

ARCHITECTURE AT ZERO

2021-22

A design competition for Decarbonization, Equity and Resilience in California



AFFORDABLE FAMILY HOUSING FOR FARMWORKERS IN VISALIA, CALIFORNIA

For food, we initially relied on nature; then ourselves; and now other people.

—Mokokoma Mokhonoana

CHALLENGE

The Architecture at Zero competition challenge is to create housing for farmworker families in California's Central Valley with low carbon emissions. Key aspects of this project include responding to the challenges of equity and resilience as part of the design solution.

There are four parts to this challenge:

First, entrants will create an overall site plan to accommodate the program outlined below. Entrants are encouraged to highlight any energy efficiency, renewable energy, energy storage, and carbon reduction strategies or systems shown.

Second, entrants will design the building in detail, and demonstrate how the design will result in lower carbon emissions and embodied carbon. In order to indicate how the building design will result in lower carbon emissions, entrants will provide required documentation and may also include supplementary documentation.

Third, entrants are asked to describe how this project engages resilience strategies.

Finally, entrants are asked to reflect on their research and design process in submitting their entry, answering the broad question of how their submission enhances equity for the residents of the project.

ABOUT VISALIA AND THE CENTRAL VALLEY OF CALIFORNIA

The Central Valley of California is one of the most productive agricultural regions on the planet, providing more than half of the fruits, vegetables, and nuts grown in the United States. More than 7 million acres (28,000 km²) of the valley are irrigated via an extensive system of reservoirs and canals.

One of the larger cities in the region is Visalia, the seat of Tulare County. The economy of the city of Visalia is driven by agriculture, especially grapes, olives, and citrus. About 138,000 people live in the city, and the population is predominantly Hispanic (53%) and white (36%). The city boasts a vibrant downtown with a number of striking murals.

About 60 miles east of Visalia is an area called “the Land of Giants” in the Sequoia National Forest, part of the Sierra Nevada mountain range. The dramatic landscape testifies to nature's size, beauty, and diversity—huge mountains, rugged foothills, deep canyons, vast caverns, and the world's largest trees.

ABOUT THE FARMWORKERS OF THE CENTRAL VALLEY

Professional farmworkers who know how to do a number of different jobs, whether it be pruning or picking or crafting, they see themselves as professionals, and they take a lot of pride in that work. They don't see themselves as doing work that is demeaning.

—Dolores Huerta

Farmworkers are traditionally defined as persons whose primary incomes are earned through permanent or seasonal agricultural labor, an essential component of California's agriculture industry. Farmers and farmworkers are the cornerstone of the larger food sector, which includes the industries that provide farmers with fertilizer and equipment; farms to produce crops and livestock; and industries that process, transport, and distribute food to consumers.

Farmworker households often include extended family members. Many farmworker households tend to have difficulties securing safe, decent, and affordable housing, and are often forced to occupy substandard homes or live in overcrowded situations. Additionally, farmworker households tend to have high rates of poverty, low homeownership rates, and are predominately members of minority groups.

Migrant farmworkers may also be individuals who travel not only across county lines but also from one major geographic region of California to another to find work. Travel for work prevents them from returning to their primary residence every evening. Many migrant farmworkers are single males, most of whom are married and migrate alone to support their families who live at home base. Many farmworkers are of Hispanic (LatinX) heritage and enjoy gathering with family and friends in their homes and public gathering spaces.

The Architecture at Zero competition challenge focuses on families in permanent residence in Visalia, not individual farmworkers traveling to multiple locations throughout the state.

ARCHITECTURE AT ZERO COMPETITION 2021-22 PROGRAM

The proposed program is for 105 new units of affordable housing, for farmworkers and their families.

Unit size and composition:

37 units to be 3 bedroom (size range 900-1250 sq ft.)

37 units to be 2 bedroom (size range 700-850 sq ft.)

31 units to be 1 bedroom (size range 450-590 sq. ft.)

Air conditioning is required. Residents prioritize natural light in their living spaces.

Height limits:

On the northern side of the site, (E. Glendale Ave.) building height should be 2 stories. On other parts of the site (east, west and south) heights may be 3 stories (including parking.)

