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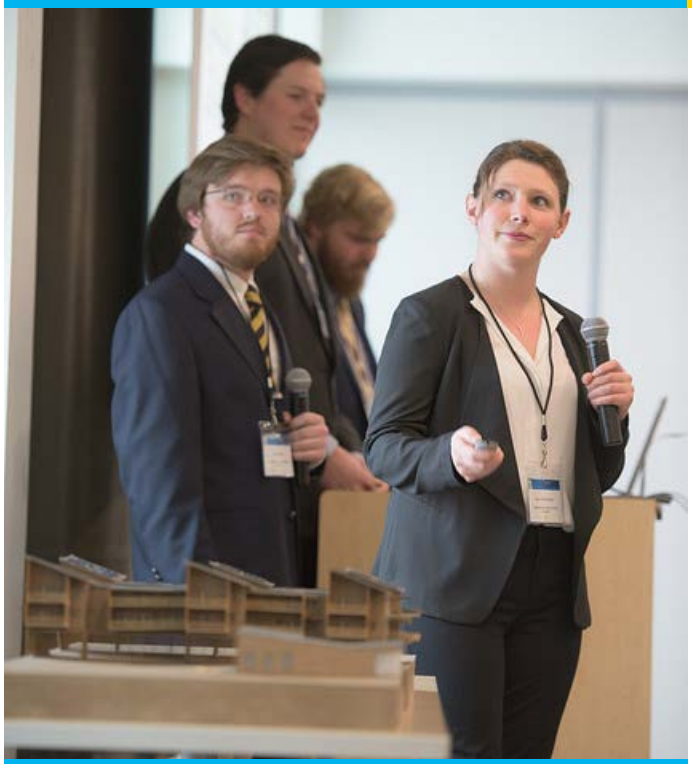

RACE TO ZERO
U.S. DEPARTMENT OF ENERGY
STUDENT DESIGN COMPETITION

KICK START YOUR 2017 RACE TO ZERO COMPETITION!

September 19, 2016

Moderator:

Linh Truong – National Renewable Energy Laboratory

Panelists:

Sam Rashkin – U.S. Department of Energy

Sara Farrar – National Renewable Energy Laboratory

Jeff Tiller – Appalachian State University

Joe Simon – National Renewable Energy Laboratory

Housekeeping

Two Options for Audio (select audio mode):

1. ***Listen through your computer***.
   - Select the “mic and speakers” radio button on the right hand audio pane display.

2. ***Listen by telephone.***
   - Select the "telephone” option in the right-hand display, and a phone number and PIN will display.

3. ***Panelists - mute your audio device when not presenting.***

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Housekeeping (continued)

To Ask a Question

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- **Having trouble viewing the webinar?**
- **A video/audio recording of this Webinar and the slide decks will be made available.**

Agenda

- Vision of Race to Zero
- 2016 Race to Zero Highlights
- 2017 Race to Zero
  - Get Started
  - Interdisciplinary Teaming
  - Competition Guide
  - Design Concept
- Questions

Vision

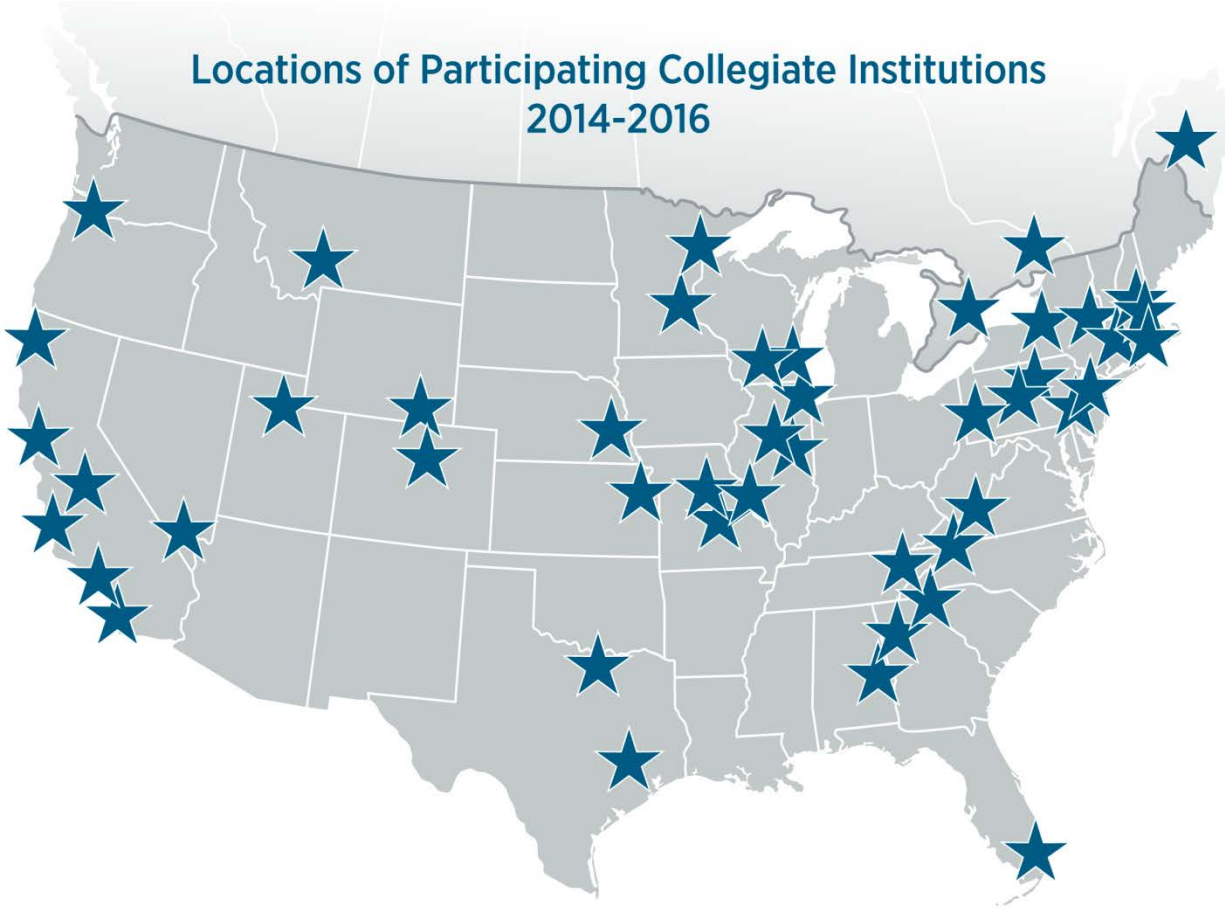
- ✓ **Inspire** and develop the next generation of building professionals
- ✓ **Advance** and enhance building science curriculum in universities

