



# Emblem Manteca Decarbonization Memo

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## Project Summary

Quarterra’s proposed multifamily project in Manteca, CA will go beyond the standards set by the state of California for carbon reduction. The purpose of this memo is to outline the planned energy-efficiency and other measures that will reduce operational carbon emissions.





The project will be built in two phases, Manteca Phase I – East and Manteca Phase II – West.

**Phase 1 – East**

Manteca East – Consists of 312 total units (13 buildings, each having 24 units) and one clubhouse. The average home size is around 990 square feet with five home types. This project is all surface parked.

FLOORPLAN INPUT						
Floorplan	Type	Bedrooms	Bathrooms	Homes	Home Mix	NRSF
S1	Market	0	1.00	0	0.0%	666
A1	Market	1	1.00	78	25.0%	738
A2	Market	1	1.00	78	25.0%	774
B1	Market	2	2.00	42	13.5%	1,099
B2	Market	2	2.00	78	25.0%	1,194
C1	Market	3	2.00	36	11.5%	1,434

**Phase 2 – West**

Manteca West – Consists of 360 total units (18 buildings, each having 20 units) and one clubhouse. The average home size is around 865 square feet with four home types. This project is surface parked and 10 tuck under garages per building.

FLOORPLAN INPUT						
Floorplan	Type	Bedrooms	Bathrooms	Homes	Home Mix	NRSF
S1	Market	0	1.00	0	0.0%	666
A1	Market	1	1.00	0	0.0%	738
A2	Market	1	1.00	108	30.0%	774
B1	Market	2	2.00	108	30.0%	1,099
B2	Market	2	2.00	0	0.0%	1,194
C1	Market	3	2.00	0	0.0%	1,434
CAR1	Market	1	1.00	72	20.0%	650
CAR2	Market	1	1.00	72	20.0%	850
CAR3	Market	1	1.00	0	0.0%	954

## Decarbonization Measures

**All-electric.** Manteca East and West buildings will be all-electric. Cooking, heating, water heating, and clothes dryers will all be electric. The use of electric appliances, heat pumps for heating and cooling, and heat pump water heaters reduces the carbon emissions associated with burning natural gas.

**Energy efficient.** In addition to being all-electric, the project will be designed to beat California’s already strict energy compliance levels by 10%. Energy calculations and the measures intended to achieve those goals are discussed in the Residential Building Energy Use section below.

**Solar photovoltaics.** The project will install solar photovoltaics on the rooftops of all buildings. Sizing and output calculations are provided later in this memo.



Electric Vehicle Charging. The project will be prepared for the influx of electric vehicles. 40%+ of the parking spots provided will have EV chargers or be pre-wired for future installation of EV chargers.

LEED for Homes. The project has targeted LEED for Homes certification. LEED for Homes projects use less water and energy and are more durable than those not built to the standard. The building envelope is constructed to leak less conditioned air. Insulation installation is held to a higher standard. This results in homes that are more comfortable and energy efficient.

Energy Star for Homes. Multifamily California version 1.4 projects require a higher standard of construction for HVAC ducting and envelope construction. Manteca’s dwelling units will be 10% more efficient than homes designed solely to meet California compliance.

## Residential Building Energy Usage

Energy simulation modeling was utilized to calculate an average annual electric usage intensity. CBECC 2022, a software approved by California Energy Commission for Title 24 2022 performance method, was utilized for the calculations. Using the building features described at the end of this section, an annual electric usage intensity of 6.613 kWh/sf was calculated.

### Phase 1 - East

Unit Type	Quantity	Unit Size (SF)	Annual kWh/unit (kWh/yr)	Subtotal (kWh/yr)
A1	78	738	4,880	380,671
A2	78	774	5,118	399,240
B1	42	1099	7,268	305,243
B2	78	1194	7,896	615,882
C1	36	1434	9,483	341,390
				<b>2,042,425</b>

### Phase 2 – West

Unit Type	Quantity	Unit Size (SF)	Annual kWh/unit (kWh/yr)	Subtotal (kWh/yr)
A2	108	774	5,118	552,794
B1	108	1099	7,268	784,910
CAR1	72	650	4,298	309,488
CAR2	72	850	5,621	404,716
				<b>2,051,908</b>



In total, the homes are expected to consume about **4094 megawatts** of electricity on an annual basis.

#### Energy Features Used in Simulation

Central heat pump water heating system
Walls – 2x6 @ 16” oc, with R-21 insulation
Attic – 2x6 trusses @ 24” oc, with R-60 insulation
Windows – 0.28/0.21
Heating/Cooling – SEER2 18 / HSPF2 8
Cooking, Clothes Dryer Fuel – Electric

## Solar Photovoltaics

The project will maximize the amount of solar photovoltaics (PV) based on the space available. Each project will fit as much solar on rooftops and carports as space will allow. It was calculated that Phase 1 can accommodate 1006.05 kW DC, and Phase 2 can accommodate 953.10 kW DC.

Production calculations in this memo utilized PV Watts Calculator. Developed by National Renewable Laboratories, the PV Watts Calculator is the industry standard tool for calculating electric generation from PV systems. Considering Manteca for the location, system losses of 14%, a 5-degree tilt, and a 180-degree azimuth, PV Watts shows that each 1 kW of solar PV produces 1514 kWh annually.

#### Phase 1 - East

1006.05 kW DC x 1514 kWh/kW/yr  
= 1,523,160 kWh AC annually

#### Phase 2 – West

953.10 kW DC x 1514 kWh/kW/yr  
=1,442,993 kWh AC annually

In total, the anticipated solar photovoltaic system for the two phases combined will be capable of producing **2966 megawatts** of electricity annually. Onsite generation will reduce electricity transmission losses, which are generally around 5-7%. Electricity lost through powerlines comes with the increased carbon emissions associated with that electrical generation.



## Conclusion

Through carefully considered design that includes Energy Star Homes, LEED, and the elimination of natural gas, Manteca will reduce its operational carbon. Additionally, the homes will be more durable, comfortable, and consume less water. The project will also be installing large quantities of photovoltaics which reduces carbon emissions associated with offsite electrical generation and transmissions losses for the electricity that is pulled from the grid. The PV is expected to account for roughly 72.4% (2966 MW generated / 4094 MW consumed) of the power consumed by the homes. With the addition of EV charging stations, the project will be ready to accommodate the shift away from vehicles that run on fossil fuel.