ARCHITECTURE AT ZERO 2021-22

A design competition for Decarbonization, Equity and Resilience in California

SOL HARVEST VILLAGE

BAR ARCHITECTS

SAN FRANCISCO, CA

TYPICAL POD PLAN

1. Porch
2. Storage
3. Amenity Room
4. Multi-Purpose
5. Unit Entry Mud Area Storage
6. Laundry
7. Movable Solar / Privacy Screens

8. PV Arrays - 158 kW System
9. Centralized DOAS
10. Centralized HP
11. Mass Timber Structure
12. PV Trellis Over Parking
13. Community Roof Garden
14. South Facing Vertical Gardens
15. Outdoor Deck at Level 2
16. Typical Pod
17. Unconditioned Breezeway
18. High Performance Envelope
19. Distributed Amenity Rooms

PROJECT NARRATIVE

The SōL Harvest Village is conceived to support a close-knit community focused on low carbon indoor-outdoor living. Organized around a central shared courtyard, the Village is full of amenities and flexible open spaces and provides a multitude of services. The design creates a strong sense of place and identity for each resident. Our zero net energy solution also includes:

- Careful site response to optimize solar access and PV power production
- Highly efficient centralized building systems
- Dedicated outside air filtration and energy recovery to remove environmental hazards and optimize energy use
- Healthy materials used throughout
- Low carbon mass timber construction

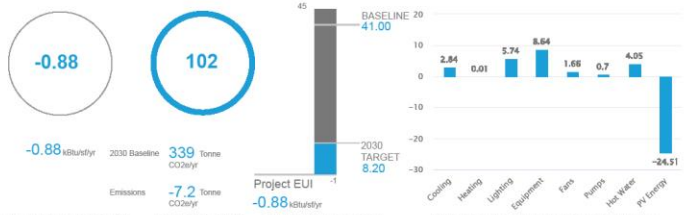
The site plan maximizes outdoor space by placing the parking along the perimeter on the east and south sides of the site. Building scale encourages interaction among residents. Each "Pod" contains a mix of apartment types and ranges from 9 to 27 units. All units have a gracious "porch" to extend the living area and make a strong connection to the outdoors. Porches provide a high degree of sun shading in this hot environment. Amenity and service spaces are decentralized and are provided in each "Pod". These flexible multi-use spaces are located on each floor.

The design reaches zero net energy performance with an integrated, multi-pronged approach. Reduced energy demand is achieved through careful massing and envelope design, high efficiency heat pump systems driving low energy radiant heating and cooling. We supplied the remaining energy requirements with on-site energy generation, including rooftop photovoltaic and solar-thermal panels and through wastewater heat recovery.

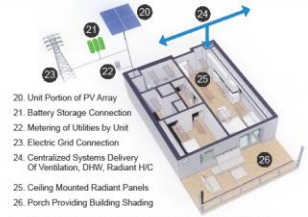

CENTRAL COURTYARD VIEW


ROOF PLAN


3RD FLR PLAN



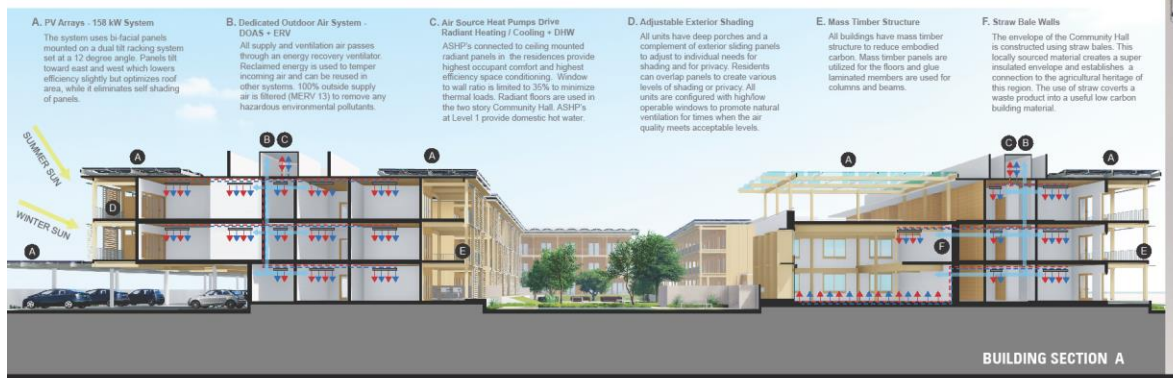
PREDICTED BASELINE EUI | CO2 REDUCTION % | BENCHMARKING ENERGY | PREDICTED WHOLE BUILDING EUI BREAKDOWN