Earn star status

Be a star on the map

2014-2016 stars

- 51 Universities
- 92 Teams



Earn star status

Be a star on the map

2016 stars

- 301 Students
- 25 Universities
- 31 Teams

2016 RTZ: The Group

2016 RTZ: The Setting

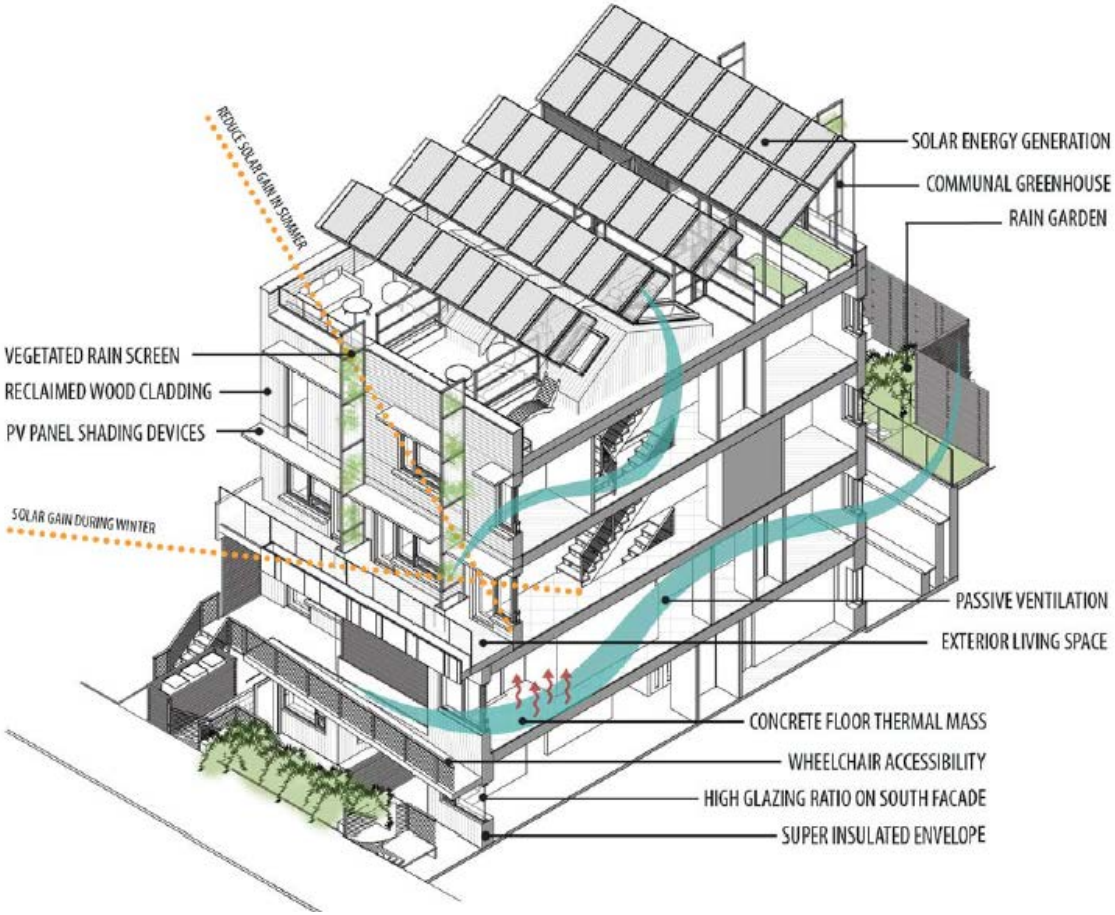
2016 RTZ: Tour of Zero

2016 RTZ: The Anticipation

2016 RTZ: The Shark Tank

2016 RTZ: The Networking

2016 RTZ: The Benchmarking



"This competition is a great opportunity to go beyond regular materials and resources that are introduced in the typical classroom."

