



Collegiate Track IMPACT Phase

Residential Energy Assessment for Equity in Energy

Student Team Members

Diego Diaz and Pedro Montano
Mechanical Engineering Department,
The University of Texas at Tyler

Rafael Reyes
Electrical Engineering Department,
The University of Texas at Tyler

Academic Adviser

Dr. Nelson Fumo
Mechanical Engineering Department,
The University of Texas at Tyler

Community Partners

Monarca Initiative

Monarca Initiative is dedicated to supporting immigrants and disadvantaged individuals who aspire to change their lives. Their mission is to empower these individuals with the necessary skills to become resilient and influential members of the community. Monarca Initiative achieves this by fostering financial stability, economic mobility, and personal growth among the individuals they serve.

Team Bio

Dr. Nelson Fumo, Associate Professor of Mechanical Engineering and Greener CASA academic advisor is an expert on residential building energy. His research on the importance of community partnerships in reaching target audiences inspired the partnership with Monarca Initiative to launch Greener CASA.

The Monarca Initiative is dedicated to empowering immigrants and disadvantaged individuals to become resilient and influential members of their communities. Monarca achieves this through fostering financial stability, economic mobility, and personal growth among the individuals they serve. Monarca welcomed a collaboration with Greener CASA to help speed its objective of reducing household electricity costs for their community.

The primary demographic served by Monarca Initiative comprises Hispanic families. Both Dr. Fumo and the members of Monarca Initiative share Hispanic origins. Consequently, three Hispanic junior students—Diego Diaz and Pedro Montano from the Mechanical Engineering Department, and Rafael Reyes from the Electrical Engineering Department—were invited to join the Greener CASA team.

Project Summary

The University of Texas at Tyler and Monarca Initiative seek to forge a lasting partnership focused on energy equity. Enabled by the Community Energy Innovation Prize, the Greener CASA team was established to initiate this partnership.

Three Hispanic engineering students involved in the project have gained significant technical expertise through practical energy efficiency assessments. Their participation advances their career goals by offering a unique learning experience in line with their professional aspirations.

Out of the targeted 50 potential beneficiaries, the team has engaged 46 individuals. These beneficiaries received guidance on selecting suitable electric providers to reduce household bills, along with advice on implementing low-cost energy-saving measures.

The team has achieved 7 out of the 10 planned energy audits and distributed complimentary energy kits containing LED bulbs, caulking kits, and insulation spray foam cans to recipients.

Moving forward, the team members will continue educating individuals on selecting appropriate electric providers and recommending energy-efficient practices as part of their daily duties. The team will use funds from the third phase to install programmable thermostats to the families that received the energy audit. Additionally, the team will pursue both public and private funding opportunities to sustain the provision of free energy audits.





Collegiate Track IMPACT Phase

SolarCharge StudyHub and FuelCell KnowledgePoint

Student Team Members

Oswaldo Garcia (captain), Peter De Vries (co-captain), Parth Modi, Anne Josiah, Muhammad Khan, Arnold Garcia, Grant Howard, and Syed Jafferri

University of Texas at Tyler, Houston Engineering Center, Department of Mechanical Engineering

Community Partner

Houston Community College, Engineering College

Team Bio

The team consists of graduate and senior mechanical engineering students from the University of Texas at Tyler. Oswaldo Garcia serves as the captain, Peter De Vries serves as the team co-captain, Muhammad Khan is the communication officer, Parth Modi is the team treasurer, and Syed Jafferri, Grant Howard, Arnold Garcia, and Anne Josiah are team member. The partnership with Houston Community College has been around for a decade. This renewable energy project was initiated by Oswaldo Garcia, a master's student, and Dr. Biswas with Dr. Stear from HCC Engineering to aid in STEM community college student engagement and to provide insights into urban and campus energy needs. The rest of the team of undergraduate senior mechanical engineering students was formed to work on the project as a part of a course. Five out of the eight student team members are graduates from HCC and are familiar with the resources and expectations. They are interested in further developing the resources to engage HCC students as well as encourage more students to take the route of getting an engineering degree. The faculty advisors are Dr. Biswas and Dr. Soren Maloney from the Department of Mechanical Engineering.

