U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Educating Workforce Professionals for Success

SAM RASHKIN, DOE

SARA FARRAR, NREL

PRIYA SWAMY, DOE

CHERYN METZGER, PNNL

May 30, 2017

Some Housekeeping Items

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- You may find PDF copies of the presentation at the website listed here and you may follow along as our speaker presents. Today's webinar is being recorded and the recording will be available on the DOE YouTube channel within a few weeks.
  - http://energy.gov/eere/buildings/building-america-meetings#current

Agenda

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- ✓ Welcome and Introductory Remarks
- ✓ Overview of Building America (buildingamerica.gov)
  - ➢ Linh Truong - National Renewable Energy Laboratory
- ✓ Presentations
  - ➢ Sam Rashkin – U.S. Department of Energy
  - ➢ Cheryn Metzger – Pacific Northwest National Laboratory
  - ➢ Sara Farrar – National Renewable Energy Laboratory
  - ➢ Priya Swamy – U.S. Department of Energy
- ✓ Questions and Answers
- ✓ Closing Remarks

Building America

- **Building America Website:**
- Program information
- Top Innovations
- Climate-specific case studies
- *Building America Update* newsletter
- Building America Solution Center
- Publications Library

www.buildingamerica.gov

Sam Rashkin, Chief Architect, U.S. Department of Energy's Building Technologies Office

As Chief Architect for the Department of Energy's Building Technologies Office, Sam's primary role is leading deployment of proven innovations for new and existing high-performance homes. In his prior position, he managed the growth of ENERGY STAR for Homes from its inception in 1996 to more than 8,500 builder partners, over one million labeled homes, and over 25 percent market penetration nationwide. Mr. Rashkin has been recognized for his contributions to sustainable housing with the 2012 Hanley Award and authored a new book titled ***"Retooling the U.S. Housing Industry: How It Got Here, Why It's Broken, and How to Fix It"***.

Cheryn Metzger, Senior Engineer, Pacific Northwest National Laboratory

Cheryn Metzger has worked at PNNL since 2014. Mrs. Metzger primarily supports the Department of Energy's (DOE) Building Technologies Office and focuses on large scale energy efficiency programs in residential and commercial buildings. Prior to joining PNNL, Mrs. Metzger worked for NREL as an engineer and research coordinator for the Building America Program. In addition to overseeing dozens of projects related to minimizing the risks of highly energy efficient buildings, Cheryn specialized in developing simulation and field test protocols for a wide range of stakeholders. Mrs. Metzger has also supported a variety of efforts related to translating fundamental research results into information suited for general audiences. She has enjoyed organizing market transformation efforts such as outreach programs, website development and multi-track technical conferences.

Sara Farrar, Senior Technical Project Leader, National Renewable Energy Laboratory

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Sara Farrar has worked at the National Renewable Energy Laboratory since 1994, and her career focus is to increase the sustainability of the built environment with performance and studies in energy efficiency, commissioning, renewable energy, and grid interconnection. She has also applied that experience to leading the project team and technical production of an award-winning collegiate competition and educational exhibit for demonstrating cost-effective, energy-efficient and attractive zero-energy houses that incorporate clean-energy products and design solutions.

Priya Swamy, Project Manager, Small Commercial Buildings, U.S. Department of Energy

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Priya Swamy manages workforce development efforts with the Commercial Buildings Integration group at BTO. Previously, she worked with DOE's State Energy Program to develop policy and program frameworks to support energy efficiency initiatives at state energy offices. Prior to DOE, Priya worked for the German utility E.ON in their Climate and Renewables Division and the Spanish wind company, Iberdrola Renewables. She holds a MS in Engineering Management from GW's School of Engineering and a BA in Economics from Bryn Mawr College.

Why Building Science Education

Supply System:
Workforce Competent in Building Science

Product on Shelf:
Better Buildings
> Savings
> Comfort
> Health
> Safety
> Durability

Market Demand:
Consumers and Transaction Process That Value Better Buildings

Big Prize:
- ROI
- ECONOMY
- JOBS
- HEALTH
- SECURITY

Webinar Outline

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Inspiring University Students	**'Race to Zero'** Student Design Competition
Integration with Commercial Buildings	Better Building Workforce Guidelines
National Platform for Competency	DOE Guidelines for Building Science Education

Race to Zero (RTZ) Vision

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Inspire and develop the next generation of building science professionals

Advance and enhance building science curriculum at universities

RTZ Overview

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- Annual Competition (Starting 2014)
  - Easily Integrated in Existing Curriculum
- Critical Skill Development
  - Building Science Training
  - Collaborative Teamwork Experience
  - Comprehensive Integrated Design
  - Market Ready Solutions (Design+Cost+Construction)
- Two-Day Competition Event at NREL
  - Team Presentations to Expert Jurors
  - Networking
  - Thought Leaders
  - Career Connections

Video

Play Race to Zero video on YouTube

Project Requirements

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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

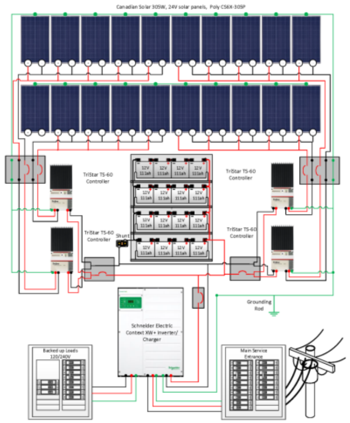
Choose One of Four Contests

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




Multi-Disciplinary Teaming

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



“The inter-disciplinary nature helped me learn more than in a typical classroom. Interacting and understanding the priorities of engineers, building scientists etc.”
-2017 Race to Zero Participant