-2016 Race to Zero Participant

2016 RTZ: The Learning

2016 RTZ: The Career Connections

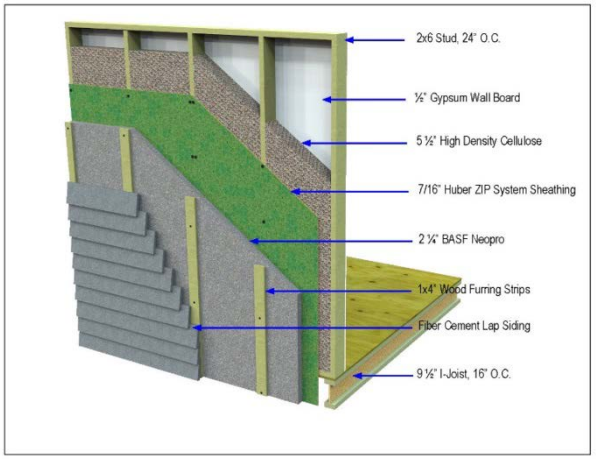
2016 RTZ: The Inspiration

2016 RTZ: The Job-Ready Skills

Figure 37. Thermal Barrier

Figure 38. Vapor Barrier

Figure 39. Water Barrier



"I am going to be looking for a job in building science/high performance building. I found out that this is exactly what I want to do because of the Race to Zero."

-2016 Race to Zero Participant

2016 Race to Zero Grand Winner

Urban Single-Family Contest

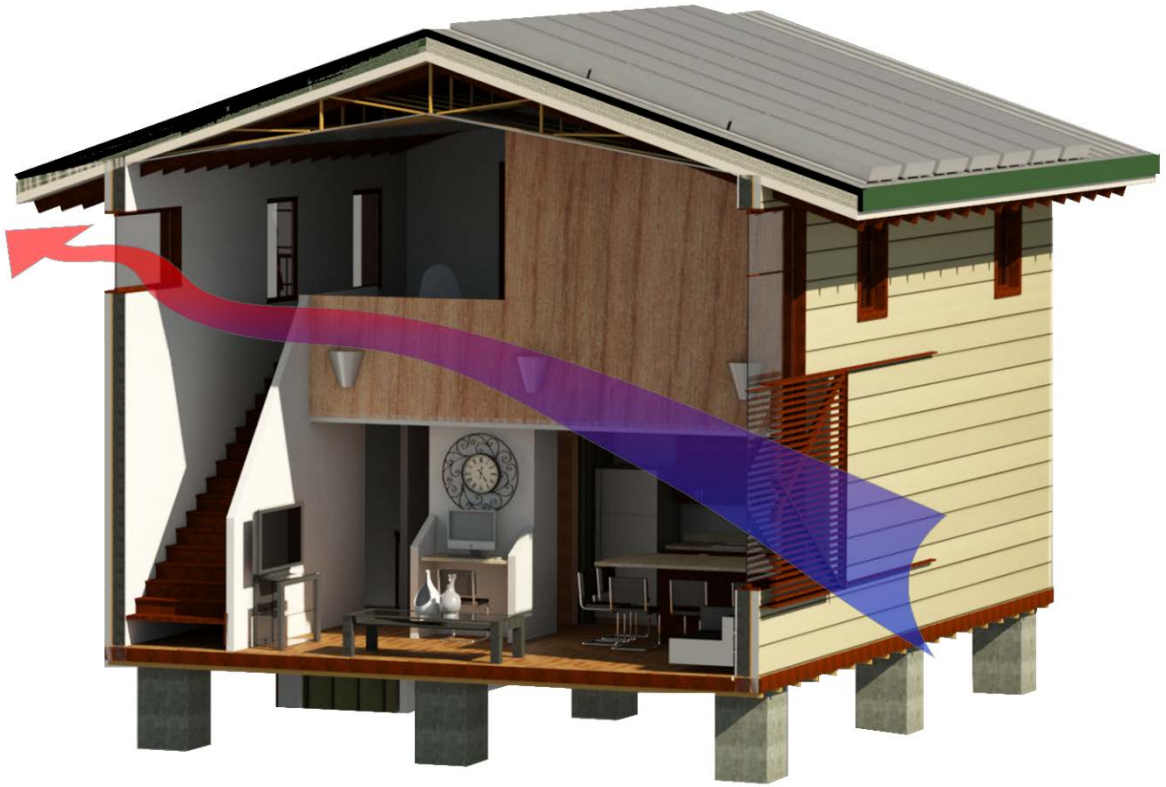
Prairie View A&M University

Green Future Team
Double Barrel Project

The Winning Design

An affordable zero ready home for a historically significant, low income neighborhood