20. Unit Portion of PV Array
21. Battery Storage Connection
22. Metering of Utilities by Unit
23. Electric Grid Connection
24. Centralized Systems Delivery Of Ventilation, DHW, Radiant H/C
25. Ceiling Mounted Radiant Panels
26. Porch Providing Building Shading

SYSTEM DISTRIBUTION DIAGRAM - RESIDENTIAL UNIT

27. Building Lobby
28. Community Hall / Kitchen / Training
29. BBQ & Picnic Area
30. Playground
31. Flexible Outdoor Space
32. Sports Court
33. Vegetable Garden
34. Amenity Room / Multi-Purpose
35. Building MEP / Battery Storage
36. Mud Room / Lockers / Laun
37. Parking With PV Trellis



A. PV Arrays - 158 kW System
The system uses bi-facial panels mounted on a dual tilt racking system set at a 12 degree angle. Panels tilt toward east and west which lowers efficiency slightly but optimizes roof area, while it eliminates self shading of panels.

B. Dedicated Outdoor Air System - DOAS + ERV
All supply and ventilation air passes through an energy recovery ventilator. Reclaimed energy is used to temper incoming air and can be reused in other systems. 100% outside supply air is filtered (MERV 13) to remove any hazardous environmental pollutants.

C. Air Source Heat Pumps Drive Radiant Heating / Cooling + DHW
ASHP's connected to ceiling mounted radiant panels in the residences provide highest occupant comfort and highest efficiency space conditioning. Window to wall ratio is limited to 35% to minimize thermal loads. Radiant floors are used in the two story Community Hall. ASHP's at Level 1 provide domestic hot water.

D. Adjustable Exterior Shading
All units have deep porches and a complement of exterior sliding panels to adjust to individual needs for shading and for privacy. Residents can overlap panels to create various levels of shading or privacy. All units are configured with high/low operable windows to promote natural ventilation for times when the air quality meets acceptable levels.

E. Mass Timber Structure
All buildings have mass timber structure to reduce embodied carbon. Mass timber panels are utilized for the floors and glue laminated members are used for columns and beams.

F. Straw Bale Walls
The envelope of the Community Hall is constructed using straw bales. This locally sourced material creates a super insulated envelope and establishes a connection to the agricultural heritage of this region. The use of straw coverts a waste product into a useful low carbon building material.

BUILDING SECTION A

SITE / GROUND FLR PLAN

SōL HARVEST VILLAGE

ARCHITECTURE AT ZERO 2021

1. Project Narrative

Project Narrative

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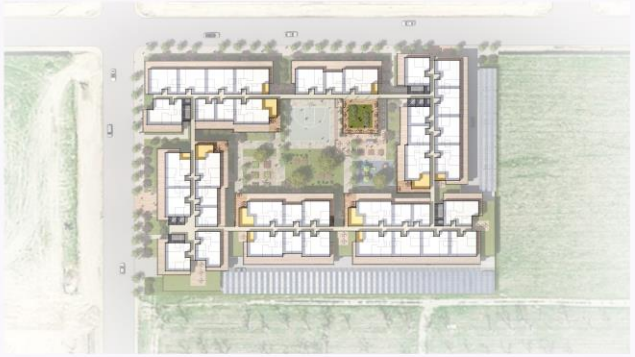
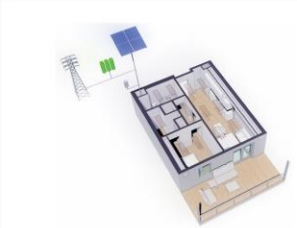
2. Site Plan

