

## Market Analysis

The Market Analysis is critical to ensure the success of the building because it is the end users that will use the home for years to come, long after this competition is over. For the Market Analysis, the team had Julio, a marketing major at BYU, help us develop a market analysis survey. We collected data on where these people lived, how much they made, and their household income. We are still going through the results; however, We will share the general takeaways from the analysis here.

Location of permanent site:

- Our house has a unique portability feature that allows it to almost anywhere that can be craned off a moving truck.
- Depending on the soil conditions, some prep work will have to be done, like underground utilities, footings, and foundation in its final spot.
- Upon moving the building, minor repairs will be completed within the house.

Also, the house will need its electrical system redone and will need to hook up to local utilities. Our home was designed for the western states, where we see scorching and frigid temperatures in summer and winter, respectively. Most survey respondents live in Utah; however, we had respondents from Texas, Arizona, Colorado, North Carolina, Idaho, Georgia, Florida, Nevada, Indiana, and Nebraska. The triple dome home is shippable, so the house's permanent location could be sold anywhere and taken

anywhere. The team is taking the house to Orange County and showing off the home in the Utah Valley Parade of Homes, so we plan on marketing the house for sale during those events.

The client demographic for the Triple Dome Home would be individuals or families that are looking to purchase their first home and want to prioritize sustainable features.

These clients could be young adults, couples, or even older couples looking to downsize.

From our survey, most people were interested in a home that could reduce the amount of money spent on energy and utilities. From the survey we collected, 78.18% of all individuals surveyed were somewhat interested or extremely interested in a house that could save the homeowner 30% on utilities, whereas 60% were somewhat interested or extremely interested in having a home that is friendly to the environment. For the homebuyer, having the high R-value and the thermal massing of the concrete as an almost unbroken envelope will allow the home buyers to save money and use less energy, thus being environmentally friendly.

If we plan on selling this house for \$250,000, then the annual income of our client would have to be more than 65,310 a year because the land is not included in the purchase of the house. From our survey, almost 40% of people surveyed could easily buy this house. If clients were making somewhere in the \$50,000-\$74,999 range, they could buy this house; however, it would be a significant part of their paycheck. Local prices for a home

with an extra bedroom and an additional 236 sqft are \$439,900. Having a home that costs almost half of that would be a deal for anyone involved in this process. We would like to have the client be a recent graduate or a working professional trying to get into their first home, and it would help elevate some of the pressure that is felt by the individuals looking to get into the market. If the client was to buy 2.5 acres in Cedar City, Utah, they could get that for an additional \$50,000. With that in mind, the owner could buy a more expensive piece of land, but with that land we have chosen, that would put the price of a new home at \$300,000.

#### Affordability and Cost Effectiveness

Upfront costs of Construction: 113,492.95 This is with appliances, student wages, and our solar panel system. That is what we have spent so far, and a lot of things have been donated and sold to us at a discount. We have around 20,000 left to spend on the house before it is completely finished.

In the area of Provo Energy Bills cost around \$131.26, our solar system is designed to be next zero on an annual basis thus eliminating the cost of electricity for the Triple Dome Home Occupants. A typical home in the area will use around \$41 worth of money every month. Cable and Internet would charge the owners around \$100. This would add up to \$141 monthly in expenses for the owner to cover. This number doesn't consider the energy savings of the Triple Dome Home and the limited electricity that would be needed to run the home.

According to [SoFi](#) the median two-bedroom rent is \$1,167 and in the Provo area the combined utilities come out to be \$271 which is \$130 dollars more expensive than the Triple Dome Home in just utilities. Our goal was to make a home cheaper and more energy efficient than our competition. We estimate that living in this home would save a minimum of \$1,560 annually for the occupants.

### Market Analysis

Our client demographic is either young working professionals, new families, or retired individuals who care more about saving money and less about space. Therefore, our home feels quite significant for the small 800 sqft home we built. We tailored the house to fit these clients, and it could be a great starter home for anyone looking to enter the market.

The Utah area has had a massive housing shortage over the last decade; truthfully, Utah has a housing shortage problem. More money is in single-family, higher-end residences, and so that is what most builders build in the area. There are increasingly more young individuals who want to live in the area, with fewer houses available for them than ever before. This creates a price increase that can be felt in many areas nationwide.

When everything is said and done, we will have the span panel inside the house, which will allow the house to be controlled and energy can be monitored and reduced from the touch of a button. In addition, having the heavily insulated envelope will dramatically decrease the energy needed to be spent on conditioning and heating the air within the structure. With smart energy appliances, the home will be better suited

for individuals who want to live in a more energy-efficient household. More energy efficiency will be the Triple Dome Homes' most significant selling point.