Design + Winning Collaboration

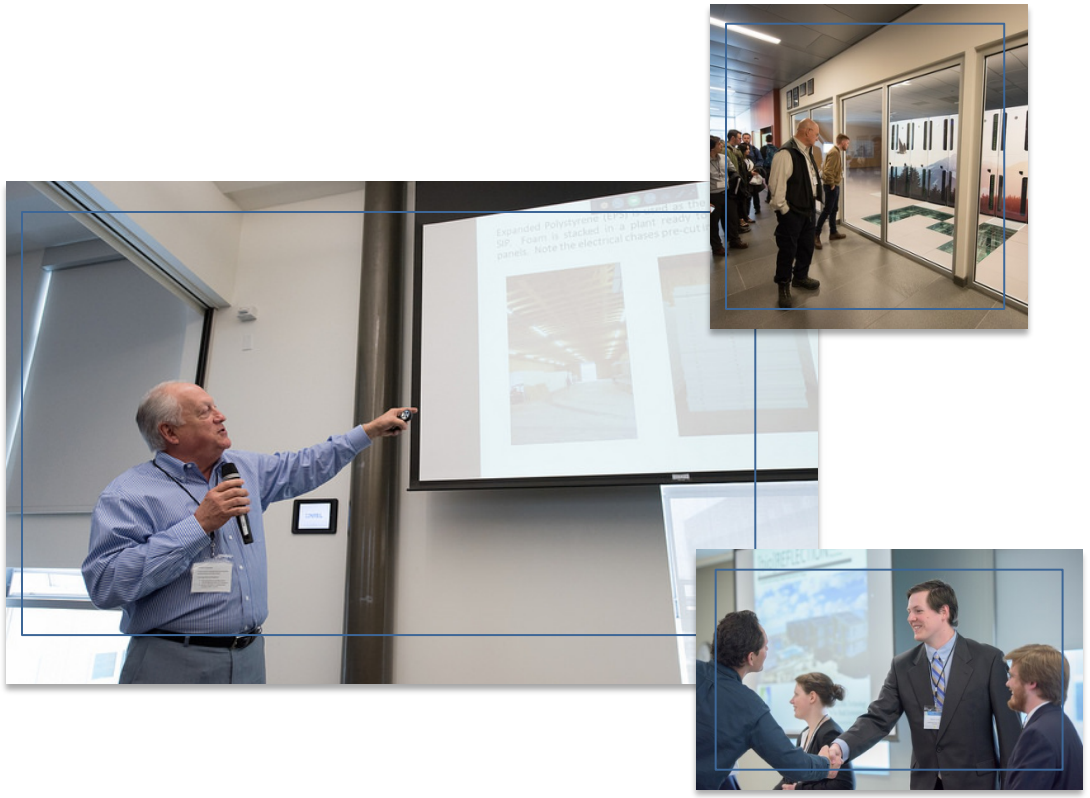


Began with the PHIUS+ 2015 BEopt optimized design criteria for the climate, and then made adjustments based on the recommendations of industry partners

2016 Race to Zero Experience

"I had almost zero knowledge in everything I had to do for this project. Learning the material in class then getting to apply it in a real world application was amazingly helpful…"

-2016 Race to Zero Participant



2016 RTZ: The Joy

Kickoff the 2017 Competition

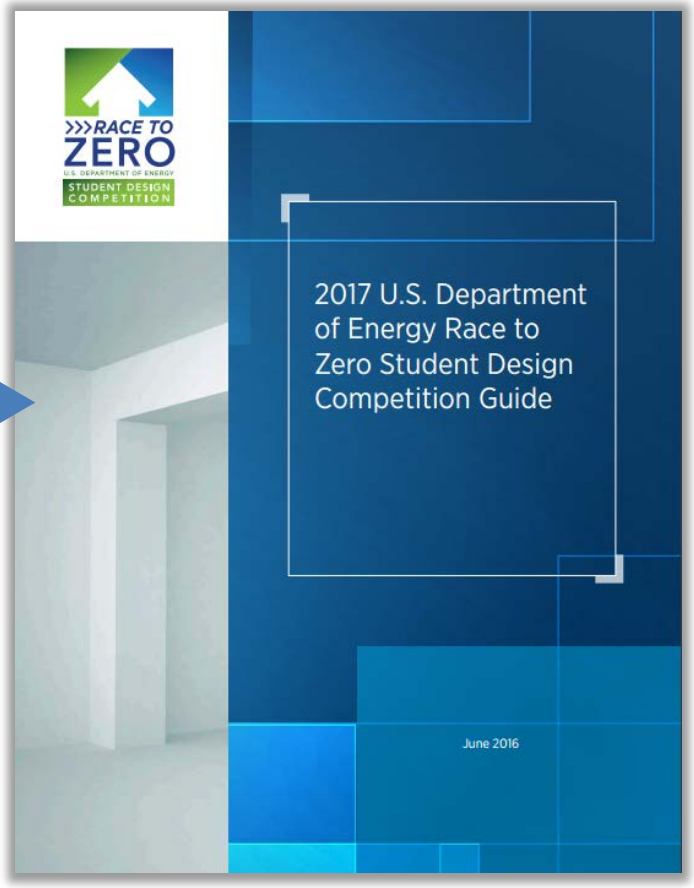
Race to Zero Guide

Race to Zero website:

http://energy.gov/eere/buildings/us-department-energy-race-zero-student-design-competition