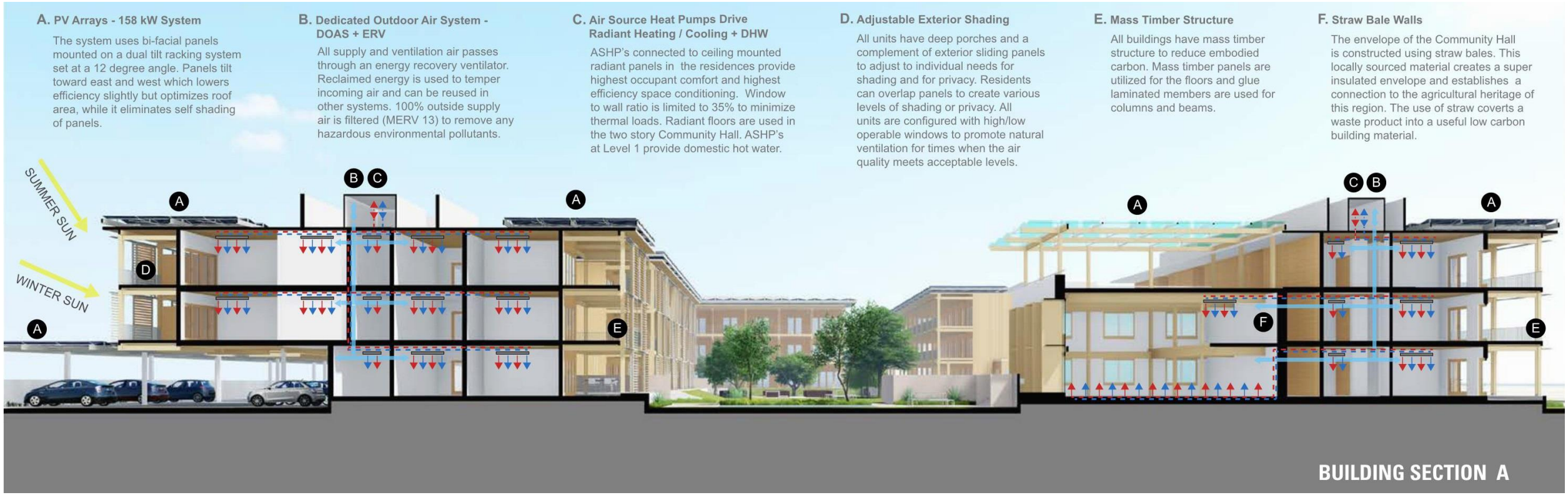
3. Floor Plans



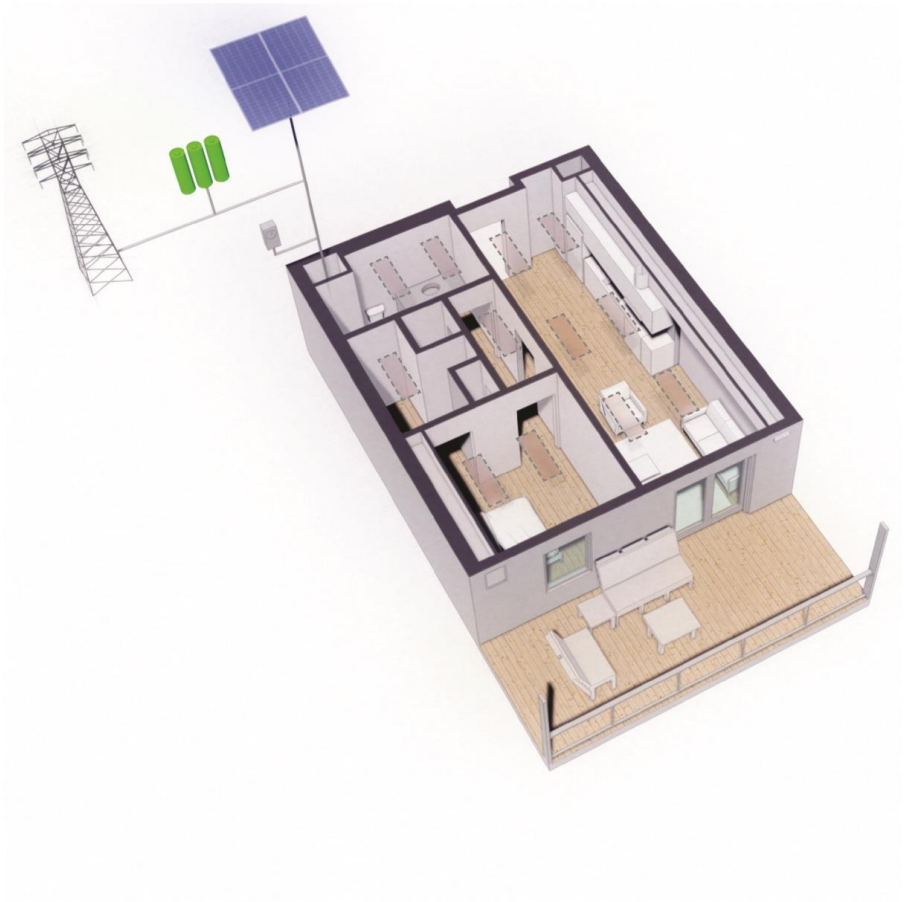


4. Perspective Drawing