The Shark Tank

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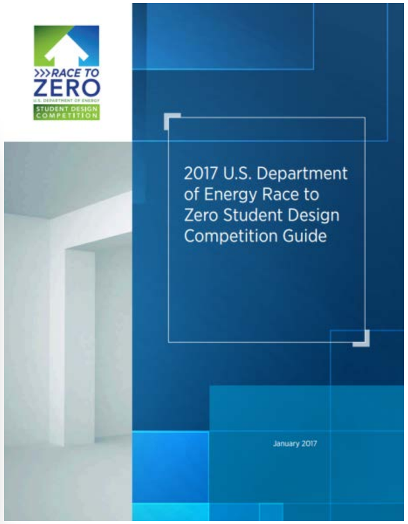
Develop a project report of design

Travel to NREL for competition weekend

Present to the jurors and peers

Receive real time feedback from jurors



Evaluation Parameters

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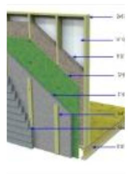
Architectural Design


Interior Design, Lighting, and Appliances


Energy Analysis


Constructability


Financial Analysis


Mechanical, Electrical, and Plumbing Systems Design


Envelope Performance and Durability


Indoor Air Quality


Innovation


Documentation and Presentation

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 partners
  - Competition sponsors
  - Individual team partners
- Financial analysis tools
- Past winning presentations and designs
- Competition Guide
- FAQ

Team Accomplishments on Project

- Learn Critical New Skills
- Apply Those Skills
- Collaborate Effectively
- Design a Visionary Home
- Prepare a Compelling Project Package

Competition Weekend Experience

- Network/Benchmark
- Present to National Experts
- Learn from Thought Leaders
- Make Career Connections
- Tour World-Class Facilities
- Get Recognition

New Perspectives and Real Life Experiences

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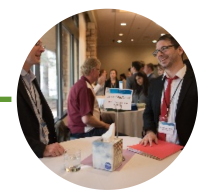
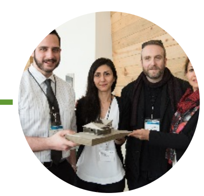
2017 Race to Zero Competition

