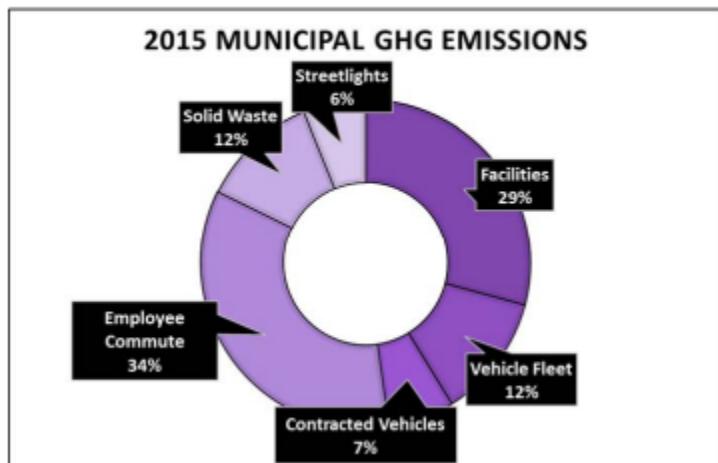


Figure 3.1

Figure 2

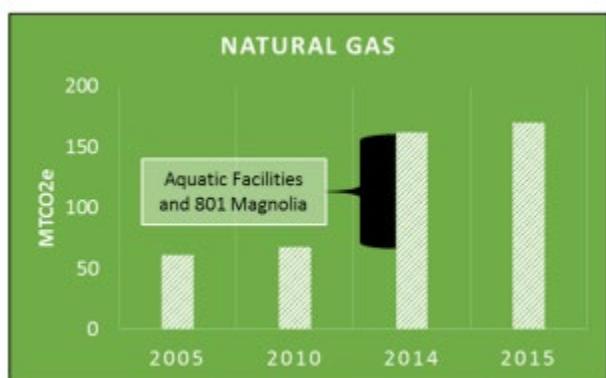


Figure 3.2

The table on page 3 of the staff report shows that a cost savings of \$1,000,000 is achieved with the all-electric option compared to the hybrid (natural gas) option. The 2/17 presentation to the Pool Advisory Committee by ELS showed that this savings is attributable to utility costs - \$77,600/year for natural gas, \$57,100/year for electricity. The figure on page 7 of Attachment A shows higher annual costs and the all-electric option still saves costs compared to the hybrid option, with or without photovoltaics but more so with photovoltaics. Total 25-year costs assume escalations for both rates but it is a safe assumption that natural gas will incur added costs due to costlier production and stricter regulation than electricity will. These factors are hard to account for now but I think would favor an even greater 25-year lifecycle cost savings from electricity compared to natural gas. Some have raised the possibility of installing natural gas now and converting to electricity in the future. At the 2/17 PAC meeting, Clarence Mumuyac of ELS said "It's really expensive" and the energy consultant advised against it.

The other important figure of the report is on page 8 of Attachment A – Facility Annual Emissions. The difference between the two options is the most important reason for the all-electric option – no new GHG will be emitted from the all-electric pool. Decarbonization is the path to reversing climate change yet since 2016, natural gas usage in Piedmont has increased 14%. This is not from the municipal sector (those emissions have been declining) but what message will it send to our residents if this new facility so vital to our community contributes to global warming?

Getting the right design for the energy infrastructure of the pool facility now has important ramifications for the long-term operating costs and greenhouse gas emissions of the pool. In both cases, the all-electric option is the best option. Additional cost analysis will be provided you by April 4 but would seem unlikely to change this conclusion. It would assist the redesign efforts of ELS were you to give direction tonight that the pool facility redesign be based on the all-electric option and I encourage you do so.

The pool facility has reached the point where a difficult choice has to be made. Conservatively \$4,000,000 in costs savings have to be found if the City is to stay within the spending limits of UU. ELS is looking at reductions to the recreational pool but if those and an all-electric pool can't be accommodated within the \$25,000,000 UU limits then Council should look at reducing the size of the aquatic pool – it is the largest user of energy within the facility and largest area of square footage. It is not fair to the larger number of residents who obtain seasonal passes to have their pool use restricted nor future generations of Piedmonters to have their climate impacted by GHG emissions from the aquatic pool. UU generated a great deal of enthusiasm for the new pool and I think Council can rely on this community support to accept reductions to all the pools in the current design.