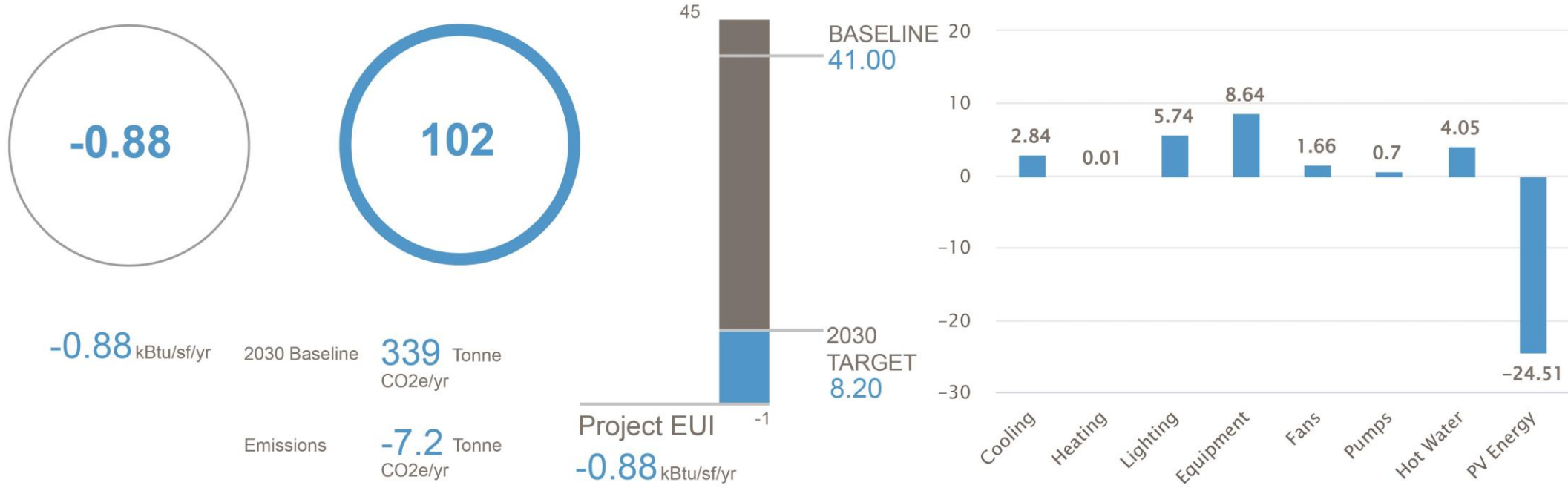
5. Illustrated Sections



6. Mechanical System Summery

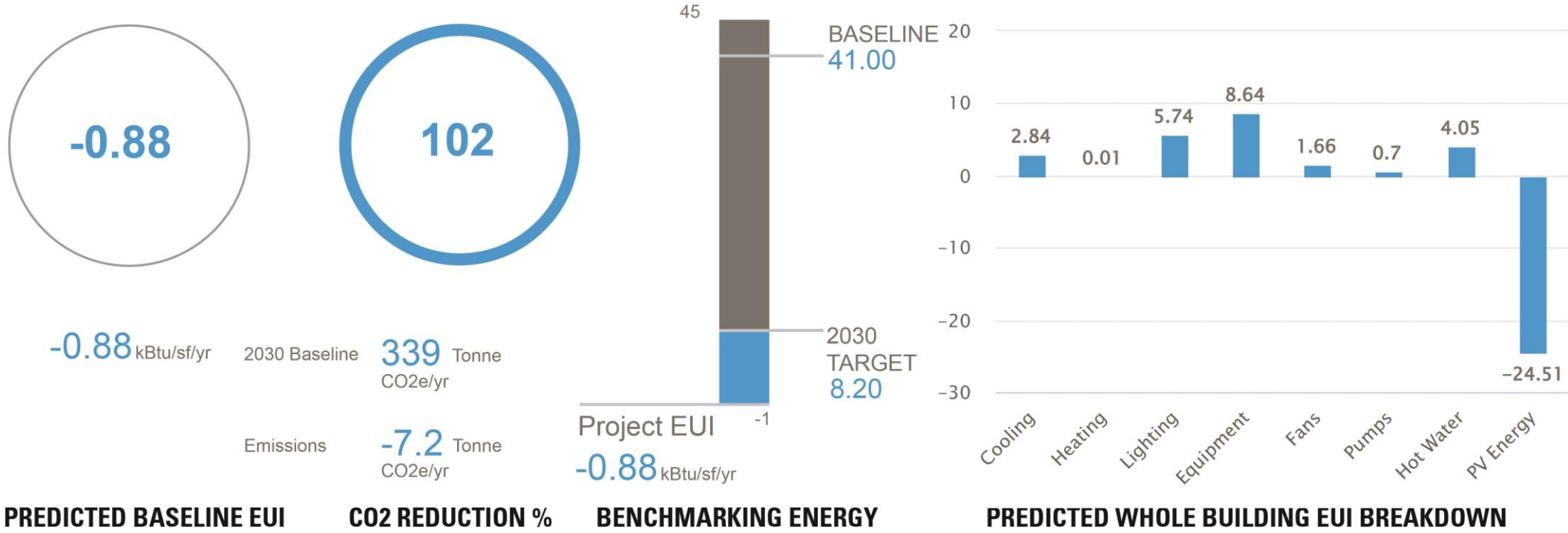


