



TEAM ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
ILLINOIS SOLAR DECATHLON

RENU HOUSE

A RENEWABLE, ECONOMICAL,
NOURISHING, & UNIVERSAL HOME

PROJECT REPORT

1. INTRODUCTION

Illinois Solar Decathlon is an interdisciplinary registered student organization at the University of Illinois at Urbana-Champaign seeking to lead innovation in design and construction to advance towards an environmentally sustainable future. We are thrilled to present our latest project, RENU House.

RENU House is a 1,510 SF energy net-zero home. RENU represents the four guiding principles of our design and construction processes: Renewable, Economical, Nourishing, and Universal.



RENEWABLE

The most important feature of the project is energy net-zero status, but we have also striven to reduce the effect on the surrounding environment in every other aspect of the home.

ECONOMICAL

Sustainable developments must be financially feasible to be adopted. We have prioritized cost efficiency in every design choice to ensure the home remains affordable for our target clients.

NOURISHING

The design seeks to encourage fulfilling lifestyles by prioritizing accessibility for all abilities and emphasizing the mental and physical health of occupants.

UNIVERSAL

This design can be replicated in similar small-town markets across the United States, potentially bringing sustainable innovation to communities throughout America.

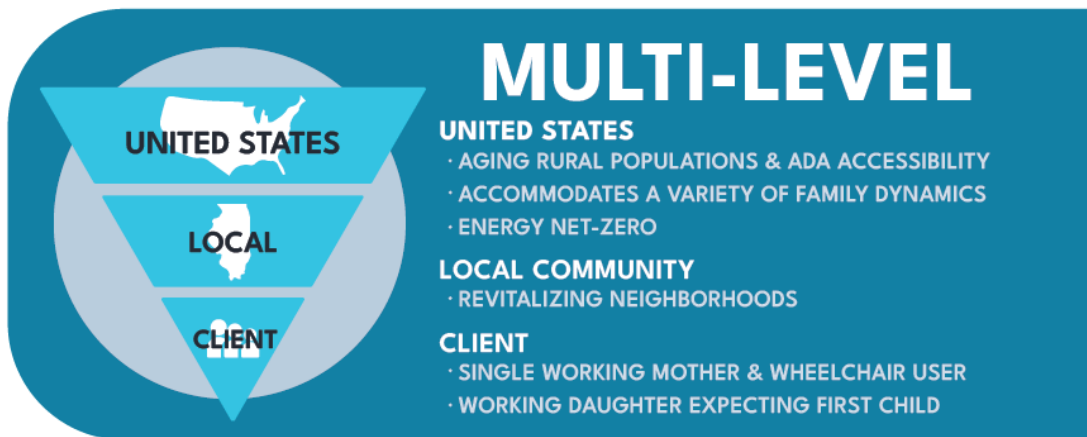
RENU House is nestled in the village of Rantoul, Illinois, a town of roughly 12,000 people fifteen miles north of the University of Illinois at Urbana-Champaign at 1318 Rockland Dr. in Champaign County. Illinois Solar Decathlon has partnered with the Village of Rantoul Urban Planning Committee and the local Champaign County chapter of Habitat for Humanity for the build, consistently communicating with local stakeholders to ensure the home meets the needs of the occupants while effectively integrating into the small-town community.

RENU House was designed as a family residence, and can accommodate a diverse range of family dynamics such as a single parent or multigenerational household. Upon completion of the Department of Energy Solar Decathlon competition, the home will be fully donated to a local Habitat for Humanity family in need.



2. PROJECT PHILOSOPHY

We believe that a truly sustainable future should incorporate societal needs as well as environmental needs, placing emphasis on mental, physical, social, and financial health. RENU House's technological innovations minimize its effect on the environment through net-zero energy consumption, but the project also tackles a number of social issues on multiple levels. The project's benefits can be examined in relation to national trends, the needs of the local community, and the wishes of the family that will one day call the house a home.



2.1 National Trends

RENU House was designed to be universally adaptable. All materials and labor in the construction of RENU House were sourced from local suppliers and subcontractors in rural Illinois, implying that this home can be replicated in similar socioeconomic markets across the country. RENU House's design specifically addresses a variety of growing needs in U.S. rural markets.