39 teams

33 universities



4 countries

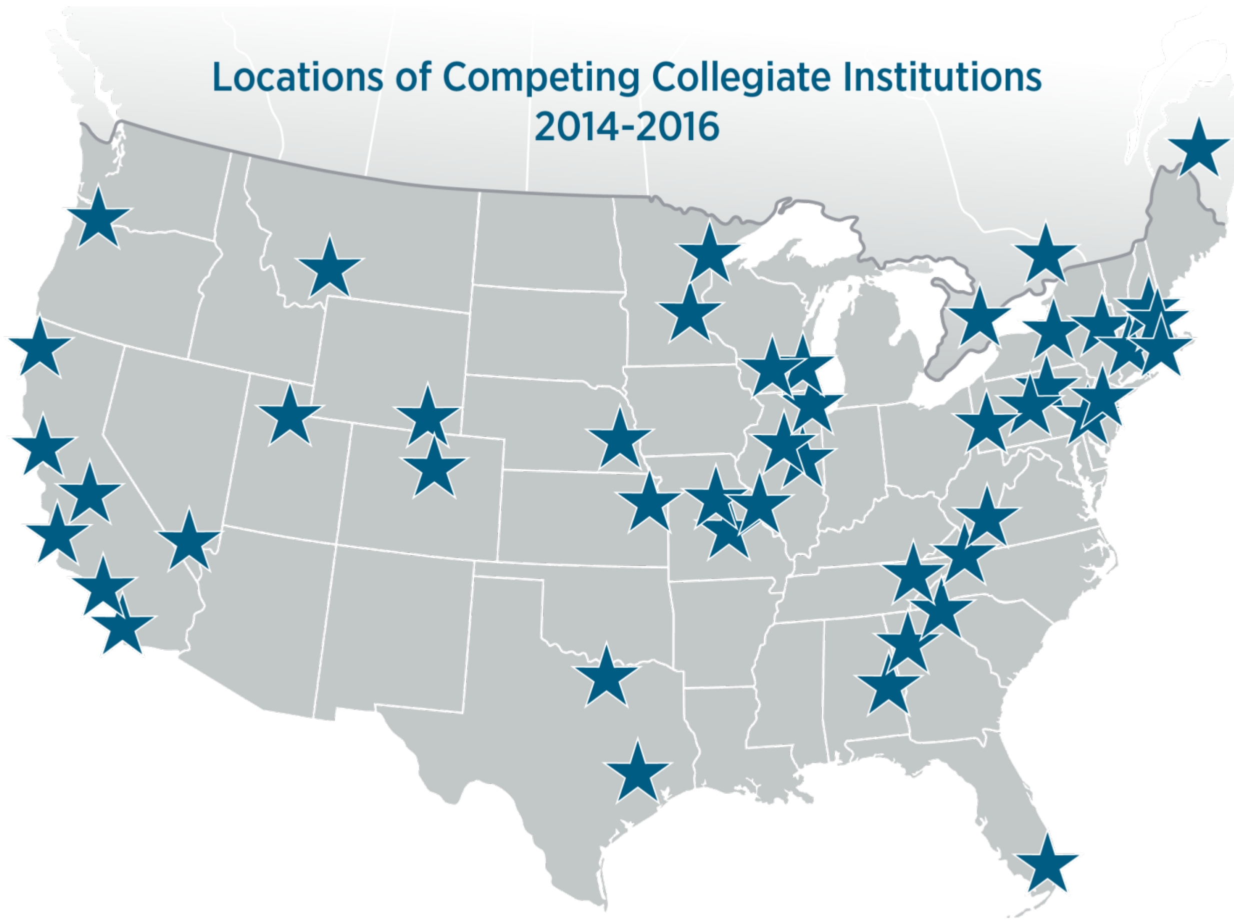


500 students

Previous Star Status

2014-2016 stars

- 51 Collegiate Institutions
- 92 Teams

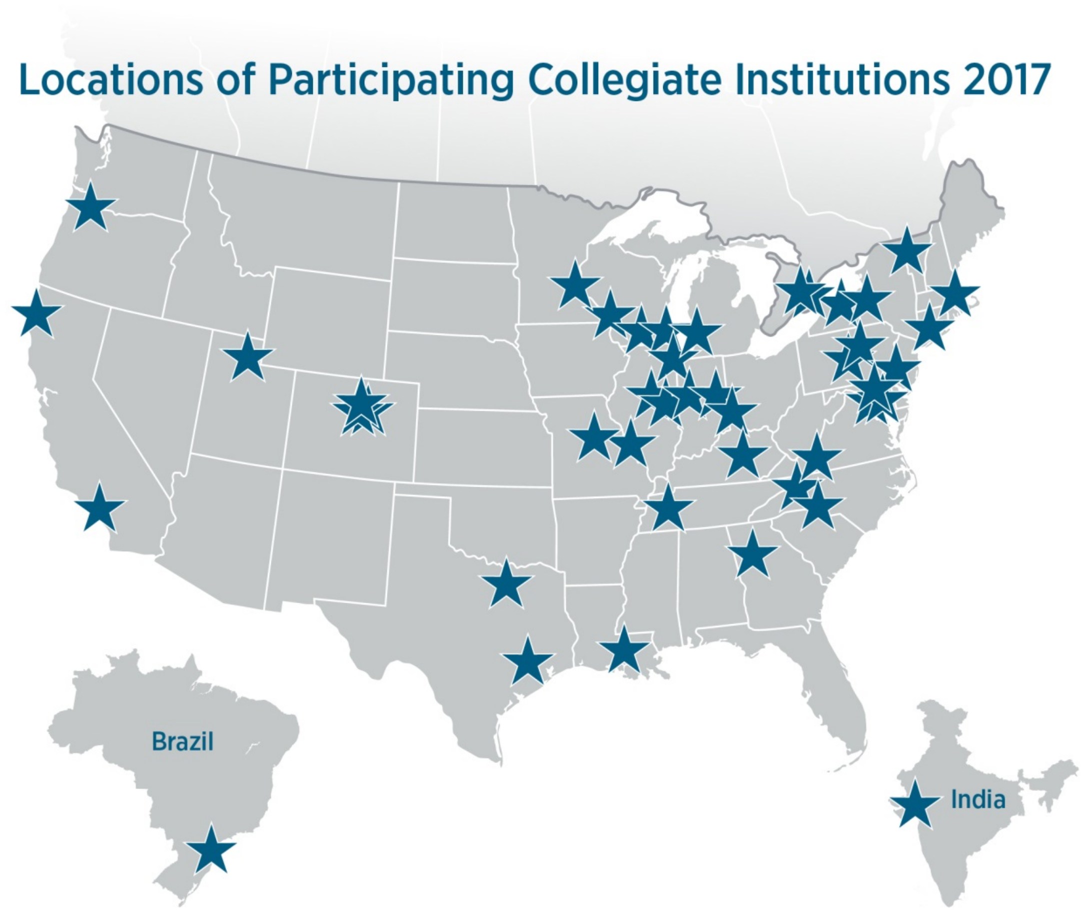


2017 Stars of Race to Zero

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

2017 stars

- 33 Collegiate Institutions
- 39 Teams



What a group!

2017 Jurors

"What a great experience to collaborate with peers (jurors), learn from the next generation of practitioners, and share/mentor the next generation of peers."

\- 2017 Juror

Competition Experience

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"This competition is a great opportunity to go beyond regular materials and resources that are introduced in the typical classroom."
- 2017 Student Participant