Project Summary

A solar-powered charging station for portable devices and micromobility such as e-scooters has been designed to provide a sustainable and accessible solution to promote renewable energy education and use for Houston Community College (HCC) students. The solar charging station uses solar panels, batteries, an inverter, and a data acquisition system to harness solar energy and convert it into electrical energy for charging various devices. The project aims to address the educational and energy gaps in disadvantaged communities by providing clean and renewable energy solutions and enhancing educational opportunities in STEM fields. The team has demonstrated an initial prototype to HCC and high school students during UT Tyler's engineering week and campus visits. From the engineering week survey, there was interest from several students to join a future focus group for the final prototype. The team also recently met with HCC faculty recently to share current prototype and future plans for classroom implementation. The team is currently designing and testing a solar-powered system tailored for micromobility and developing a user-friendly interface to facilitate remote access for data acquisition. The future plan includes conducting a pilot test, incorporating a fuel cell system to evaluate usability and reliability, and collecting focus group feedback.





Collegiate Track IMPACT Phase

Georgia Tech Zero Energy Collaborations (GTZEC)

Student Team Members

Jackie Zong, 3rd Year Civil Engineering; **Arya Desai**, 3rd Year Civil Engineering; **Charles Morris**, 3rd Year Building Construction; **Rachel Witherspoon**, Master's of Architecture; **Aidan Risey**, Master's of Building Construction; **Yona (Yuhan) Wang**, 4th Year Architecture; **Wyatt Williams**, Master's – Business Administration and Environmental Engineering; **Julie Chen**, 3rd Year Architecture; **Anushka Kibria**, 4th Year Architecture; **Kiki (Jingqi) Ruan**, 1st Year Architecture; **Nader Osman**, 4th Year Building Construction; **Joel Jimenez**, 3rd Year Building Construction; **Mahlon Sale**, 1st Year Building Construction; **Carlos Hernandez**, 3rd Year Building Construction; **Arjun Thangaraj Ramshankar**, PhD Civil Engineering

Community Partners

Westside Future Fund
Lifecycle Building Center

Project Summary

Solar Decathlon at Georgia Tech (SDGT) is a newly formed student organization that is hosted by the School of Building Construction at the Georgia Institute of Technology and rooted in the U.S. DOE Solar Decathlon competition. The student organization connects Georgia Tech's academic resources and industry network to collaborate with underserved communities in Atlanta's Westside neighborhoods using the Asset-Based Community Development approach. SDGT's current project, 258 Andrew J. Hairston, was recently selected as the winner of the Single Family Division in the 2024 Solar Decathlon Design Challenge. During the design stage, the students conducted multiple sessions with the community partners and engaged local residents to ensure the design is practical and meets the community's needs. Built on the momentum of this win, the students are motivated to move toward the next steps of the project. The team is currently finalizing the Construction Document set and will begin construction in fall 2024. Throughout construction, the team is planning to include workforce training, site tours, open-house events, etc. to educate the communities on best practices to improve energy efficiency at an affordable cost. The project will be completed by summer 2025 for a legacy resident family to move in.

Team Bio

Solar Decathlon at Georgia Tech (SDGT) is an interdisciplinary student-driven organization at the Georgia Institute of Technology, rooted in the U.S. Department of Energy Solar Decathlon competition, with multiple academic, community, and industry partners. Currently, SDGT has 15 dedicated student members across different levels and disciplines.

The student team is collaborating with two community partners: Westside Future Fund (WFF) and Lifecycle Building Center (LBC). WFF, a local nonprofit, focuses on compassionate revitalization in the historic Westside. They own the abandoned property at 258 Andrew J. Hairston, which the team is designing and reconstructing. LBC, a nonprofit warehouse facility, provides affordable reclaimed materials promoting sustainability and community reuse efforts.