Garrett Keating

Honorable City Councilmembers,

I support an all-electric Piedmont Aquatic Center. As the climate crisis deepens, Piedmont must do everything in its power to reduce greenhouse gas emissions in both our municipal and residential sectors. City government needs to set an example by decarbonizing municipal facilities, to encourage residents to take similar steps in their homes.

At very best natural gas as a fuel is nothing more than bridge technology to buy time until a better alternative was developed. The all electric alternative is the better alternative. Natural gas is still a fossil fuel that requires burning and emits greenhouse gasses; The City of Piedmont has been a great, award-winning example of local governments reducing ghg emissions. This isn't the time to reverse that progress. It is time to invest in longer terms rewards while using the newer, better alternative.

While the upfront cost of building a pool facility that uses natural gas is less (by approximately \$600,000), an all-electric facility will create \$1,000,000 more in cost savings over a 25-year period and reduce greenhouse gas emissions from pool heating to zero. As California and the nation begin transitioning off natural gas, a natural gas-fired pool runs the risk of becoming

obsolete, and we would face the cost-prohibitive prospect of having to entirely re-do the pool's heating system before the end of the pool's lifetime. Piedmont must be a leader in reducing greenhouse gas emissions and not hide behind excuses about a natural gas-fired pool only being a small percentage of overall city-wide emissions.

Thank you. I look forward to continuing effort to avoid the climate disaster.

Susan Ode

Dear Councilmembers,

I know that each of you care deeply about acting to limit climate change. You are now facing a critical choice as Piedmont's elected representatives between a natural gas vs. an all-electric energy system for the new Piedmont Aquatic Center.

The results of the preliminary energy use report are very encouraging. As you've seen, while an all-electric facility will require an additional \$600,000 in upfront cost and have a longer payback period (15.8 years, in comparison with 8.4 years for the natural gas option), it will provide approximately \$1,000,000 more in cost savings over the 25-year period studied as compared to the natural gas option. Moreover, the estimated greenhouse gas emissions from each option stand in sharp contrast: The natural gas-fired facility will generate 260 MT CO₂e and would make greenhouse gas emissions from the new facility 1.5 times greater than those from the old Community Pool, which generated approximately 75% of municipal emissions from natural gas. The all-electric option, however, will reduce the pool facility's emissions by 100%. Opting for natural gas would thus make it impossible to meet Piedmont's Climate Action Plan's targets for reducing emissions in municipal facilities, reductions that are important not just in and of themselves but as an example for residents to emulate in reducing emissions in their homes.

The decision to choose the all-electric system appears to be a no-brainer. But I am very concerned that the Staff Report accompanying the preliminary energy use report frames emissions from the pool in the context of the municipal sector and Piedmont's overall emissions, arguing that, when emissions from employee transportation are taken into account, the old Community Pool contributed less than 20% of municipal emissions and less than 1% of total emissions from Piedmont's residential sector. This calculation underestimates the old pool's contribution to City greenhouse gas emissions by including employee commuting. The City has very little control over employee commuting, and when that is excluded, municipal facilities were 44% of total municipal emissions, with the old pool the largest emitter by far. Given that a new natural gas-fueled facility will generate 1.5 times more emissions than the old facility, its portion of municipal emissions will increase substantially. Even if one does include emissions from employee commutes, this calculation doesn't account for the emissions decrease that will occur after EV charging stations are installed near City Hall, providing an incentive for employees to switch to EVs. The important point here is that referencing these relative numbers appears to be in service of providing a rationale for choosing natural gas for the pool. Please don't go down that path!

Choosing natural gas would be very short-sighted. As the preliminary energy analysis report points out, natural gas prices have become very volatile and are trending upwards. As California moves towards phasing out natural gas, a natural gas-dependent facility could become obsolete before the end of its expected lifetime. It is wiser to construct an energy system for the future now, than to face the cost-prohibitive prospect of having to re-do the system later. Choosing natural gas would also be imprudent from a financial perspective; While it may be tempting to choose a system with a lower up-front cost and shorter payback period, we need to keep in mind that the actual cost savings over 25 years of an electric system will be approximately \$1,000,000 more than a natural gas system. A \$600,000 up-front cost differential is really not that much in the larger picture, nor is an additional 7.4 years until payback.