7. Annual End-Use Summery Table



PREDICTED BASELINE EUI **CO2 REDUCTION %** **BENCHMARKING ENERGY** **PREDICTED WHOLE BUILDING EUI BREAKDOWN**

8. Monthly End Use Energy Consumption Bar Chart



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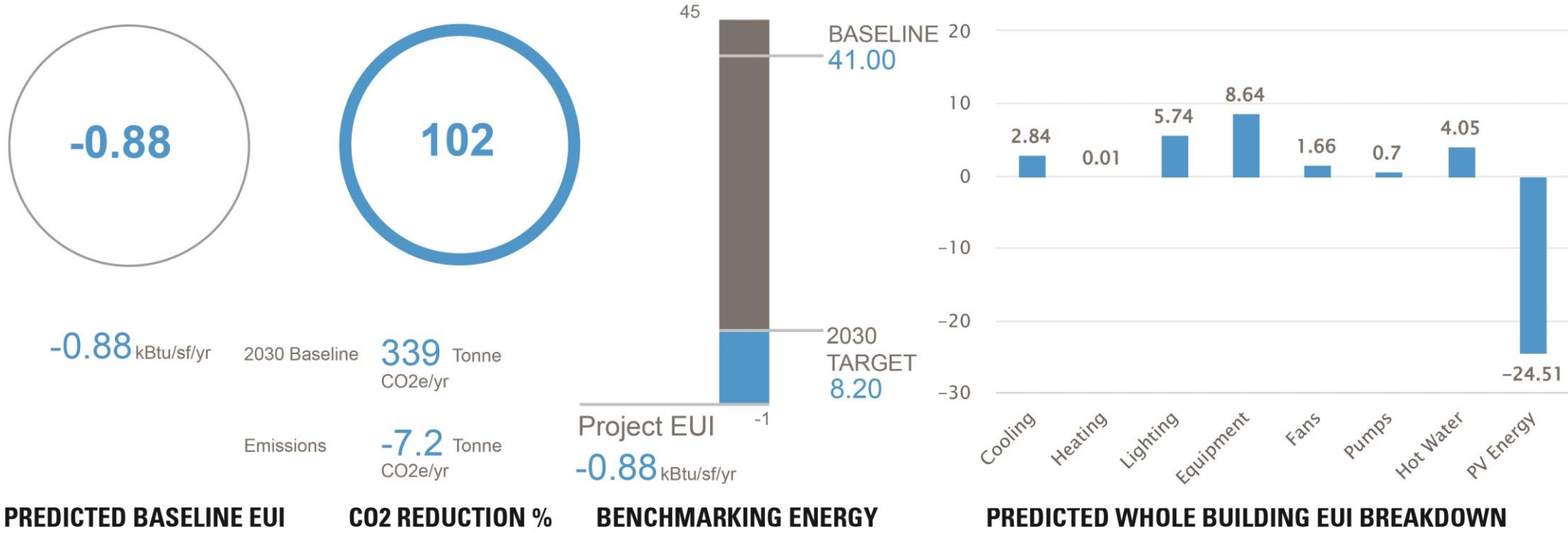
