



Zero Energy Design Designation (ZEDD) Nationally Recognizes Programs That Prepare Collegiate Students for Building Decarbonization Careers

Zero Energy Design Designation

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BACKGROUND / INDUSTRY IMPACT

- To fully realize the potential of high-performance buildings and efficient technologies, the **future workforce will need more building science knowledge across a wide range of professions** (Truitt et al. 2020).
- Academic programs can **prepare future workers with the knowledge and skills necessary to deploy low-carbon technologies and solutions** that address the 130 million existing buildings in the United States, and the 40 million new homes and 60 billion square feet of commercial floorspace expected to be constructed between now and 2050 (U.S. Department of Energy [DOE] 2024).



Rendering by Illinois Institute of Technology Design Challenge team, a ZEDD-recognized program.

PROJECT OBJECTIVES

- ZEDD recognizes collegiate academic programs** that prepare students with **career-ready knowledge and skills** to join the skilled building decarbonization workforce.

APPROACH

- ZEDD establishes a set of building science learning objectives** aligned with the knowledge and skills necessary to transform the buildings sector.
- ZEDD supports long-term integration of building science and zero energy design in collegiate programs** by providing DOE recognition to institutions for their leadership.
- Recognized programs must demonstrate alignment to the learning objectives through:

Building Science Education Curriculum

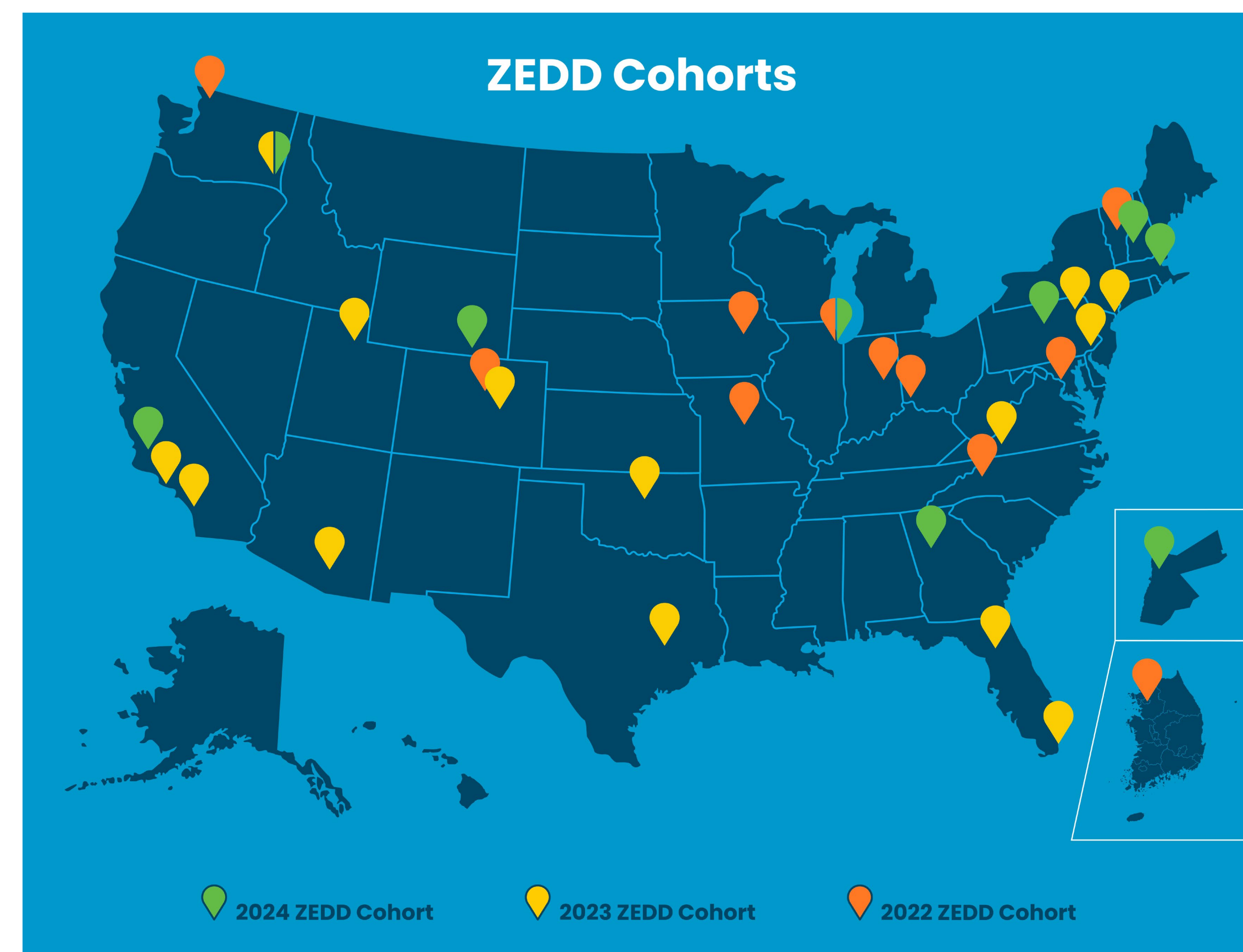
- Option 1: Solar Decathlon Building Science Education learning modules
- Option 2: School-created building science education program addressing required learning objectives

Zero Energy Design Practicum

- Option 1: Solar Decathlon Design Challenge competition participation
- Option 2: A zero energy building design project meeting DOE Zero Energy Ready Home certification or more stringent

Research Outcomes

- 53 programs from 33 collegiate institutions** have been recognized since 2022, embedding building science and zero energy design education in their curriculum.
- An estimated 700+ students will graduate from the 2024–2027 ZEDD cohort** alone. ZEDD students joining the building decarbonization workforce can leverage career-ready knowledge and skills to transform U.S. buildings.