Choosing natural gas would be irresponsible from a climate perspective. No matter how small the pool's emissions are in the context of total Piedmont and world emissions, we all know that it's important that each family, city, state and nation work to reduce its emissions in as many ways as possible, in order for us to collectively bring emissions down. Cities and other government bodies have an additional mandate of serving as role models for the citizens they represent; If governments don't wholeheartedly attempt to reduce their emissions, saying that what they do doesn't matter, citizens will follow suit. If we choose an all-electric pool, Piedmont will become one of the first California municipalities to do so, and we will be on the map as a model for other communities. If we choose a natural gas-fired facility, we will be taking the position that we are exempt from needing to tackle climate change on all possible fronts – an assertion of privilege that many in the community deeply wish us to move beyond.

Thanks for your attention to this important matter,

Margaret Ovenden

Dear Piedmont City Council members,

As residents for of 45 years, we strongly support a ALL ELECTRIC aquatic center. With the deepening climate crisis we as a city MUST do everything in our power to reduce greenhouse gas emissions in both our municipal and residential sectors. As a start, City government needs to set an example by decarbonizing municipal facilities, and to encourage residents to take similar steps in their homes. Although more expensive to start, in the long run it will save a huge amount and be proactive before natural gas is ban. We want to avoid the cost-prohibitive prospect of having to entirely re-do the pool's heating system before the end of the pool's lifetime. Piedmont must be a leader in reducing greenhouse gas emissions and not hide behind excuses about a natural gas-fired pool only being a small percentage of overall city-wide emissions.

Thank you
Annis and Nicholas Kukulan

We believe it would be incredibly short sighted to put in anything but an all-electric Piedmont Aquatic Center. As the climate crisis deepens, Piedmont must do everything in its power to reduce greenhouse gas emissions in both our municipal and residential sectors. City government needs to set an example by decarbonizing municipal facilities, to encourage residents to take

similar steps in their homes. While the upfront cost of building a pool facility that uses natural gas is less (by approximately \$600,000), an all-electric facility will create \$1,000,000 more in cost savings over a 25-year period and reduce greenhouse gas emissions from pool heating to zero. As California and the nation begin transitioning off natural gas, a natural gas-fired pool runs the risk of becoming obsolete, and we would face the cost-prohibitive prospect of having to entirely re-do the pool's heating system before the end of the pool's lifetime. Piedmont must be a leader in reducing greenhouse gas emissions and not hide behind excuses about a natural gas-fired pool only being a small percentage of overall city-wide emissions.

Thank you for your attention,

Terry and Rob Smith

I support an all-electric Piedmont Aquatic Center. As the climate crisis deepens, Piedmont must do everything in its power to reduce greenhouse gas emissions in both our municipal and residential sectors. City government needs to set an example by decarbonizing municipal facilities, to encourage residents to take similar steps in their homes. While the upfront cost of building a pool facility that uses natural gas is less (by approximately \$600,000), an all-electric facility will create \$1,000,000 more in cost savings over a 25-year period and reduce greenhouse gas emissions from pool heating to zero. As California and the nation begin transitioning off natural gas, a natural gas-fired pool runs the risk of becoming obsolete, and we would face the cost-prohibitive prospect of having to entirely re-do the pool's heating system before the end of the pool's lifetime. Piedmont must be a leader in reducing greenhouse gas emissions and not hide behind excuses about a natural gas-fired pool only being a small percentage of overall city-wide emissions.

Debra Constantine

Dear Members of the City Council,

You have an opportunity to make a difference in our City's greenhouse gas emissions profile as you define the PAC. I strongly urge you to select the all-electric pool facility. We can make a difference in the damage caused by the PAC by replacing the carbon-heavy existing system with an electric system.

Citizens are waiting to see your planet-positive decision.

Thank you.
Ellen Smith

Dear City Council,

As a long time resident of Piedmont, I am writing to strongly urge you to support an all-electric Piedmont Aquatic Center, which should include electrification for heating the new pool. This is both consistent with Piedmont's commitment to address the climate crisis and a wise financial investment for the city. Now is the perfect time to make this switch to an all electric facility given we are right in the middle of the planing process for the new facility.

The climate crisis is occurring right now and we will continue to see extreme fires, droughts and sea level rise without drastic actions to reduce use of fossil fuels, including natural gas. Piedmont must move to reduce greenhouse gas emissions in both our municipal and residential sectors as quickly as possible as part of collective efforts to address this crisis. This includes in all current and new planned city facilities, including the Aquatic Center.