2017 Grand Winner!

Keynotes & Thought Leaders

Tours of NREL

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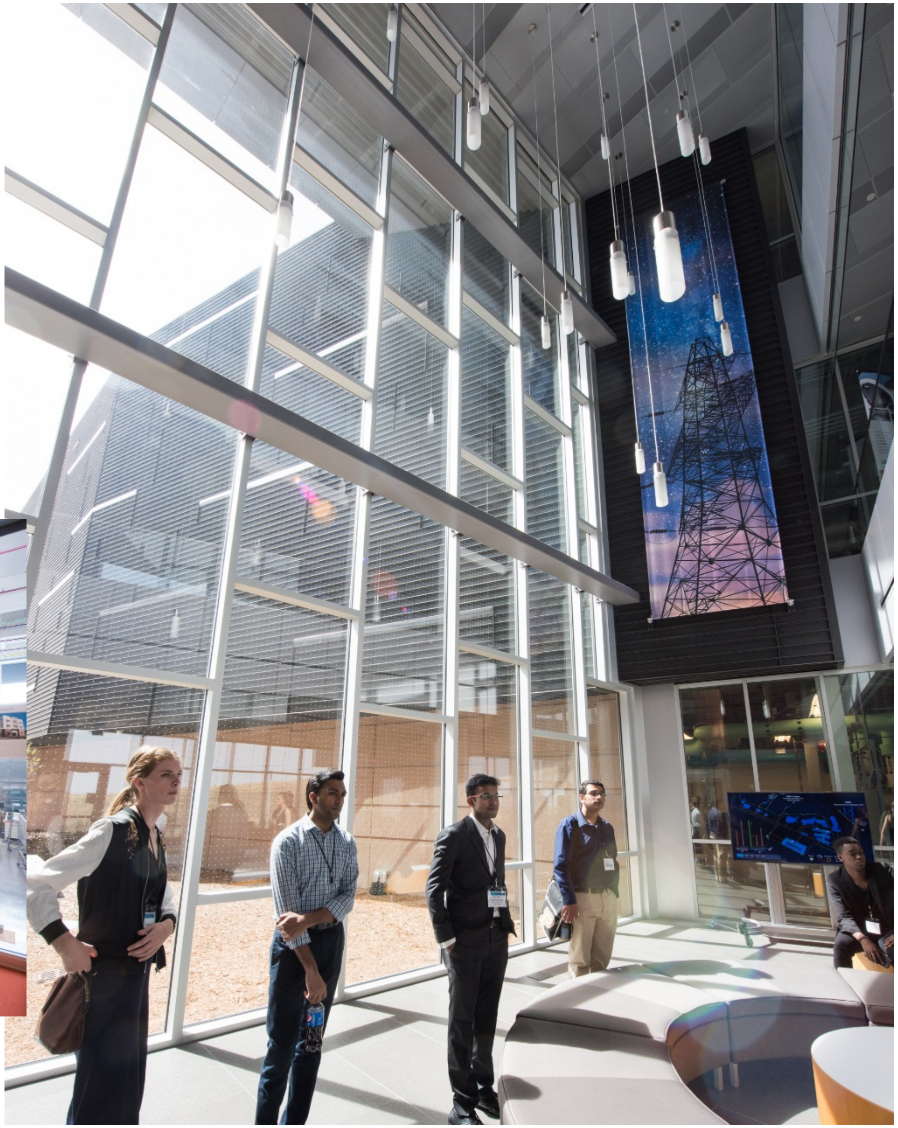
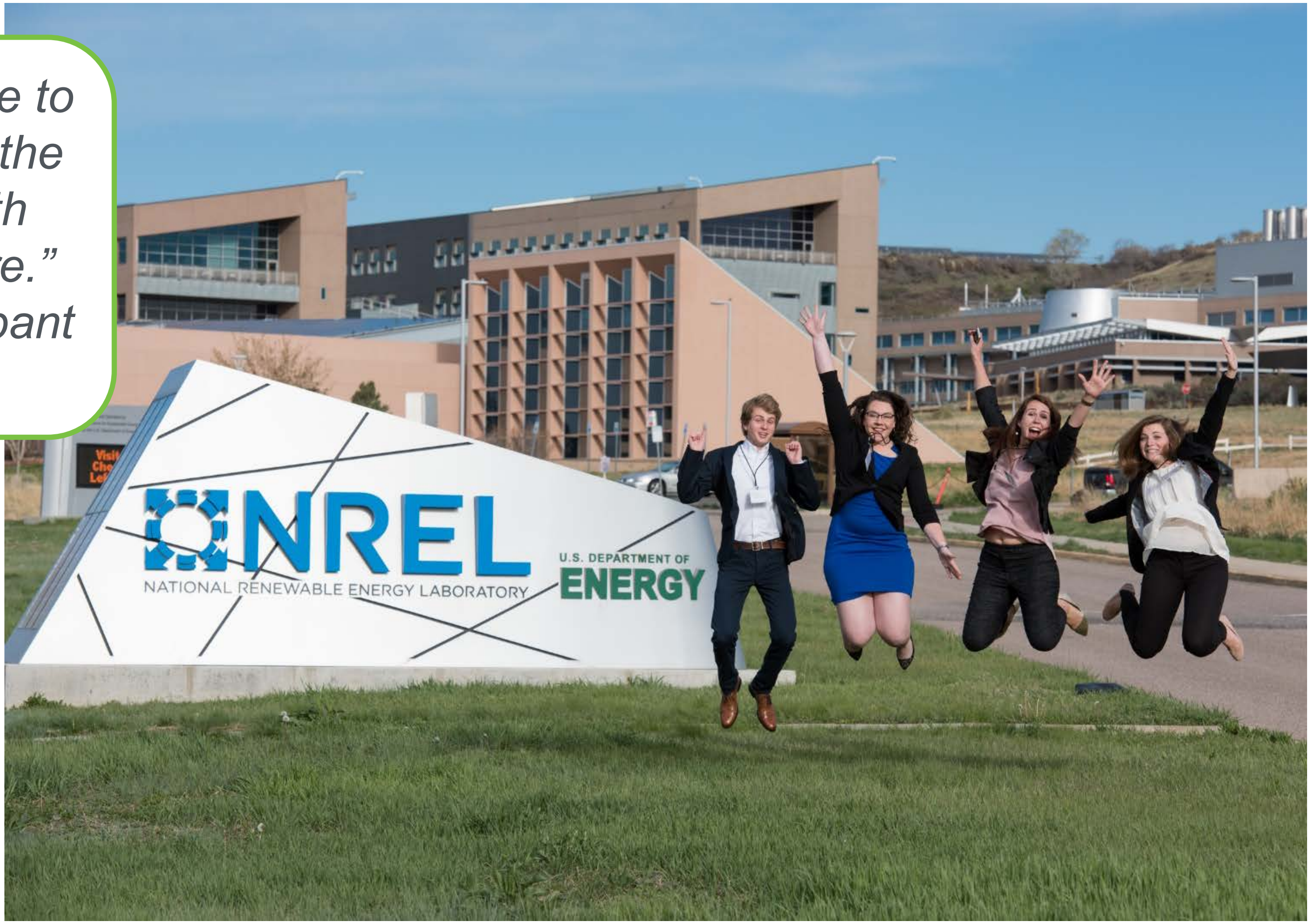