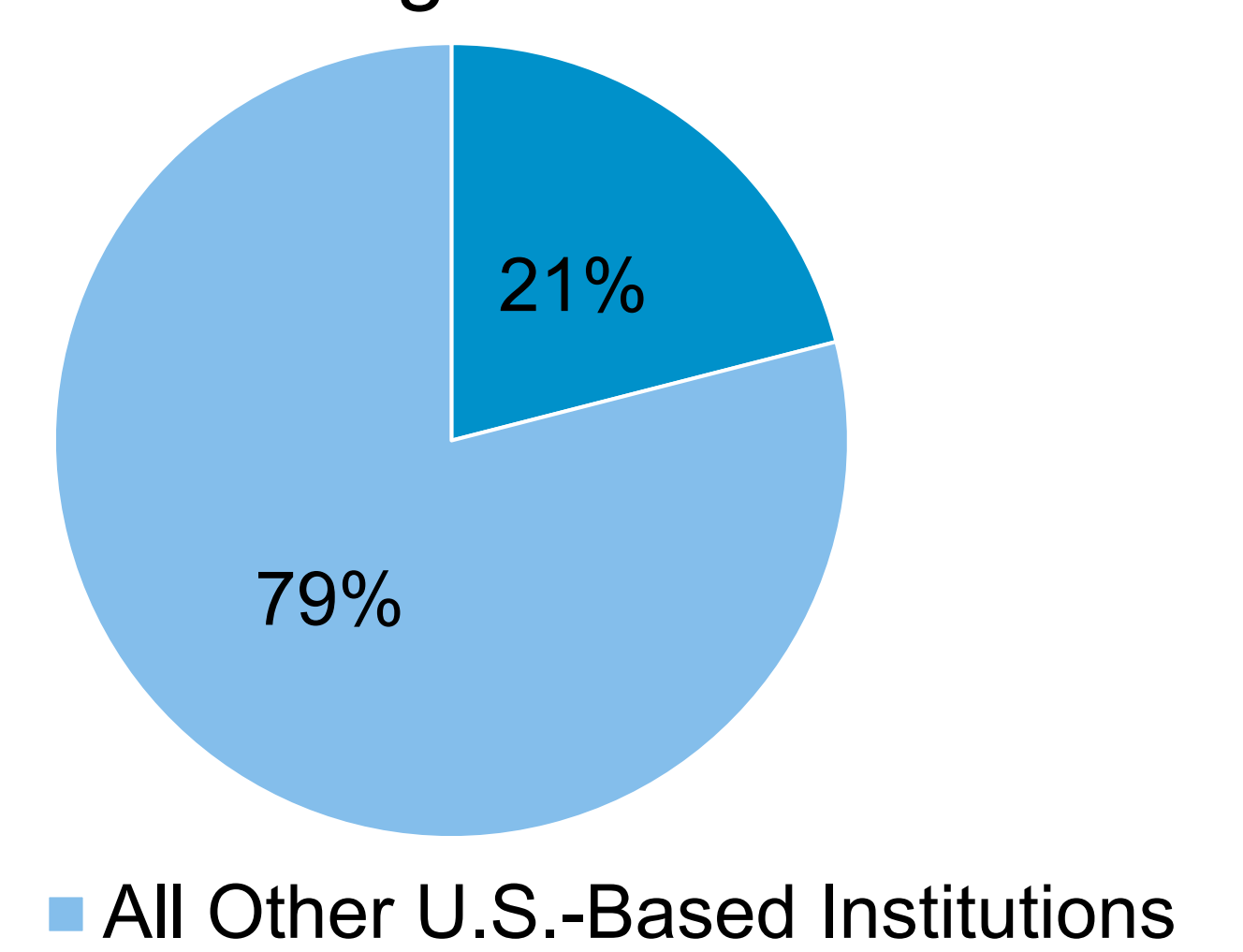


Map showing location of ZEDD-recognized programs. Graphic by NREL

Impact

- ZEDD helps institutions meet accreditation requirements and addresses employer difficulty in finding qualified candidates** with industry-relevant knowledge and skills (NASEO and EFI 2020).
- 21% of ZEDD-recognized programs hail from Minority-Serving Institutions (MSIs).**
 - This can be compared to MSIs comprising 14% of all U.S. degree-granting programs (Rivera 2023). Reaching underrepresented students **supports the equitable distribution of economic benefits** related to building decarbonization jobs.

Minority-Serving Institution (MSI) Representation in ZEDD-Recognized Programs



FUTURE WORK

- Connecting skilled and qualified students with potential employers requires **building employer awareness and demand for these new workforce entrants** to scale impact across the industry.
- There is opportunity to further scale and embed ZEDD in more Architecture, Engineering, and Construction (AEC)-related academic programs to train the future skilled building decarb. workforce.

REFERENCES

- DOE. 2024. *Decarbonizing the U.S. Economy by 2050: A National Blueprint for the Buildings Sector*. <https://www.energy.gov/eere/articles/decarbonizing-us-economy-2050>
- Truitt, Sarah, et al. 2020. *Building the Efficiency Workforce*. National Renewable Energy Laboratory. NREL/CP-5500-75497. <https://www.nrel.gov/docs/fy20osti/75497.pdf>
- Rivera, Heidi. 2023. "HBCU and minority serving institutions facts and statistics." Bankrate. <https://www.bankrate.com/loans/student-loans/hbcu-and-msi-statistics/>
- NASEO (National Association of State Energy Officials) and EFI (Energy Futures Initiative). 2020. *The 2020 U.S. Energy & Employment Report*. <https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5ee78423c6fcc20e01b83896/1592230956175/USEER+2020+0615.pdf>