The initial cost of building a pool facility using electricity is a modest investment for an initiative of this size (approximately \$600,000 of the \$20 million bond amount). Additionally, an all-electric facility will create \$1,000,000 more in cost savings over a 25-year period and reduce greenhouse gas emissions from pool heating to zero.

Putting in a new natural gas-fueled facility will generate 1.5 times more emissions than the old facility, and its portion of municipal emissions will also increase. It would be a much wiser use of our tax dollars to look at decreasing other elements of the design to accommodate an electrified pool that will meet the needs of our future. Piedmont will still have a new facility and pool while at the same time being responsible in our investments. Given the extreme nature of the climate crisis, California will continue to transition off of natural gas, meaning a natural gas pool could become more expensive and/or obsolete, which require additional costs.

Given the climate crisis and the impacts it will have on our children and future generations, it is imperative that we all take any and all necessary steps to address this crisis.

Thank you,

Tracey Woodruff

Dear Council Members,

I write to urge you to specify that our new community pool be an all electric installation. From both a moral and an economic stance, this makes sense. And while the payback period is longer, this is the right thing to do. We can afford it. In fact, we cannot afford not to do this.

Thank you so much for your excellent service to Piedmont. I appreciate that these decisions are not easy, but I think that our planet is really in trouble.

Valerie Matzger

I am very against using “natural” gas for pool heating. I have read the arguments for and against, and in both the short and especially long term views, electric power wins out.

Both from a financial and certainly from an environmental point of view.

To say nothing of negative publicity! How does it look if Piedmont chooses gas for a big municipal project when it’s promoting measures to slow climate change?

Len Nathan

The council may want to ask the following questions to EBCE/CASIO:

1- What is the plan for the showers? Continuous electric/gas heater? Can the heat pumps provide the hot water for the showers?

2- How much energy are the showers expected to consume?

3- The Energy Use report mentions a "hybrid heat pump". Does hybrid refer to an ability of the pumps to boost heating using electric resistances? In that case, what is the rated kW and what percentage of the pool heat is expected to be generated through resistance heating over a year?

Thank you for your service on the Council.

Bernard Pech

Dear City Council Members:

First of all, thank-you for your service to our fine little city.

It is with a deepening sense of alarm that we write to oppose a gas-fired heating plant at the new Piedmont pool complex, and in support an all-electric system. Adopting yesterday's technology to support tomorrow's pool complex would be a costly error, and would set exactly the wrong example we need to be setting in order to ensure our children's future. Here are the reasons:

1. Piedmont has pledged to reduce greenhouse gas emissions in our municipal and residential sectors. "Recarbonizing" a major city facility runs exactly in the opposite direction, and sends a loud-and-clear message that the city is not serious about its stated goals.
2. Spending more in up-front cost will pay a substantial dividend (\$1,000,000) through the expected lifetime of the heating system, and reduce greenhouse gas emissions from pool heating to zero.
3. A natural gas-fired pool is highly likely to become obsolete during the lifetime of the system, and will be dependent upon unpredictable fluctuations in energy costs.
4. Piedmont must be a leader in reducing greenhouse gas emissions and not pretend its new pool is only contributing "a little bit" to climate warming
5. The complex is right across the street from Piedmont High School and Piedmont Middle School. The example it sets is literally right in the faces of our children, and will be for decades. What do we want them to see?

We strongly encourage the City of Piedmont to step up to the challenge of our times and do the right thing in the case of the new pool complex. Now is the time to be serious about doing everything we can to meet the needs of today and of our increasingly fragile future. The time is now, and the burden is ours.

Most sincerely,
Debi and Scott Fitzgerrell

Should the Council lean toward an all-electric approach using EBCE 100% renewable energy service, it may want to ask the following questions to EBCE and satisfy itself that EBCE will be able to continue to deliver the service at a reasonable price in the future.

A - How does EBCE provide a 100% renewable energy service when, presumably

1. there are times when the facilities that have contracted to provide the energy in a given hour cannot meet their commitment because either EBCE customer demands exceed renewable production and/or there is congestion on the grid that prevents delivery of the energy to these customers?
2. there are times when the facilities that have contracted to provide the energy in a given hour have an oversupply of renewable energy that exceeds EBCE customer demands? Presumably that energy is either absorbed by other non-EBCE customers in the grid or is curtailed.

