



UNIVERSITY OF DENVER
Solar Decathlon

MARKET POTENTIAL
BUILD CHALLENGE

LIVABILITY



DU's home design matches most of the houses in the 5 mile-radius around DU. Our target market is looking for affordable and functional living near the DU campus. Renovations allowed for three bedrooms on the street level floor. The bedrooms size and style is fluent with many of the other properties around this area. The design renovations of the house have been limited but are still able to provide a comfortable space to sleep, cook, and enjoy time with friends.



Lighting and other controls were brought up to date and code from their previous 1950's installation. Asbestos has greatly limited what can be done to the property. Instead of the complete remodel we had hoped to do, we had to settle on upgrading features of the house. Lighting, appliances, and electrical was brought to code. The HVAC system was moved from the basement into the attic to allow for more efficient heating and cooling as well as bring it out of the flood plain. RetroFoam was used as insulation to increase the R rating of the walls and therefore lower the energy used to heat/cool the building. Smart thermostats also allow for convenience to the occupants.



The basement of the building was left mostly as-is due to the FEMA floodplain rating of the property. The FEMA floodplain regulations and the asbestos limited what could be renovated on the house. The focus is creating a safe, eco-friendlier house for the shareholders.

MARKET ANALYSIS

ZONDA HOME DATA

Unless otherwise stated, the following data is market intelligence collected by Zonda Home Denver division. Zonda Home updates its data quarterly and has assisted our market research efforts tremendously.

DENVER MARKET

Denver is a booming residential area that has become a prime location for families, couples, and empty nesters to settle down. Denver was recently ranked as the second Best Place to Live/Best Place to Retire by U.S. News & World Report in 2021. Due to the rapid population growth and low supply of land, the current housing stock is undersupplied and in high demand. The low supply of homes in the area is causing existing pricings to skyrocket, creating a trend of unaffordability within the city. Through the use of green building methods, the price of both existing and new homes can become significantly more affordable.

TARGET MARKET

The target market we are focusing on is the well-established adult community who wishes to live in a home with a variety of green infrastructure. This allows our consumer group to save money on their utility expenses while knowing they are making a significant impact on the environment. They desire upgrading their home to an energy efficient model, while staying within a reasonable budget.

MARKET POTENTIAL FOR GREEN CONSTRUCTION

A solution that is sprayed into the building area that conjugates and seals hole with no harmful chemicals. As AeroBarrier is applied, the results are displayed in real time. By incorporating a blower door, the AeroBarrier system is able to target and hit your desired Air Changes per Hour (ACH). The system gets leakage readings in real-time allowing to stop the process once the target is hit.

RESOURCE EFFICIENCY

By using sustainably harvested and recycled materials to build, we are creating durable and economically responsible homes for years to come. This type of efficiency can mostly be seen in the building process and can help builders save on costs as well as materials. For example, we utilized unique solutions such as RetroFoam which creates a higher R value. This in turn allows the homeowner to reap the savings of a green design. In addition, the implementation of recycled products such as recycled cabinetry can further enhance the sustainability of the home.

EXISTING HOME MARKET

The city of Denver has very little land available to develop new infrastructure. With the rapidly growing population, the city needs to turn their efforts to renovating the existing market and making those homes more livable. A great portion of the homes in the Denver MSA were built before 1970 and neither livable nor energy efficient. To expand the housing infrastructure and preserve the environment for future generations, a great deal of effort needs to be put into preserving and upgrading the homes which are already built. By providing necessary upgrades and utilizing recycled materials, it was more efficient for us to revamp this current property than to tear down and start new. This concept applies across the entire US, and is especially crucial in the Denver market with our low supply of housing stock.

REPRODUCIBILITY

The total cost of this project falls right above \$40,000 and can easily be competed by other homebuilders in the area. The design methods are rather straightforward and will contribute to a significantly higher HERS rating. This project will likely be a guide for future renovations to improve the environmental impact of other designs and to create more livability.