Rural areas in the United States are growing older. According to the U.S. Census Bureau, 17.5% of the rural population was aged 65 years or older in 2016, a notable increase from 12.8% in 2000. Furthermore, persons with disabilities make up 23% of rural areas. As the baby boomer generation grows older, these numbers are expected to grow, leading to unique needs in housing and infrastructure. Residents of rural areas have long been characterized as valuing independence, self-reliance and individualism, traits that should be taken into account when designing this infrastructure. RENU House emphasizes accessibility for all abilities, maintaining ADA accessibility throughout the home (with the exception of one out of two bathrooms). We also prioritized low maintenance in every facet of the design: the ductless HVAC system requires less yearly maintenance than a traditional system by eliminating filtration, and using native, perennial vegetation in our landscaping requires very little work from the occupant.

The layout of the home can also accommodate a variety of living situations. The flexible hub space can be converted into a private living space, a private working space, or opened up to create a circular floor plan, as demonstrated in the graphic below. A multigenerational



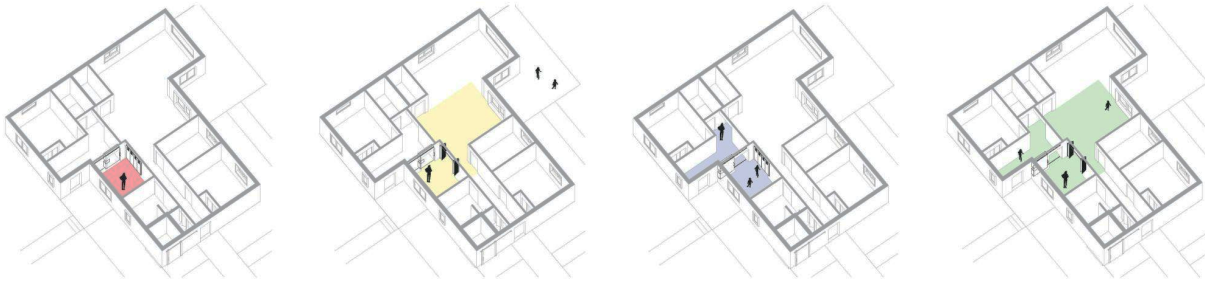
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household, a single parent family, or an independent working professional couple could all tailor the home to fit their specific needs.



And lastly, the energy benefits of the home are applicable in any community across the United States. Although it requires an initial investment, our solar array design is estimated to pay itself back in six years, reducing homeowner energy costs for years to follow. The positive environmental impact of reducing the need for non-renewable electricity production in the U.S. also goes well beyond the financial benefits.

2.2 Local Community

RENU House has been built in the Village of Rantoul, a town of roughly 12,000 people fifteen miles north of the University of Illinois at Urbana-Champaign. In 1993, the local Chanute Air Force Base, the primary economic driver in the town of Rantoul, closed down. This led to a mass exodus of residents, as the population decreased by half and approximately \$100 million in commercial spending disappeared. The community has evolved since then; as a primarily white population gets older, the black and hispanic populations have grown, primarily made up of young low-income residents attracted by an affordable housing market.

As a result of this changing population, a top priority of the local Rantoul Urban Planning Committee is to try and revitalize neighborhoods by replacing vacant and dilapidated properties with new, affordable, and sustainable housing. Illinois Solar Decathlon has partnered with the Rantoul Urban Planning Committee for the RENU House project, and we firmly believe our home's design can help meet this goal.

2.3 Client

Illinois Solar Decathlon has partnered and worked closely with the Champaign County chapter of Habitat for Humanity to ensure the home will benefit a local family in need after the competition. Upon completion, the home will be donated through Habitat for Humanity to a single mother and intermittent wheelchair user, and her adult daughter who is pregnant with her first child. With the abundance of accessibility, low maintenance design considerations, and innovative family-centered plan, the soon-to-be trio will be comfortable at any level of physical ability and able to navigate the challenges of child development more easily than in a standard home. Overall, the RENU House will provide long-lasting stability and comfort to a family in need.



3. CONSTRUCTION PARTNERS

3.1 Contractor

Illinois Solar Decathlon partnered with numerous companies and organizations to make this project possible. Early in the design process, we worked with engineers from the Boston office of international design and consulting firm Arup, who supported us throughout the early conceptualization and basic design stages of RENU House. Illinois Solar Decathlon also partnered with the Chicago office of national construction company Whiting-Turner, who provided valuable advice and support while we formed our construction specifications, request-for-proposal, and other aspects of construction. As a completely student-led organization, all contract signings, construction payments, and communications were managed by our student construction management team. Our general contractor for construction was Nelson Builders, a local low-volume custom builder that specializes in high-efficiency homes. The communication and flexibility of Nelson Builders in maintaining an accelerated construction schedule was especially imperative to our project's success.