B- Is the claim of 100% renewable service based on averaging over the year the total renewable energy put by EBCE into the grid (whether consumed by EBCE customers or not) and checking that it exceeds the EBCE customers load?

3. What data does CAISO provide EBCE on energy delivered detailing primary energy sources (hourly or 5 minutes interval)?
4. How does EBCE know that its surplus renewable energy in a given hour is consumed somewhere and not curtailed?

C- CAISO publishes reports of curtailed renewable energy:

<http://www.caiso.com/informed/Pages/ManagingOversupply.aspx>. For each of the years 2020, and 2021, 1.5TWh was curtailed. Some was due to grid congestion preventing the moving of the energy to places needed. Does PG&E have a plan to upgrade the grid and remove this obstacle to renewable energy delivery?

D- The curtailment of renewable energy will increase in the future as the proportion of renewable energy offered to the grid increases unless grid storage is added or new demand is created through near real time "demand request" (to produce green hydrogen for example). How much grid storage will EBCE need to serve its *existing 100% renewable* customers assuming their load does not change as a function of the portion of the grid renewable energy offered to the grid.

Thank you,

Bernard Pech

Hello CMs Anderson, Cavanaugh, King, McCarthy and Long -

Our family very much supports an all-electric Piedmont Aquatic Center. As the climate crisis deepens, Piedmont must do everything in its power to reduce greenhouse gas emissions in both our municipal and residential sectors. City government needs to set an example by decarbonizing municipal facilities, to encourage residents to take similar steps in their homes. While the upfront cost of building a pool facility that uses natural gas is less (by approximately \$600,000), an all-electric facility will create \$1,000,000 more in cost savings over a 25-year period and reduce greenhouse gas emissions from pool heating to zero. As California and the nation begin transitioning off natural gas, a natural gas-fired pool runs the risk of becoming obsolete, and we

would face the cost-prohibitive prospect of having to entirely re-do the pool's heating system before the end of the pool's lifetime. Piedmont must be a leader in reducing greenhouse gas emissions and not hide behind excuses about a natural gas-fired pool only being a small percentage of overall city-wide emissions.

Gabriel is professionally deeply involved in the development of new energy technologies and Piedmont should take the long view with regard to heating our new pool. Our family is a strong supporter of using electricity to power the new pool.

Thanks for your service and consideration,

Julie Caskey and Gabriel Kra

Dear members of Piedmont City Council,

I am aware you are discussing the new pool our community overwhelmingly supported, including myself and my husband, with Measure UU. I am also aware some community members are trying to revise what was actually voted and approved on by now trying to make sure the pool is energy efficient. PLEASE, do not change the pool capacity and plans due to these individuals' more than late request about energy efficiency. We all were aware of Measure UU and had plenty of time to provide input into the measure, the pool budget and the pool design. To now take away pool capacity, either for lap lane swimming or the rec pool, to accommodate overly expensive costs related to energy efficiency would be a bait and switch for voters. It is not what we voted on. Our swim team, our high school swimming and water polo teams, masters swimmers, rec swimmers, kids learning how to swim, etc all deserve the pool we voted on. Thank you.

Katherine Rolefson

Item #5 – Energy Use Report for the Piedmont Community Pool Conceptual Design
Correspondence Received before Monday, March 21st at 3:00 p.m.

We need to keep in perspective that we are talking about a tiny fraction of Piedmont's overall carbon footprint (a part of 1%) and that no other public pool is all electric. While it would be nice to be at the forefront and build an all electric pool, if we could afford it, we are now in a budget crunch. At the recent meetings of both the City Council and the PAC, the most vocal participants have been those advocating for an all electric pool (way more vocal than any potential users of the pools or their facilities). They are asking that the City Council allocate money raised from the whole community to meet their personal budgetary priorities. The staff report makes clear that there is no extra room in the community's budget to cover those priorities. Something else that other, less vocal, members of the community might prize would have to be cut. I suggest that it is time to see how personally committed the all-electric advocates are to their priorities—that Piedmont Connect fund raise to see how much of the up-front costs of having an all electric pool they can cover. If 600 families were willing to contribute \$1000 each, the up-front costs would be covered without impacting the rest of the budget.