Experiencing NREL

"I enjoyed the exposure to the NREL facility with the tour and meeting with people who work there."
- 2017 Student Participant



The Competition

The students love competing against others, getting an opportunity at this platform, and meeting other teams and seeing their work. So what RTZ offers is something much more that what we can do in the classroom alone.”

-2017 Faculty Advisor

Feedback from Faculty

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"Trying to fit everything in a 120-credit format and creating interdisciplinary courses with cross-college faculty is a challenge."

- *"The competition encouraged collaboration with local industry partners, which increased the rate at which students were able to process through the various design phases and topics. The industry collaboration and real-world design scenario also added a practical motivation that stretches students beyond classroom examples."*
- *"This is essentially a capstone course opportunity to put together a lot of parts and pieces that they have in the classroom. And the students bring their classroom knowledge into a singular optimized package with all the challenges and trade-offs that entails."*
- *"This competition forced students to get involved with the local industry and government agencies. This pushes them out of their comfort zone and prepares them for their careers."*

2017 Race to Zero Sponsors

Questions?

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

OR

racetozero@ee.doe.gov

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

Webinar Outline

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Inspiring University Students	**'Race to Zero'** Student Design Competition
Integration with Commercial Buildings	Better Building Workforce Guidelines
Updated Guidelines	DOE Guidelines for Building Science Education

Better Buildings®
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BETTER BUILDINGS WORKFORCE

Home | Framework | Resources | Projects | Participate

Interested in aligning your program with Better Buildings Workforce Guidelines: Download Job Task Analyses and Certification Schemes at the NIBS resources site

BETTER BUILDINGS BULLETIN

Enter email address SUBMIT

VIEW PREVIOUS EDITIONS

The Better Buildings Initiative is a broad, multi-strategy initiative to make commercial and industrial buildings 20% more energy efficient over the next 10 years. DOE is currently pursuing strategies across five pillars to catalyze change and accelerate private sector investment in energy efficiency.

The pillars are:

- Developing Innovative, Replicable Solutions with Market Leaders
- Making Energy Efficiency Investment Easier
- Improving Effectiveness of Federal Incentives
- Federal Government Leading by Example
- **Developing a Skilled Clean Energy Workforce**

www.eere.energy.gov/workforce

2

Workforce Barriers

- **Patchwork**
  of Technical Standards, Codes and Work Specifications
- **Lack of National Skill Standards**
  for Emerging Energy-Related Jobs
- **Nonalignment**
  with Training Content, Platforms, and Programs
- **No Infrastructure**
  to Support National Credentials
- **Minimal Uptake**
  of Accreditation Stds. for Training & Certification Programs
- **Lack of Recognition**
  of Quality Workforce Credentials

Stakeholders:

NEEC
NORTHWEST ENERGY EFFICIENCY COUNCIL

BUILDING OPERATOR CERTIFICATION

ASHRAE® Certified

fmp
INTERNATIONAL FACILITY MANAGEMENT ASSOCIATION

CEM®

IFMA®
International Facility Management Association

EAI

CMVP®

EVO®

EMIT

TABB
TESTING, ADJUSTING AND BALANCING BUREAU
THE PROFESSIONAL'S CHOICE™

aee®
The Association of Energy Engineers

BCxA™ Building Commissioning Association

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

EMC

NEBB®

NEEi
Northwest Energy Education Institute

CUNY The City University of New York

BESA

UCDAVIS EXTENSION

The National Energy and Sustainability Institute

cea CERTIFIED ENERGY AUDITOR

acg AABC Commissioning Group

EBCP

CBCP

Critical Path

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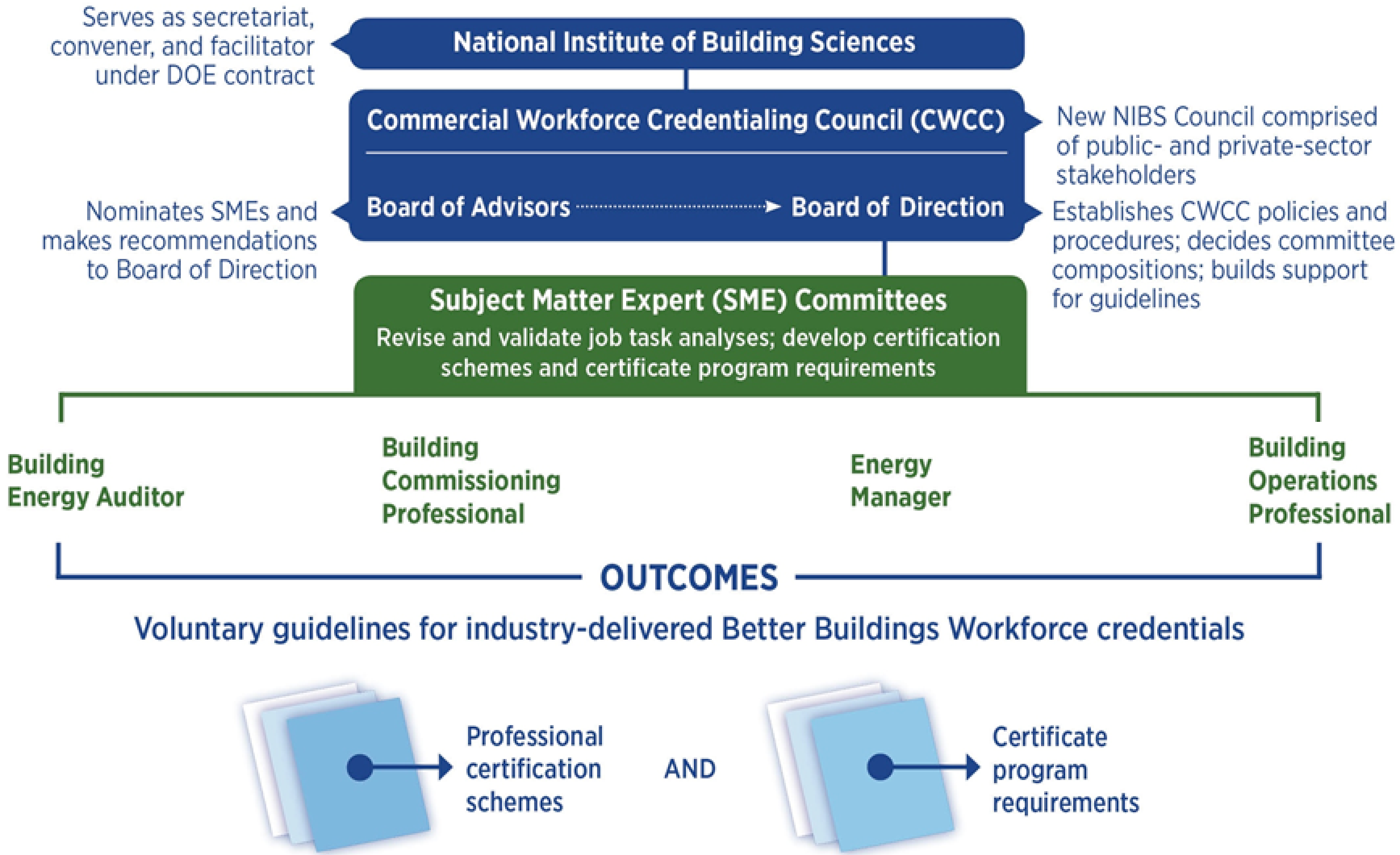

Program Structure

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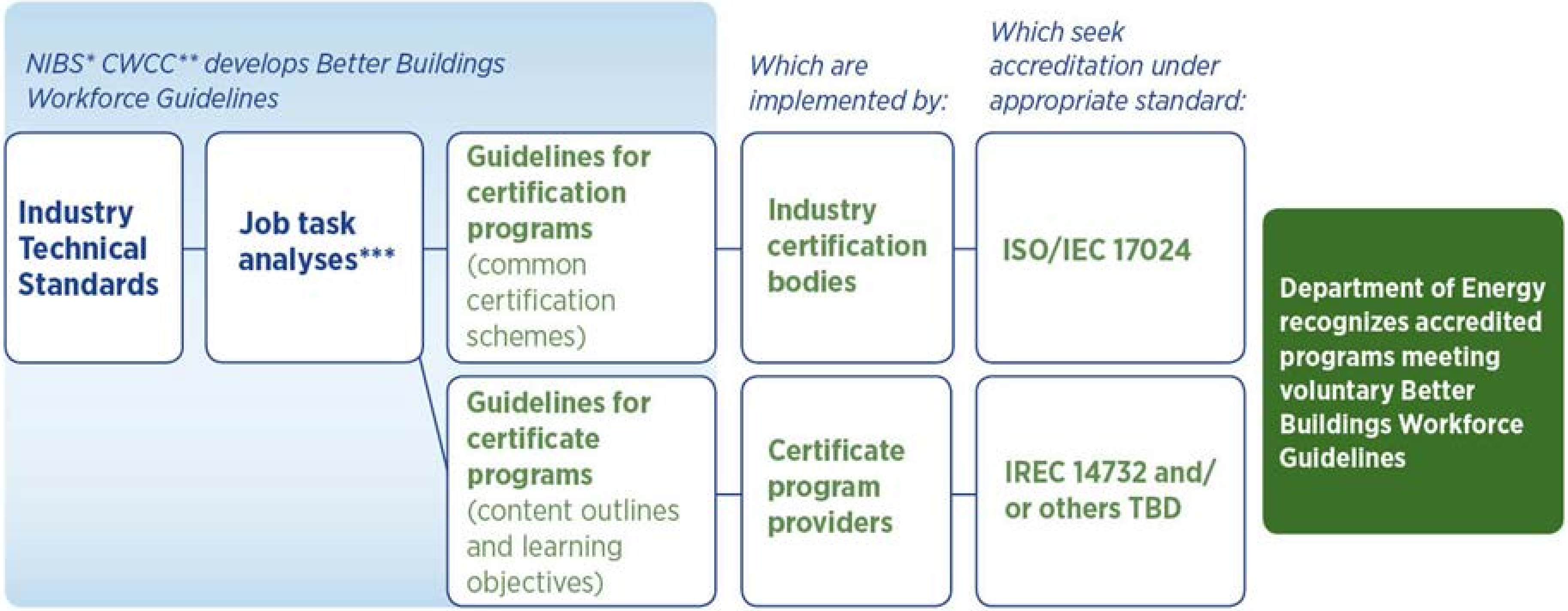
A Government and Industry Partnership to Advance Commercial Workforce Quality