3.2 Funding and Sponsorship

Illinois Solar Decathlon secured the necessary funding for the project through a variety of grants and awards from numerous organizations including the Illinois Student Sustainability Committee, U.S. Department of Energy, Illinois Clean Energy Community Foundation, Ameren Illinois, Energy to Educate, and numerous departments within the University of Illinois. We have also received contributions from corporate sponsors through product donation and design consultations. Companies we have partnered with for material sponsorship include Jeld-Wen Windows and Doors, Daltile, MOSO, Morin, Mission Solar, SolarEdge and Unirac. To minimize lead times and support the community, we worked to partner with local companies that share our beliefs in sustainability and innovation whenever possible.

Illinois Solar Decathlon has made certain to give back to our contributors in multiple ways. As a show of our appreciation for their donations, all contributors received complementary benefits for partnering with us based on the amount they contributed to the project. This includes items such as an organized portfolio of resumes of all our current members and a feature in our sponsorship product booklet that showcases the sponsor and the items contributed that have gone towards constructing the project. In addition, we encourage all of our sponsors to join our newsletter and send invitations to our general team meetings so they may stay updated on project updates and news.

3.3 Creation of a Non-For-Profit Build Solar Inc.

At the beginning of the project, a huge question we had to answer was: What will happen to this house once it is donated? We knew that with such a unique project, there would be so many ways to contribute to our community and expand the notion of sustainable living in Champaign-Urbana. It was not long until we realized being able to donate this house was one of them. This is why we have partnered with the Champaign Chapter of Habitat for Humanity and have been matched with a mother and daughter to fully donate to RENU House, but with this, came many challenges. In the past, when Solar Decathlon was not a local build competition, we had a strong partnership with the University of Illinois Urbana-Champaign. It



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was their name on the contract so that liability shifted away from students and to the University. In return, the University would take ownership of the home after the competition, and place it on the campus as storage space. This model for our organization hindered our ability to fully donate the home to Habitat for Humanity hence why the student leaders have founded a 501c Non-for-Profit, BuildSolar Inc., with the help of McDermott Williams law firm in Chicago.

With this non-profit as the official sister organization of Illinois Solar Decathlon, we have been able to apply for grant funding without having to go through the bureaucratic process of the University. We have also been able to sign the construction contract with Nelson Builders without the University's name on it which allows us to be in full ownership of RENU House, and therefore, have the full authority to decide what will happen to the home post-competition. BuildSolar Inc. has also given our organization the ability to give tax benefits to companies that donate their product to RENU House which has helped us greatly. This new model that we have created allows all the money used to build this home to go straight to Rantoul rather than the University, and allows us to have an influence on sustainable living that will inspire many in the community.

4. SUMMARY OF PUBLIC EXHIBITION

During the 2 week period, we will be having media days on April 11th and 13th from 12:30 - 2 PM on both days. Present will be our spokespeople, the family we are donating the house to, and representatives from Habitat For Humanities. From there we will hold our community exhibition on April 15th and 16th with each day running from 10:00 AM - 2:00 PM. Outside of these dates, we will conduct private tours to accommodate other community groups that are unable to attend the community exhibition. So far this includes groups like Girl Scouts and Boy Scouts on April 10th and Youth Builders on April 14th.

Our outreach included the surrounding neighborhood, local schools, sponsors, community youth groups, sustainable organizations in Illinois, media, and our own community on the University of Illinois Urbana-Champaign campus. Our main strategy is communication through email so we could send updates directly as well as push out our newsletter to update on more details. This was how we reached out to schools and other community members. Similar strategies were used when communicating with our sponsors except these interactions also included specific product updates concerning each company so that we could coordinate publicity projects. Multiple requested installation footage so they could create their own sponsorship material to share with their audience. In addition, we utilized the platforms at our own school like department newsletters and bulletin boards to spread our event and also collaborated with the Grainger College of Engineering's media department to further improve our photographic content and outreach through their wide networks.

4.1 Final Details on Community Exhibition

The event will take place from April 15th to 16th with each day running from 10:00 AM - 2:00 PM. We have coordinated 30 minute time slots in which our members will lead house tours. A sign up genius was created for visitors to reserve their spot. Outside of the time spent on the tour, visitors will be able to review posters going over each of our team's work and house



design highlights. Members will also be in the surrounding area so any questions or comments may be received and given. Light snacks and refreshments will also be provided from a Rantoul restaurant to support local business. A product book will be set at the front of our house to highlight all of our sponsors and the specific equipment we have implanted in our house as well as a resume booklet for further networking opportunities per request from our sponsors. At the end of the tour when visitors exit through the backyard, we will have a timeline of photos to show our construction progress. Parking will take place in the street of the neighborhood and if needed, an empty lot in front of the house address. Due to our time slot model, this should help lessen any possible parking congestion.