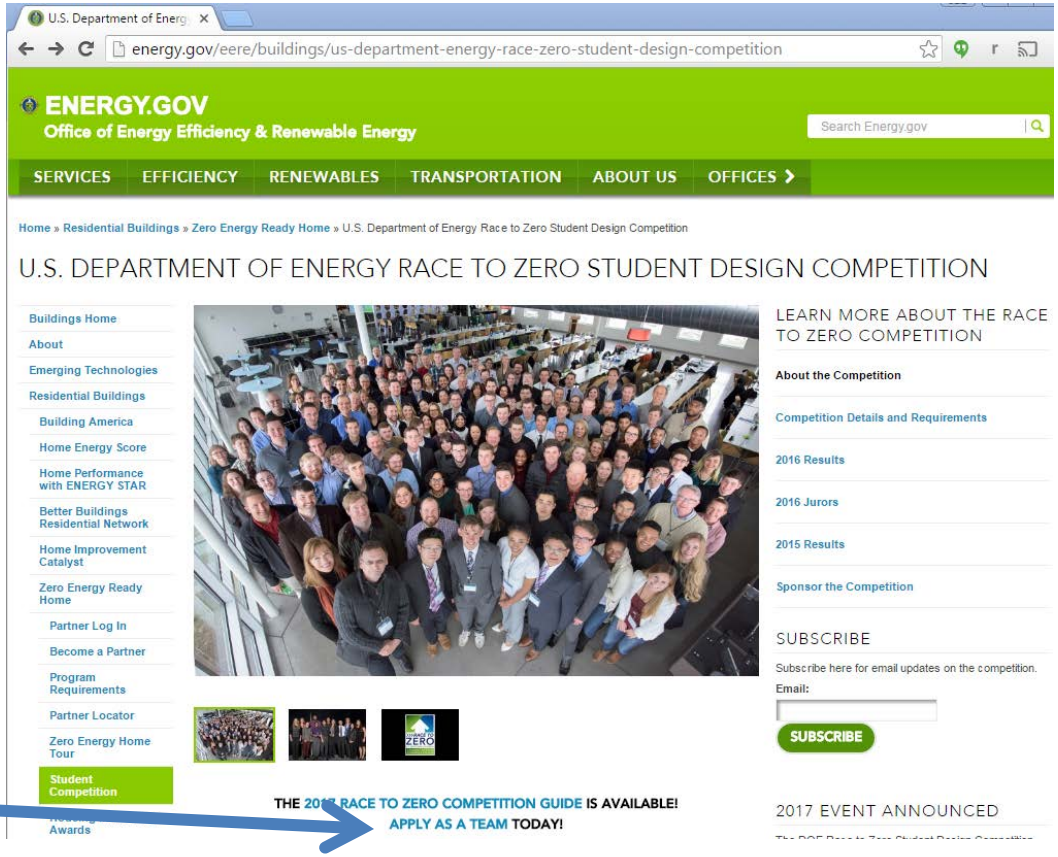
Get started:

- Read the Competition Guide
- Form a team
- Review past winning submissions
- Complete your Team Application
  - Team Roster and $200 fee due by Nov. 1
- Seek industry partners/advisors
- Brainstorm, design, and analyze!



Team Application

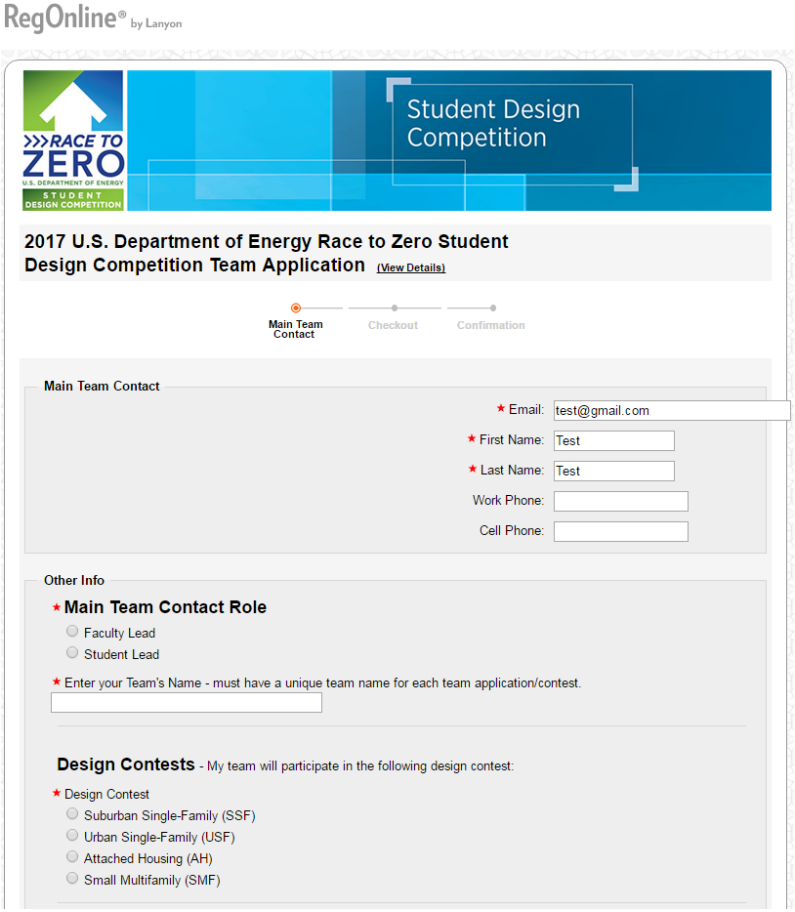
- Apply!
- Submit questions to racetozero@ee.doe.gov



Team Application

To register a team:

- Complete RegOnline Info
- Upload team roster
- Pay $200 Registration Fee
  - Covers food, trophies, etc.
- Minimum one faculty advisor and three students to make a team