*National Institute of Building Sciences
**Commercial Workforce Credentialing Council

*** Building Energy Auditor; Building Commissioning Professional; Energy Manager; Building Operations Professional

Accreditation and DOE Recognition

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Who are the skilled and qualified workers in advanced energy occupations?

Define Skills

Voluntary Better Buildings Workforce Guidelines, defined by industry and government

Verify

Third-party accreditation of certification or training programs

Recognize

DOE recognition of accredited programs = consumer trust in program quality and workforce performance

CONFUSION → CONFIDENCE

Four Job Titles

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Project Scope	
Job Titles	**Job Descriptions**
Building Energy Auditor	• Assesses building systems and site conditions • Analyzes and evaluates equipment and energy usage • Recommends strategies to optimize resource utilization.
Building Commissioning Professional	• Lead, plan, coordinate and manage a commissioning team to implement commissioning processes in new and existing buildings.
Energy Manager	• Manage and continually improve energy performance in commercial buildings • Establish and maintain an energy program management system supporting organization mission and goals
Building Operations Professional	• Manage the building systems O&M and installed equipment • Perform general maintenance to maintain operability and optimize performance • Ensure comfort, productivity and safety of the occupants.

DOE Recognized Certifications

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1. **Association of Energy Engineers, CEM®**
   - Individuals who optimize energy performance
   - CEM® is a systems integrator
2. **Association of Energy Engineers, CEA®**
   - individuals who evaluate and analyze how energy is being used
   - identify energy conservation opportunities
   - Make recommendations for reducing or optimizing consumption
3. **Building Commissioning Association, CCP**
   - individuals who lead, plan, coordinate and manage commissioning for new and existing buildings.
4. **AABC Commissioning Group, CxA**
   - Certification available to independent professionals who implement commissioning processes in new and existing buildings.
   - serve building owners' best interests by delivering facilities with systems that perform as intended.

Benefits for the Entire Industry

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Workers

- Better credentials
- Clearer career paths

Employers

- Better workforce
- Increased customer demand
- Greater profits

Building Owners/Managers

- Confidence and trust in certified contractors
- Higher quality work
- Faster payback

EE Program Administrators or Regulators

- Increased demand for clean energy services
- Job creation
- Criteria to recognize credentials