5. SUMMARY OF ONLINE PRESENCE

We've seen a lot of unwavering support from community members since the start of RENU House. Though it was a bit difficult to share the start of our design process, we found ways to update our supporters as much as possible through different social media platforms like Instagram, LinkedIn, and Facebook. Once the construction process started picking up, we were able to get on site photos and videos documenting our progress. Alumni and supporters expressed their excitement for RENU House through comments, reposts, and direct messages after seeing our updates.

With LinkedIn being our account with the highest following, we were able to reach about 1,500 accounts per post. A couple of our posts on Facebook were also able to reach more than 2,000 accounts. Unfortunately, the number of accounts that interacted with our posts were disproportionate to the number of accounts reached for both Facebook and LinkedIn. Our most successful social media platform was Instagram, as our supporters are most active on that platform. One thing we noticed we struggled with when posting our design process towards the end of 2022 was having a small reach audience. About 75% of the accounts reached were already followers. Our goal for the next few months would be to expose our project to people who were interested in sustainable housing. We were able to carry this out through using various hashtags and reaching out to university student organizations related to sustainability, engineering, and architecture. After using these techniques for the next couple of posts in the duration of three months, we saw an instant 30% increase in the number of non-followers reached between January and February. We also saw a 32% increase in the number of non-followers engaged between February and March. Our analytics from Instagram tell us many of the accounts reached these posts through "hashtags" and "other", which we assume came from the generous student organizations and university departments who reposted our project.

In addition to having multiple social media platforms, we created a newsletter to send to club members, alumni, Rantoul community members, and anyone interested in receiving progress updates for RENU House. Throughout this entire marketing and outreach process, we learned how to engage with the community and will continue our efforts in informing people about our progress in creating green, affordable housing. Our marketing techniques not only expose people to the possibilities of sustainable infrastructure, but also encourage students like ourselves in thinking for the future.



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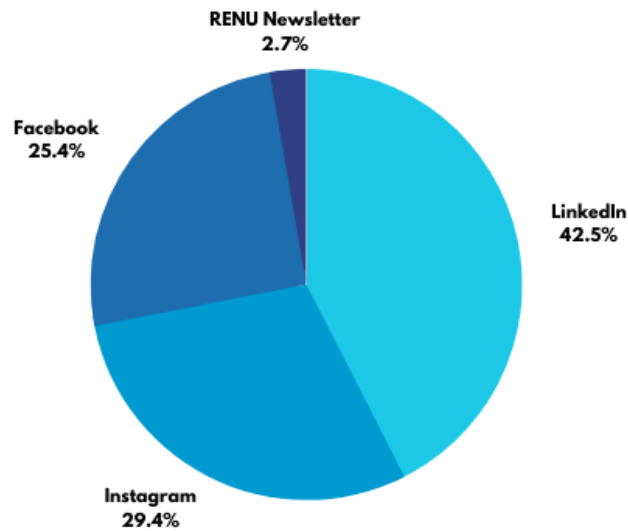
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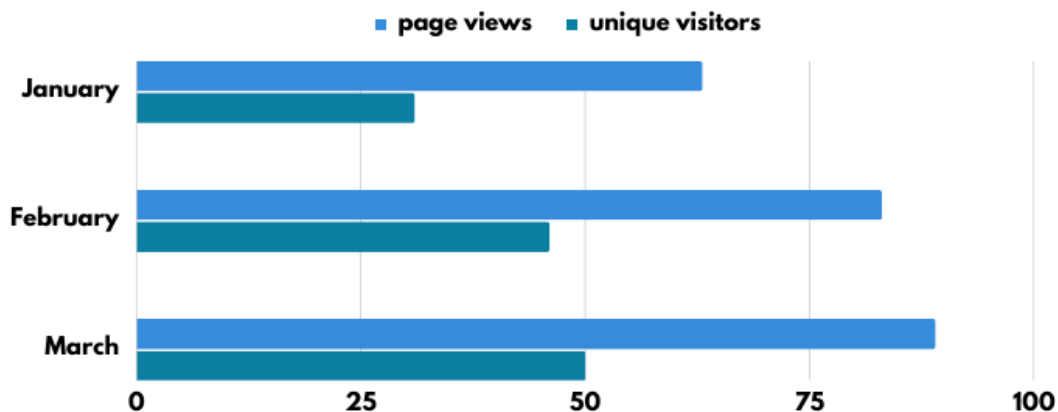
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MARKETING STATISTICS