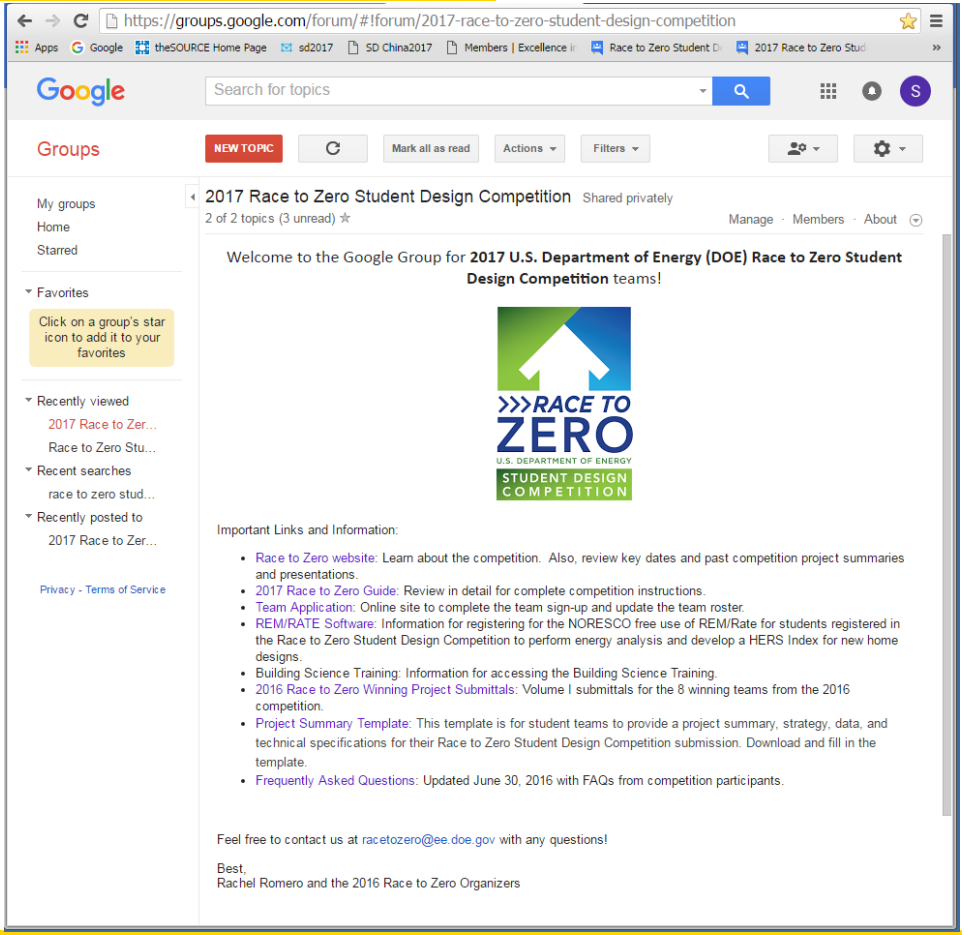
Team Application Requirements

- Name, title, and email of faculty advisor and/or student team leader
- Preliminary Team Name (can change later)
- Desired design contest for entry
  - One application per university per contest (up to 4/school total)
- Collegiate Institution Name(s)
  - The team may be comprised of one or more institutions
- Optional Design Concept
- Notice of on-site participation by foreign nationals
  - NREL requires additional documentation for access to the federal campus

After Initial Team Application

Race to Zero Google Group:

- Invitation to join the Race to Zero Google Group, created specifically for providing information to teams



Race to Zero: Valuable Educational Resources

- Building Science Training
  - Seminar: Principles of high-performance homes taught by renowned industry leaders
  - Webinars: REM/Rate, BEopt, HVAC/IAQ, + more
- REM/Rate software license
- Expertise from industry sponsors
- Financial analysis tools
- Past winning presentations and designs
- Competition Guide
- FAQ

2017 Race to Zero Timeline

July 1, 2016

2017 Competition Guide released and team application open

November 1, 2016

Team application deadline: roster, $200, and 3-page design concept,

Acceptance notices by November 10

August 2016 – February 2017

Webinars and building science training available

February 28, 2017

Project Progress Report and Building Science Training complete

April 4, 2017

Final Project Report Submittal due

April 22-23, 2017

Invited teams compete with presentations to jurors at NREL

Forming a Team

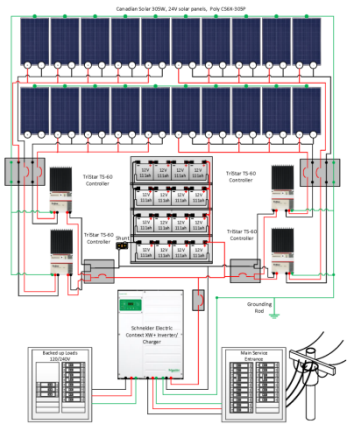
- Associated with one or more collegiate institutions
- Faculty advisor lead
- Student team lead
- Minimum two additional students
- Industry partners or advisors

"This project had a tight budget and required intense technical scrutiny. This required me to work with industry professionals and to design with a different mindset than usual school projects."