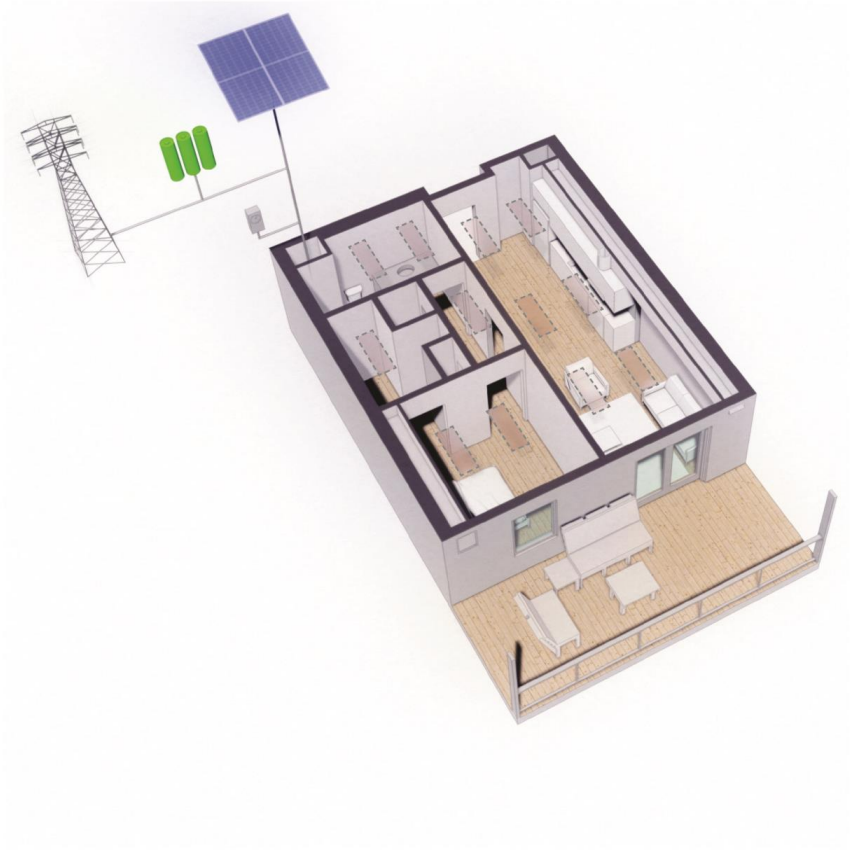
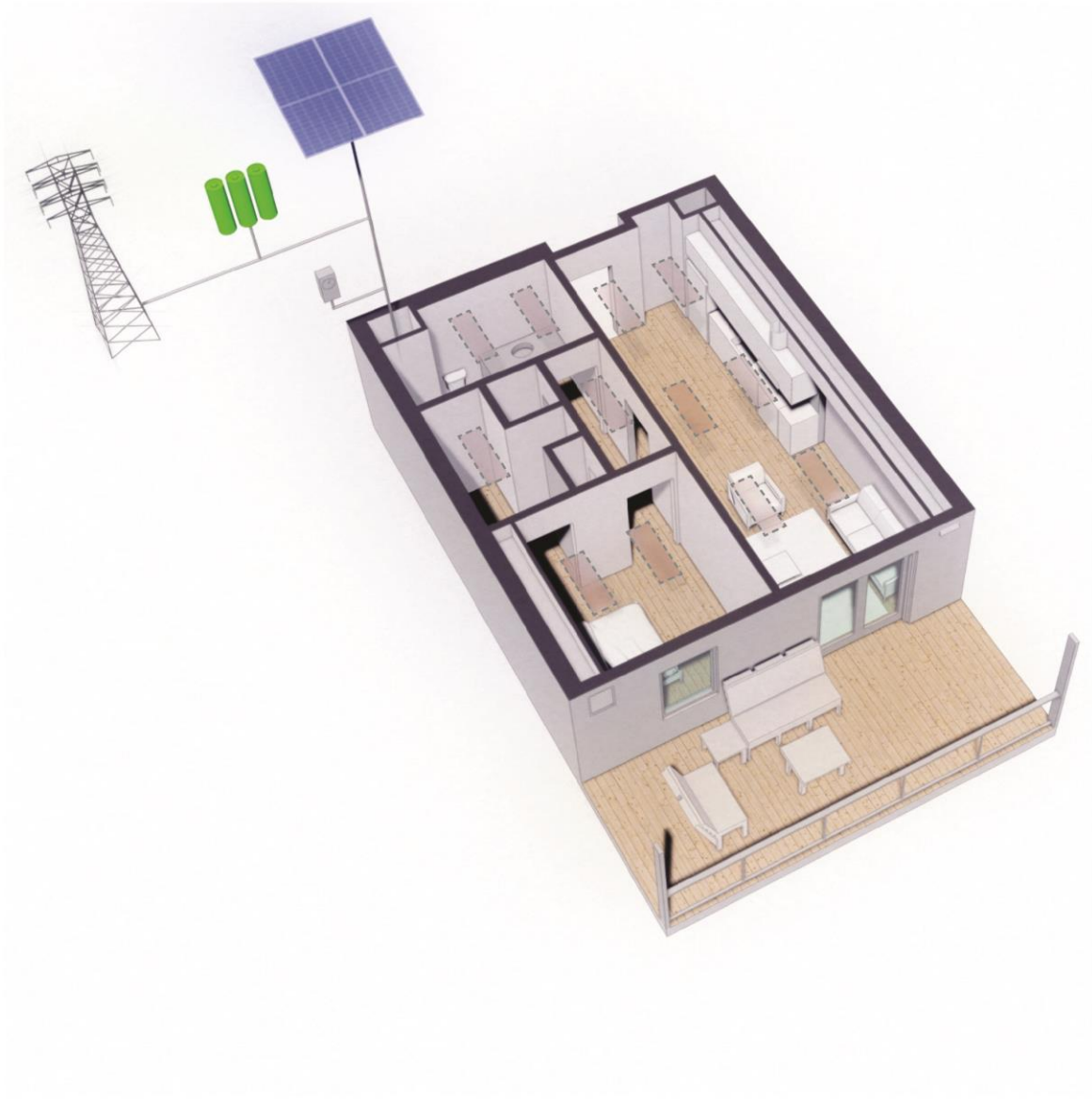
9. Hourly load shapes for energy and emissions