Other site requirements:

In addition to residences, the project should include community space of 3000 sq ft. (to include a laundry room, meeting space (for 30-50 people), community kitchen, 2 unisex bathrooms, and a computer lab.) Internet connectivity is important to residents, both at home and in the community center.

The site should have a playground for children ages 2 to 12 years old, a multi-use full or half court surface play area that could be used for basketball or “pick up” soccer, and a BBQ and picnic space for residents.

Parking:

Parking is required on site. One parking space is required for each 1 bedroom apartment and 1.5 spaces are required for each 2 and 3 bedroom unit. 2 of the total spaces should be reserved for electric vehicle charging stations. PV's may be used to shade the parking, should entrants seek this design solution.

Renewable Energy and Storage:

Integrated PV and battery storage systems are strongly encouraged.

CHALLENGES TO RESILIENCE

For the purposes of the Architecture at Zero competition, resilience is described as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.”¹

The most acute challenges to the resilience of Visalia’s farmworkers are poverty and air quality. However, climate change, extreme heat and drought are also important factors to consider.

Poverty:

Poverty and low-income status are associated with a variety of adverse health outcomes, including shorter life expectancy, higher rates of infant mortality, and higher death rates for the 14 leading causes of death. Many farmworker families are low income and thus live at or below the US poverty line. Ironically, farmworkers may find it difficult to access fresh fruit and vegetables from local stores as much of the harvested food is sent for packaging and processing off site.

Air Quality:

Air quality is a chronic and serious issue for Visalia for a number of reasons. Smog and wildfire smoke from other areas of the state can settle in the region for weeks and months, often resulting in some of the worst air quality in the U.S. High rates of asthma and lung disease impact the lives of children and adults. In addition, there are concerns about “pesticide drift” and leaching in the Central Valley of California. Residents can experience risk of contamination from pesticides when living in proximity of application sites.

Climate Change and Drought:

Most of California’s precipitation falls in the winter as snow. Due to climate change, this is expected to change, resulting in more frequent rainfall events and less frequent snowfall events. It has been projected that the Sierra Nevada mountain snowpack will experience a 25% to 40% reduction from its historic average by 2050. Rising temperatures have resulted in more precipitation falling as rain instead of snow, and snowmelt occurring earlier in the spring.²

In addition, the combination of higher temperatures, periods of low precipitation, and the potential higher reliance on groundwater supplies may cause a drop in groundwater tables and a concentration of groundwater contaminants. Higher intensity storm events may lead to more surface runoff, and less infiltration and groundwater recharge. Additionally, more precipitation falling as rain rather than snow could also mean more surface water runoff and less infiltration and recharge. Less recharge would lead to more concentration of contaminants and poorer groundwater quality. In an effort to recharge groundwater aquifers, increased application of storm water and/or treated wastewater injection may alter groundwater quality.

Extreme Heat:

In August 2020, temperatures in the Central Valley soared to 112 degrees Fahrenheit, breaking previous records. Climate scientists expect that extreme temperatures will continue in the future.

¹ [The Center for Resilience](#) - LEED

² [Climate Change in the San Joaquin Valley](#) – Union of Concerned Scientists

EQUITY

Equitable design takes into account social vulnerabilities, acknowledges experiences, opportunities, and barriers among different groups of people, and helps strengthen communities by engaging local social and cultural contexts. Designing for equity means maximizing positive impacts across multiple scales by creating productive spaces and systems for the individual, the community, the environment, and global sustainability. Marginalized groups often face higher risks of climate vulnerability as well. Access to resilient spaces and resources are essential to mitigate those risks. By dismantling barriers to elevate individuals to an even playing field, equitable design can create inclusive and empowering environments.

While often used interchangeably, equity and equality mean different things and lead to different results. When we treat everyone equally, we treat everyone the same, but when we treat everyone equitably, we focus on individualistic needs. Equity asks us to acknowledge that everyone has different needs, experiences, and opportunities.

The fourth aspect of this competition requires submitters to reflect on the question of equity. Be sure to submit an essay of at least 250 words, and no more than 500 words, on how your design process was influenced by your research and consideration of issues of equity.