-2016 Race to Zero Participant

Multi-Disciplinary Teaming

- Architecture
- Engineering
- Construction Management
- Business
- Environmental/ Sustainability
- Other



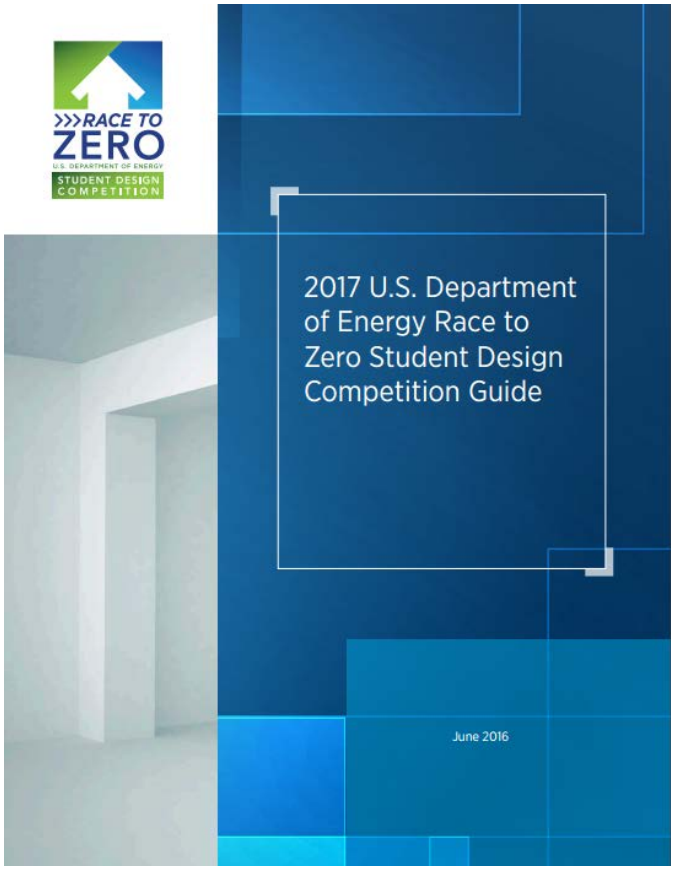
"Interdisciplinary teams, extended work time, and presentation and feedback from experts make this an exceptional learning experience."

-2016 Race to Zero Participant

Integrated Design – Key to Success

- Agree on Joint Vision/ Design Goals & Program
- Select a Team Leader/ Team Roles & Rules
- Have Effective Team Meetings
- Create an Environment of Mutual Respect
- Remain Open to Other's Recommendations
- Create a Reasonable Schedule for Successfully Completing the Project Goals
- Meet Deadlines
- Submit Your Work Early!

Race to Zero Guide



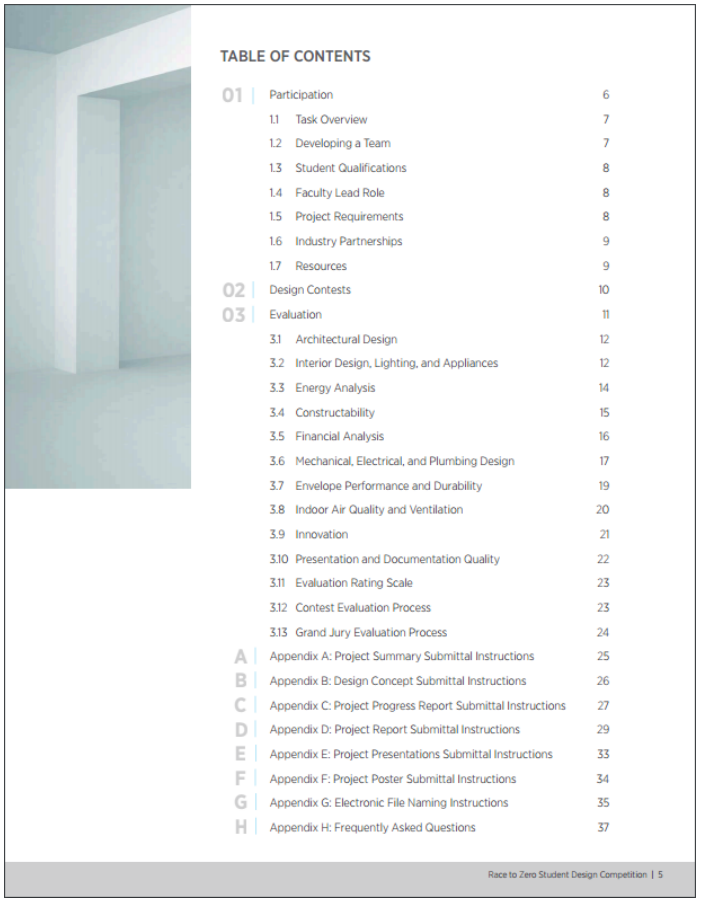


TABLE OF CONTENTS

Choose One of Four Contests:

1. Suburban Single-Family Detached House
2. Urban Single-Family Detached House
3. Attached Housing
4. Small Multifamily

Project Requirements

ZERO
ENERGY READY HOME
U.S. DEPARTMENT OF ENERGY

- Achieve DOE Zero Energy Ready Home requirements
- Effectively integrate building science principles and best practices
- Demonstrate marketplace relevance

Task Overview

- Read the Race to Zero Guide
- Reviewing winning team's presentations
- Submit an application
- Gain access to Google Group for info & announcements
- Complete Building Science Training course
- Develop Industry Partnerships
- Study Zero Energy Ready Home program requirements
- Participate in Race to Zero webinars
- Complete your design & submit materials by deadlines
- Attend Race to Zero competition at NREL!

