



U.S. DEPARTMENT OF ENERGY

U.S. Department of Energy Zero Energy Design Designation Program

The President has set a goal of a net zero emissions economy by 2050. Buildings play a significant role in reaching this goal and building professionals must be prepared to design and construct high efficiency, low-carbon buildings powered by renewables. The U.S. Department of Energy (DOE) is interested in recognizing higher education institutions that prepare students for 21st century building careers.

The Zero Energy Design Designation Program

Requirements:

Schools interested in being recognized by the DOE will need to demonstrate a commitment to preparing students for a zero carbon future by offering a building science education curriculum within their programs of study which showcases best practices in zero energy strategies and technologies. DOE offers a Building Science Education curriculum which can be adopted and implemented to meet the curricular requirements. Qualified programs could be specialty tracks, certificates or stand alone degrees.

To receive a designation the selected program of study will need to include the following:

- **Part I: Building Science Education Curriculum**

Meet requirement by offering:

- Option 1: [Solar Decathlon Building Science Education](#)
- Option 2: School created Building Science Education

- **Part II: Zero Energy Design Practicum**

Meet requirement by offering:

- Option 1: Participation in Solar Decathlon Design and/or Build Challenge
- Option 2: Participation in school course focused on zero energy building design meeting [DOE Zero Energy Ready Home](#) certification or more stringent. Residential or commercial projects may qualify.

Application Checklist below.

Designation Period

Initial recognition period is three years. DOE reserves the right to revoke recognition if it is determined that institution is not in compliance.

Renewing Designation

Institutions may renew recognition after three years by providing:

- Updated letter from the Dean or Department Chair / Head 1) confirming designation elements remain in place or 2) describing updates or improvements to the recognition elements
- Student metrics - # of students graduating with both designation elements during previous reporting period

How to apply:

The application deadline is July 1, 2022 at 11:59 PM PT.

Access the application at: <https://www.energy.gov/eere/buildings/us-doe-zero-energy-design-designation-recognizes-leading-collegiate-programs-study>

Additional questions?

Please contact ZEDD@nrel.gov

When to expect information about acceptance into the program?

The first designation cohort will be announced in August 2022.

Additional Resources:

- [Building America Solution Center](#)
- [Building Science Education](#)
- [DOE Guidelines for Building Science Education](#)
- [Green Buildings Career Map](#)
- [Solar Decathlon Career Profiles](#)
- [Solar Decathlon Design Challenge Rules](#)



Application Information Checklist

The application deadline is July 1, 2022 at 11:59 PM PT
Submit questions to ZEDD@nrel.gov

| Basic School Information | |
|--|--|
| Institution | |
| Program of Study (Major / Minor / Certificate) | |
| Program of Study URL | |
| Current Student Enrollment | |
| Expected Number of Students Graduating over the course of the next 3 years | |
| Individual Submitting Documentation | |
| Name | |
| Role | |
| Contact E-mail | |
| Phone | |
| Who the Letter of Recognition Should Be Sent To | |
| Name | |
| Title | |
| Address | |
| E-Mail | |
| Who else should be CC'ed | |

| Part I: Building Science Education | |
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| Option 1: All students complete Solar Decathlon Building Science Education program. | Yes/No |
| Participation in the Solar Decathlon is an annual activity in Program of Study | Yes/No |
| Instructions: Skip to Part II | |

Option 2: All students complete required coursework covering DOE Building Science Education learning objectives.
Instructions: Identify required course(s) that addresses each DOE Building Science Education learning objective. For each, submit associated course name, number, syllabus and course schedule. Syllabi should include course requirements and learning objectives.

| Learning Objectives by Topic Area | Course Information Required to Demonstrate Objective Will Be Met: | | | |
|--|---|---------------|-----------------|-----------------|
| | Course Name | Course Number | Course Syllabus | Course Schedule |
| Buildings and Energy | | | | |
| Discover how buildings are one of the largest end use sectors and where their energy comes from | | | | |
| Gain insight on electricity delivery to a building and how to read an electricity bill | | | | |
| Define the three main components of the power grid and how they work together to deliver electricity to buildings and other end-users | | | | |
| Zero Energy Buildings | | | | |
| Understand the critical balance between energy generation and consumption in a zero energy building | | | | |
| Distinguish between source energy and site energy, and understand the calculations for each | | | | |
| Set measurable building design goals that can both lower the energy use and cost of a building | | | | |
| Building Envelope | | | | |
| Explain how heat travels from higher temperatures to lower temperatures using Fourier's Law | | | | |
| Understand and describe the methods of heat transfer (conduction, convection, and radiation), and how a well-designed building envelope optimizes each of these to create a comfortable indoor environment | | | | |
| Discuss the different types of insulation, windows, and wall construction materials and their impact on the final R-value of a wall | | | | |
| Heating, Ventilation, and Air Conditioning | | | | |
| Define the various efficiency metrics for HVAC systems | | | | |
| Interpret the science behind heating sources used in buildings and how heat is distributed | | | | |
| Discern the differences between hot water heating systems and explain why their design matters | | | | |
| Lighting | | | | |
| Recognize the shift in lighting technology from vacuum-based lighting technologies to solid state light-emitting diode-based (LED) technologies | | | | |
| Reduce the energy consumption for lighting and provide a healthy indoor environment for occupants | | | | |
| Plug Loads | | | | |
| Analyze plug loads and understand how they play such a large role in a building's energy consumption | | | | |
| Describe a real-life example of how one building was able to reduce plug loads by over 50% | | | | |
| Evaluating Energy Performance | | | | |
| Realize the importance of modeling when evaluating energy performance, and learn some modeling best practices | | | | |
| Acknowledge some limitations of modeling and how modeling results compare to actual performance | | | | |
| Renewable Energy and Zero Energy Buildings | | | | |
| Select appropriate renewable energy sources for a net zero energy building | | | | |
| Grasp the "duck curve" and its associated challenges with over-generation of solar energy | | | | |
| Think strategically about aligning your building loads based on the intermittent nature of some renewable sources | | | | |

| Part II: Zero Energy Design Practicum | |
|--|--------|
| Option 1: All students participate in the Solar Decathlon Design or Build Challenge | Yes/No |
| Participation in the Solar Decathlon is an annual activity in Program of Study | Yes/No |

Option 2: Students participate in a school offered design practicum
Instructions: Identify required course(s) that address the Zero Energy Design Practicum. For each, submit associated course name, number, syllabus and course schedule. Syllabus should include course requirements and learning objectives.

| Zero Energy Design Practicum | Course Information Required to Demonstrate Practicum Will Be Met: | | | |
|--|---|---------------|-----------------|-----------------|
| | Course Name | Course Number | Course Syllabus | Course Schedule |
| Participation in school course focused on zero energy building design meeting DOE Zero Energy Ready Home certification or more stringent | | | | |

| Verification Letter |
|--|
| A letter from the Dean or Department Head / Chair verifying both recognition elements are required of students to graduate in the designated program of study. |