Jon Sakol

Dear Mayor King and City Council,

I urge you to have an all electric pool. Using natural gas now is a misguided attempt to save a few dollars now but will be extremely costly overall. Also forcing Reach Code heat pumps and other costly all-electric conversion on older homes, with the high costs, seems inconsistent with the City using natural gas in one of the largest single energy users in town.

Respectfully, Rick Schiller

Dear Mayor and Councilmembers,

I am reading through the staff reports for tonight's meeting, and, putting several related pieces together, I would like to offer up an idea.

First, here are the pieces of information that I gleaned from the staff reports and related City reports:

- Hyperinflation of construction costs has caused the initial design to become \$6 million over budget, necessitating significant design modifications, including reducing the ancillary building from two stories to (mostly) one story.
- Piedmont's Climate Action Plan directs the City to reduce municipal greenhouse gas (GHG) emissions substantially over the next several decades.
- According to Piedmont's CAP 2.0, 34% of municipal GHG emissions come from employee commutes. The staff report for tonight's agenda item 5 states that the old Community Pool contributed less than 20% of municipal GHG emissions.
- The additional capital cost of building an all-electric pool is approximately \$600,000.
- According to the City's housing consultants, the cost per square foot for apartment construction was estimated to be \$195 as of November 2021.

My thought is that, if the City is considering a \$600,000 investment to reduce GHG emissions in furtherance of its CAP, it should invest a similar amount to incorporate a couple of apartment units along Bonita Ave, as a second floor above the pool complex building, to be rented to City employees. More specifically:

- Using a construction cost of \$250 per square foot (a 28% increase over the Nov 2021 estimate), \$600,000 in capital costs would produce 2,400 square feet of apartment space, which represents two 1,200 sf apartments or three 800 sf apartment units.
- City employees who occupied the new rental units would reduce their employee transportation emissions to zero.
- If the City only needed to cover its operating costs, including a fee to a professional property manager to manage and maintain the units, the units could be rented at a very affordable rate. Alternatively, rents could be set slightly higher (but still affordable to City employees) in order to repay a \$600,000 loan from the City over time.
- If no City employees wanted to rent the units, they could be made available to PUSD employees, or to the general public, at market rates. Surplus revenue could be used to capitalize an affordable housing fund or support other GHG emission-reducing endeavors.

I strongly encourage you to consider this alternative.

Thank you,

Deborah Leland

Dear Council,

Please support an all-electric Piedmont Aquatic Center.

I understand from the staff report that the upfront financial investment will be more (by approximately \$600,000). I also understand that an all-electric facility will create \$1,000,000 more in cost savings over a 25-year period, with a 7.5 year break-even point on the larger upfront costs.

The Aquatic Center is an investment in Piedmont's future, and it seems unconscionable to me that an affluent community like Piedmont would consider locking in gas ([the fuel of the past, not the future](#) in the era of climate change) at an energy-hog facility, in order to save a buck today that it can earn back tomorrow.

The City will own and operate the Aquatic Center, as a community resource in which we all have a strong vested interest. We look to civic leaders to do long-term thinking and planning on our behalf. We look to Council to make decisions inline with [Piedmont's Climate Action Plan 2.0 goals](#), adopted 4 long years ago, on our behalf. See esp. *Increase Renewable Energy to 100%* (Buildings/Energy category); *Reduce emissions from City* (Municipal category).

We'll enjoy this beautiful facility before, *and then long after*, the financial break-even point. The question for our community is, what is our moral break-even point?

An all-electric Piedmont Aquatic Center...with a dose of financial patience, commitment, and leadership.

Respectfully,
Susan Miller-Davis

City Council,

I support, and urge you to approve, an all-electric Piedmont Aquatic Center. As the climate crisis worsens, Piedmont must not miss important opportunities to significantly reduce greenhouse gas emissions, especially highly-damaging emissions from burning natural gas within Piedmont. I understand that the upfront cost of building an all-electric pool facility is currently greater than building one that uses natural gas (by approximately \$600,000), but that an all-electric facility is expected to generate \$1MM in cost savings over 25 years— and will emit no greenhouse gasses over the course of its lifetime, which are both harmful to our health and damaging to our environment.

Thank you for considering my point-of-view.

Respectfully,
Suzie Skugstad

Hello,

I am very excited for the communication pool for Piedmont. Please make every effort to ensure the pool is set for the future and invest now in making the pool solar powered.

Thanks, Helen and Dave Fahey