10. Details of renewable energy systems



11. Storage Systems



B EQUITY Essay

Equity at SōL Harvest Village:

SōL Harvest Village addresses equity – cultural, social and environmental, in multiple ways. To avoid the significant challenge of preconceived ideas of how families from different cultural backgrounds live and work, we interviewed staff from a farmworker support non-profit organization in Hollister CA, as well as a Visalia resident to get a sense of the larger community. This effort proved invaluable in clarifying what was essential to create more equity for the families. Our understanding is that family and the sense of community is very strong and dominant in the farmworker culture, which is predominantly Latinx in the region, calling for a design response that supports a strongly connected community, or 'extended family';

- SōL Harvest Village is a series of connected 'neighborhoods', or "Pods", scaled to allow people to connect with each other and create a cohesive and supportive community.
- SōL "Pods" are organized around a series of exterior common spaces – focused on exercise, sport, community vegetable gardening, a children's play area, a BBQ area or an open lawn, which offer opportunities to for the residents to gather in myriad ways. These spaces extend the living area available to residents and enhances the sense of the larger cohesive community.
- In addition to the centralized exterior amenity spaces, each "Pod" contains flexible amenity spaces, including cooking facilities, that provide opportunities for multiple families or individuals to gather, serving as further extensions of the living area for all residents.
- A central community hall, serves a wide variety of uses, from larger community gatherings, meetings and performances to providing classroom space for youth and adults as well as housing the village's community youth center or after-school programs.
- Covered private porches extend the living area of the individual units and create a buffer zone between private and public space permitting people to engage with the larger community more or less actively, depending on their circumstances, while reinforcing that they are part of a supportive community.
- The private porches also provide flexible outdoor space where families can grow plants or vegetables which can help address the chronic issue of food insecurity for farmworkers and their families, also promoting improved air quality.
- Knowing farmworkers disproportionately incur high rates of acute and chronic injuries, disease and disability, it's essential for the housing to provide a healthy environment for the residents. Specifically to minimize the amount of contaminants entering the homes, SōL Harvest Village incorporates two layers of wash areas outside the units. The first is next to the parking, where heavily soiled clothes can be removed and cleaned, isolating them from the living areas. The second is just outside the unit entry, to place less soiled clothes prior to entering the living areas, further helping to improve IAQ.
- With most residents having limited finances, providing a variety of internal and external spaces for people to gather and live expands their functional living area is essential to creating a more equitable community living environment for the farmworkers and their families.

C. Climate Adaptation Assessment Matrix

PROJECT NAME:	SoL Harvest Village		
IMPACT	ADAPTIVE MEASURE	USING THIS MEASURE? (Y/N)	IF THE PROJECT IS EMPLOYING THIS MEASURE, BRIEFLY DESCRIBE TECHNICAL SPECIFICATIONS
HEAT	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
	[illegible]	N	[illegible]
	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
PRECIPITATION CHANGE (e.g. drought, extreme precipitation events)	[illegible]	Y	[illegible]
	[illegible]	N	No
	[illegible]	N	No
	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
	[illegible]	Y	[illegible]
	[illegible]		
WILDFIRE	[illegible]	N	No
	[illegible]	N	No
	[illegible]	N	[illegible]
	[illegible]	N	No
	[illegible]	N	No
	[illegible]	N	No
	[illegible]	Y	[illegible]
	[illegible]		