TARGET MARKET



"I'm looking into ways that add value to my home. Making my space feel great for having company over and having a good time."



OVERVIEW

The market we are focusing is not looking to move into a brand-new home, but live in one with character and charm that just needs a little of that **TLC magic**. The **target audience for the DU house is a homeowner seeking to renovate their home with net-zero and energy efficiency in mind** - within a reasonable budget of course! They are curious in knowing what the latest technologies and methods are in transforming their little corner of the world.

JANE SMITH

Location	Denver, Colorado
Age	58
Relationship Status	Married
Household Income	\$76,900
Children	1
Education	Master's/PhD
Homeowner/Renter	Homeowner
Occupation	Teaching

FAVORITES

Some of Jane's favorite things about her neighborhood:

- ✓ Walkability
- ✓ Parks
- ✓ Location
- ✓ Great sense of community
- ✓ University Campus

HOME

Some of Jane's favorite things about her home:

- ✓ Memories of family and friends
- ✓ Character and charm
- ✓ Backyard
- ✓ Extension - added space

JANE'S NEEDS & GOALS

Jane lives with her husband and they have the house to themselves now that her daughter is in college. She's noticed conditions are her home that she would love to improve:

- ✓ The big window that lets cold temperatures seep into the home in the winter
- ✓ Electricity running longer during hot and cold temperature
- ✓ In need of new appliances

JANE'S FRUSTRATIONS

- ✓ Affordable and sustainable, energy efficient housing options
- ✓ Housing she and her husband can live in that's centrally located in an engaged community
- ✓ Having to drive long distance to work, especially regarding affordability

TECH COMFORT

INTERNET

SOCIAL MEDIA

SEARCH ENGINES

DEVICE CHOICE: LAPTOP

BUILDABILITY

The current housing industry is significantly more focused on energy efficiency and energy reduction than ever before. Everything from the exterior sheathing, roofing, and windows to the interior lights and appliances is selected to minimize energy consumption in both new construction and in-home renovations. Based on the current specifications and models we believe that the materials specified and depicted are aligned with the current home construction industry. The materials we have specified were selected with efficiency in mind which aligns directly with current market trends in new construction and in-home renovation projects such as we have here.

The design we have created supports buildability in the following ways; to start with the design uses an existing structure and well known and standardized materials meaning the project does not go outside of standard industry expectations and knowledge. Second by reviving an existing house we are preserving the neighborhood and preserving lower cost housing options rather than building a new construction which out prices the existing market in the neighborhood.

While a home renovation is always difficult, a house built in this era presents many different challenges from its outdated construction methods. One of the biggest concerns of renovating any pre 1970s home is asbestos. Asbestos mitigation is hugely expensive and requires a specialized team to ensure that the asbestos is removed and disposed of in the correct and most environmentally conscious manner possible. The asbestos in the project house is a significant problem and mitigation strategies are being used however a complete renovation is not achievable due to these circumstances. Similar to the asbestos that is in this house, things such as lead paint, lead pipes, and outdated electrical are serious issues that can be found in 90% of the older homes around the DU area. The FEMA floodplain regulations as well as the universities budget limitations do not allow for the property to be claimed as a tear-down. Therefore our team focused on upgrading and renovating the property to be as comfortable and eco-friendly as possible. The benefit of preserving one of these older homes aside from preserving the neighborhood is the significant cost savings to starting fresh. The materials that are conserved through the process of reviving an existing house vs rebuilding a new construction help to reduce waste and help to maintain the existing land space around the property. This makes construction significantly more likely to be successful as the total scope is significantly reduced compared to a new construction.

In the private sector building this house would likely not be done. In most cases new builds are focused on a larger scale on a smaller lot rather than a small home such as this on a relatively large lot. In the current market you could not find a house such as this. Due to the cost of land particularly in this area of Denver if you were to build this house today it simply wouldn't be worth it. However in terms of the renovation we believe that this house could easily be replicated in other homes. The construction costs of doing a renovation versus building a new home are significantly less making a renovation a much more achievable prospect.