Required Building Science Training

- Students must watch Race to Zero Building Science Training videos
  - 13 hours of Building Science
  - On-demand for students
  - Access available upon receipt of initial application
  - Completion certificate provided

OR

- Faculty must attest to equivalent coursework at university

Evaluation Parameters

2017 Evaluation Parameters	Available Points
Architectural Design	10
Interior Design, Lighting, and Appliances	10
Energy Analysis	10
Constructability	10
Financial Analysis	10
Mechanical, Electrical and Plumbing Design	10
Envelope Performance and Durability	10
Indoor Air Quality and Ventilation	10
Innovation	10
Presentation and Documentation Quality	10

2016 Contest Jurors

Urban Single-Family

Small Multifamily

Suburban Single-Family

Attached Housing

Evaluation

- Jurors will be industry representatives who will:
  - Evaluate how well teams meet the evaluation parameters and complete the requirements
  - Review project submittals prior to competition
  - Watch on-site team presentation & ask questions
  - Assign scores to each team
  - Award first and second place winners

Grand Jury Evaluation Process

- 1st-place award winners will deliver 10-minute presentation at the awards banquet
- Grand jury will evaluate these four teams based solely on the presentation
  - Jury understands that the four 1st-place winners have demonstrated a quality design to contest jurors

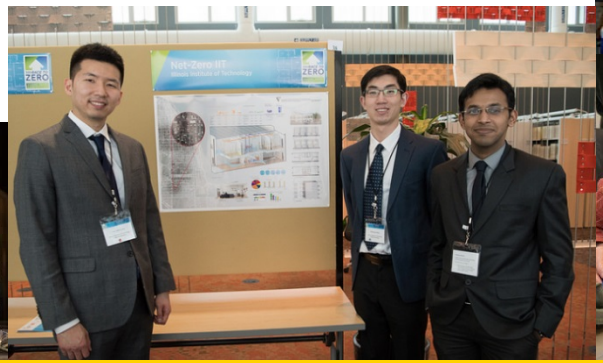
Grand Jury Evaluation Parameters

- Quality of architectural design & aesthetic
- Design's functionality for the occupants
- Comprehensive energy efficiency features across design elements
- Appropriateness of the design for the location and climate
- Proactive design to enable successful construction
- Affordability of the design for the target market
- Innovative integration of solutions that are achievable, beneficial, and cost-effective
- Quality of presentation package of visual aids and spoken remarks



Project Submittals

- Project Summary
- Design Concept
- Progress Report
- Project Report
- Project Presentations
- Project Poster



Design Concept

- Project Summary
  - Project name
  - Team name
  - University name(s)
  - Brief summary of goals, target market, and strategy
  - Project data
  - Key images
- Names of student team members
- Contest category
- Project approach
- Summary of industry partners & expected form of support
- Potential structural & mechanical systems
- Floorplan, exterior renderings, or interior renderings (all optional)

Team Name: Green Future
Project Name: Double Barrel

Project Summary

The Independence Heights neighborhood is Historically significant in that it was the first Incorporated black municipality in Texas (19010). The Neighborhood was subsequently incorporated into the City of Houston and most recently, sustained significant damage from Hurricane Ike in 2008. This net zero ready home was designed to provide an affordable, high performance, small Footprint home for low-income families in an area that needs it the most.

Relevance of Project to the Goals of the Competition

The purpose of the competition is to extend the reach of building science both in the University curriculum as well as in the profession. Our team has taken that impetus several steps further by applying Passive House methodologies to a hot & humid climate, pioneering the Certified Passive House Consultant training in a Historically Black College & University (HBCU), and designing an affordable net zero ready home for a historically significant, low-income neighborhood.

Design Strategy and Key Points

In order to make the home affordable, we knew that we had to keep the size of the home small, yet comfortable and modern. The design was further constrained by the historically narrow and deep lots in Independence Heights. Our team began with the recently completed PHIUS+ 2015 BEopt optimized design criteria for our climate and then made adjustments based on the recommendations of our industry partners. To keep the design contextual and respond to community feedback, the design is inspired by the vernacular 'shotgun' homes of the south.

Project Data

- Houston, Texas
- Climate 2A
- 1,567 SF (max)
- 3 Bedrooms, 2 Baths, 2 Story
- HERS 36 prior to photovoltaic system HERS -9 after photovoltaic
- $72 prior to photovoltaic system

Technical Specifications

- Wall Insulation = R-30 (PH Upgrade is to R-33)
- Foundation Insulation = R-30 (PH Upgrade is to R-48)
- Roof Insulation = R-47 (PH Upgrade is to R-55)
- Window Performance = U-0.15, SHGC-0.25
- HVAC specifications = SEER-23 (cooling), HSPF 10.5 (heating)

Design Concept Evaluation Criteria

- Quality of the formation of a team
- Quality of the formulation of a project approach
- Quality of a design strategy
- Level of content inclusion & completion
- Other factors, such as geographic or technology diversity

Join us for the next webinar!

- Good Housing Design
  - Sam Rashkin, DOE Chief Architect
  - Tuesday, Oct. 18 at 3:00 p.m. EST
- Recorded and available on the Google Group
- Announcement of future webinars will be on the Google Group

Thank you to our 2016 Sponsors!

Questions?

http://energy.gov/eere/buildings/us-department-energy-race-zero-student-design-competition

OR

racetozero@ee.doe.gov