Social Media Platforms



LINKEDIN





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INSTAGRAM

15,564 total impressions
Jan-Mar

2,886 content reached
Jan-Mar

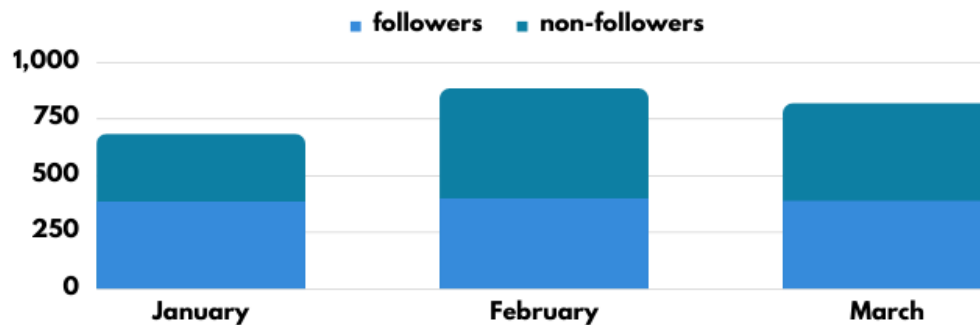
68% accounts reached
were non-followers
Jan-Mar

JAN
2 posts
5 stories
1 reel

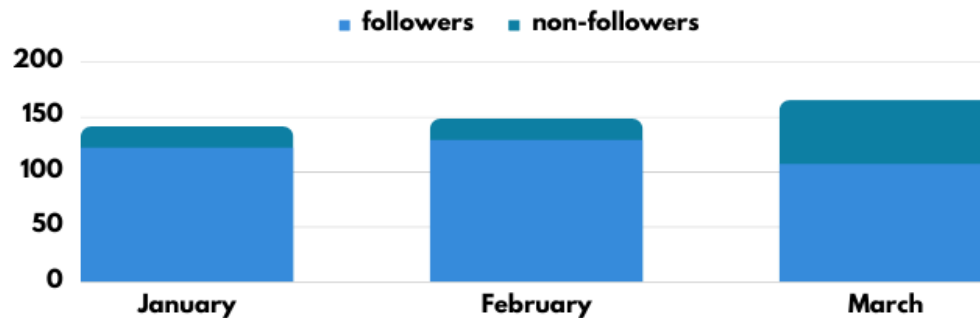
FEB
2 posts
5 stories

MAR
3 posts
5 stories

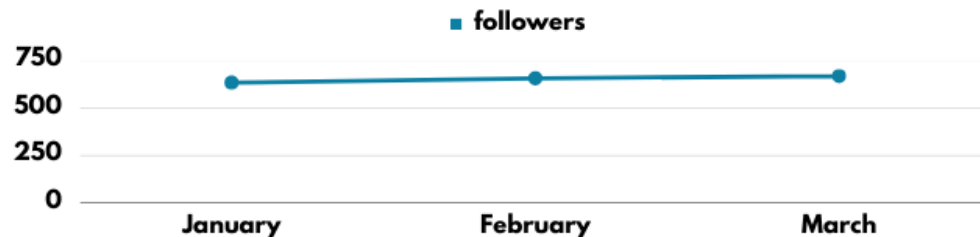
Accounts Reached



Accounts Engaged



Following





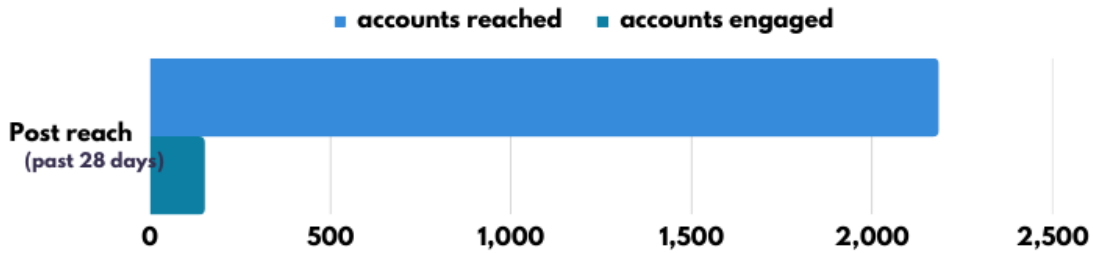
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FACEBOOK



RENU NEWSLETTER

298 total visits

62 newsletter signups