### Livability

The current market expectations for livability and convenience have grown over the last decade. We want something that will tailor to our lifestyle, and we designed the home to do just that. The open floorplan with the dining room and living room lets the occupants entertain family and friends. With safety in mind, the Triple Dome Home will be fire resistant compared to similar wood-framed houses; because of the weight of the concrete, it is perfect for the windstorms in the area, being a safer version of what it is.

A smaller home makes it easier to provide adequate heating, cooling, ventilation, and lighting. The layout of the house should be functional and easy to clean. The house should be more affordable than anything on the market for purchase, allowing the home to be more livable compared to the average home in the area. Finally, the home's location will solely depend on the buyers, so if they chose a safe and convenient location for them, then the house will be even more viable for them.

With the smaller footprint, the house has been designed to be as functional as possible. Safety was our number one priority for this home, and it can be seen in how the house supports a safe, functional, and enjoyable place to live for any family. Many of this house's features are considered safe, like the scraped concrete walls and ceilings, so any child running into the wall will not be damaged. As a smaller home, the house has to be

incredibly functional, and we tried to give the user much more functional area. The closets are a good size, and the storage area above the washer/dryer combo should be enough of a pantry for a growing family.

The house was built to be thermally efficient, so we ensured the envelope to the building was unbroken and highly insulated. Thermal efficiency is where the Triple Dome Home can shine. With less air to condition, less space to illuminate, and smart appliances and water-saving faucets, our clients will naturally use fewer resources than a traditional homeowner. In addition, with a smaller area, the Triple Dome Home will require fewer resources to make it feel like any other building. Finally, the Thermal Massing of the concrete will allow the house to stay at a more generalized temperature and save the client a lot of money during the cold winters and hot summers.

### Buildability

Having subcontractors come and perform the work was critical to the dome shape; we had South Industries come and help us build the domes and spray the insulation and the unique shotcrete mixture. Having a subcontractor with all the expertise in building a dome made the construction process a lot easier. Much of the construction is similar or the same as a traditional house. Framing becomes more challenging than most because of the rounded ends, and this can be done more efficiently by a framing subcontractor. Framing is where we had the most setbacks because of the student involvement. It took more work to get the area framed out and done when many volunteers who came to

work on the house needed to be more capable. We have sent the design change time and time again throughout the build process, and yet the Triple Dome Home has not ever given us a challenge we could not surpass. The buildability of this kind of structure is unique but very doable for someone with experience in the construction industry.

### Scalability

This type of construction can be scaled up in massive ways. For example, these homes could be built on an assembly line and shipped out nationwide. They would give a much-needed positive market impact within the U.S. by giving affordable housing to thousands of Americans.

The entire building can be built offsite and even mass-produced in a way that only requires underground plumbing and utilities to public utilities and the footing and foundation work to be done on-site.

If the builder had in-house trades for all aspects of this work, they could produce at least four homes daily, even more depending on their scale. The trades already perform this work, but the building structure is different, so some things have to be altered.

However, if a company were to do these projects and bring in the help they need, the repeatability of the homes would make the workers incredibly efficient and effective.

The entire marketplace could follow along and start making more concrete domes for houses, extending the average house's lifespan. An extended lifespan would allow the homeowners to get more life out of the home and have less energy load. Although, as

we can see, the house can change shape drastically. Hopefully, we will see more concrete domes placed in all marketplace areas wherever buildings are considered. Even if we can find a way to build a traditional wood-framed structure that would allow for a sealed envelope of insulation, we would consider this building impact success.

### Innovation

We have been building homes the same way here in the United States for a long time. Very few buildings are not wood framed; although we can make a traditional brick house, only a few do so. At this stage of the built environment, doing a wood-framed house is cheaper, faster, and more straightforward. We contest that a concrete dome costs roughly the same as a traditional wood-framed house. It can be done quickly once the process is understood and broken down into simple steps for the competition. The entire shape of our home is innovative and goes against the standard building methods of today. However, we chose the dome shape because of the unbroken envelope of insulation, which reduces thermal bridging and increases thermal massing. The structure is more stable and can withstand extreme weather conditions such as hurricanes, earthquakes, and tornadoes. The shape of the dome can vary greatly depending on what the end user needs and can have unique architectural features. The concrete used in the dome is long-lasting and can be recycled easily when its lifespan is complete, making it a greener and better option for the future.