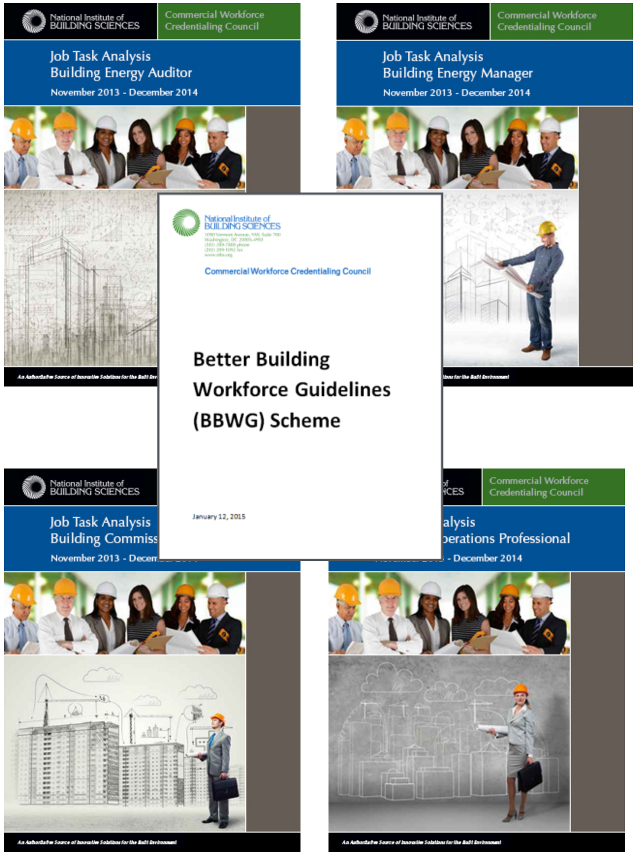
Training and Certification Programs

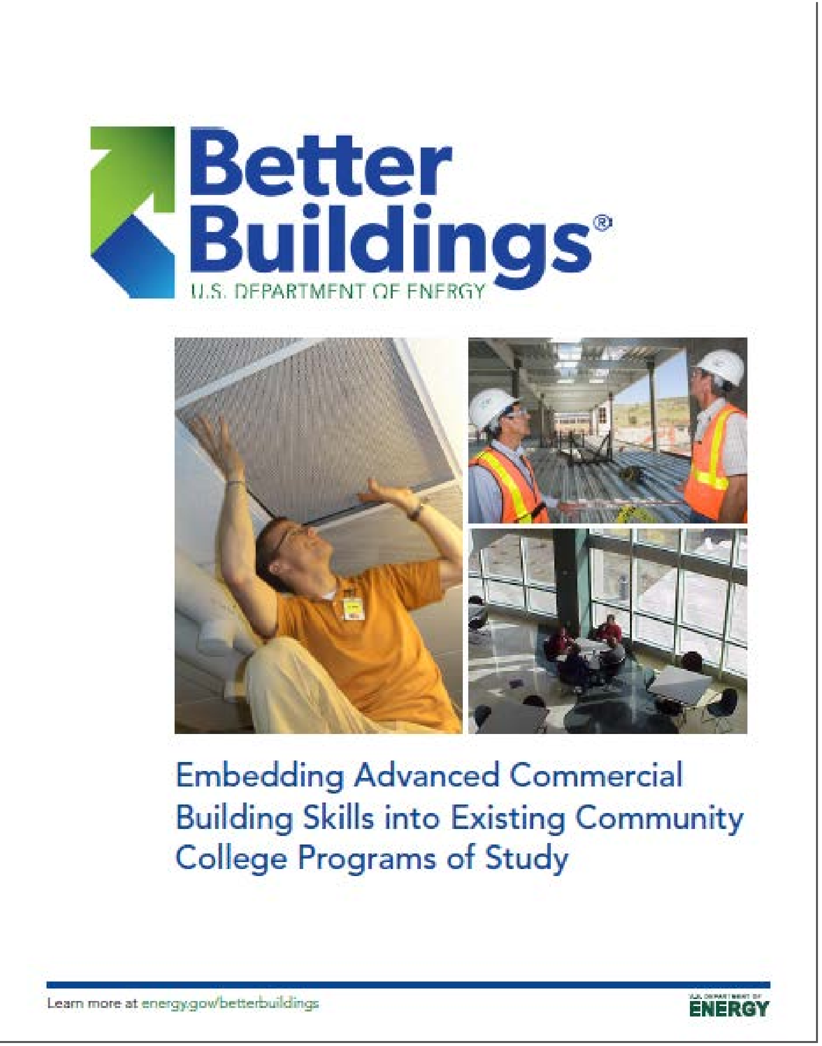
- Able to distinguish their programs as “Better Buildings” recognized
- Tool to increase demand for workforce credentials

BBWG Materials & Resources

- DOE
  https://www4.eere.energy.gov/workforce/projects/workforceguidelines
  - BBWG Factsheet
  - Community College Guidance
  - Apply for DOE Recognition

- NIBS
  https://www.nibs.org/?page=cwcc_resources
  - Job Task Analysis and Certification Schemes




Better Buildings®
U.S. DEPARTMENT OF ENERGY

Embedding Advanced Commercial Building Skills into Existing Community College Programs of Study

Learn more at energy.gov/betterbuildings

U.S. DEPARTMENT OF ENERGY

Integration of BBWG into Existing Curriculum

1. Sort BBWG Student Learning Objectives (SLOs)
2. Categorize SLOs
3. Categorize SLOs Level of Learning
4. Design Modules
5. Design Courses

Webinar Outline

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Inspiring University Students	**'Race to Zero'** Student Design Competition
Integration with Commercial Buildings	Better Building Workforce Guidelines
Updated Guidelines	DOE Guidelines for Building Science Education

Critical Starting Point

Guidelines for Building Science Education (GBSE)
Shall be Fully Coordinated with
Better Buildings Workforce Guidelines (BBWG)

GBSE/BBWG Similarities

- **Goals:**
  - Improving building performance
  - Better credentials for a better workforce
  - Critical mass of knowledgeable workforce
- **Development**
  - Industry involvement
  - Many input opportunities for stakeholders
  - Partnering with education programs for alignment
  - Aligning with other private and federal efforts
- **Collective Impact Process:**
  - Adoption of guidelines by education/training programs

Complementary Programs

Better Buildings Workforce Guidelines

Framework

4 Specific Workforce Classifications (specific task training)

End Goal

Workforce Full Certification Programs

Partner Strategy

Exclusive Involvement

Guidelines for Building Science Education

Framework

Full Spectrum Workforce Classifications (general BS knowledge)

End Goal

National Platform and Resources for Consistent Competency

Partner Strategy

As Much Involvement as Possible

Consistent Framework – Career Classifications

Career Classifications

1 High-School Ed.	2 Builder/ Remodel Pros	3 Program/ Project Manager	4 Transact. Process Pros	5 Design/ Construc. Pros	6 Building Science Pros	7 Energy Pros	8 Building Depart.
Physics	Builder	Utllity	Realtor	A/E Degree	Forensics	C. Auditors	Code Offic.
	GC/Forem.	Energy Eff.	Appraiser	Lic. Arch.	Commiss'g	R. Auditors	
	Remodeler	Maint. Pro	Home Insp	Mech. Eng.		Perf Assess	
	Insulater	Facil. Man.	Insurers	Bldg Auto.		Ener. Man.	
	HVAC		Lenders	Elec. Eng.			
	Plumber			Light. Des.			
	Home Perf.			Civil/Struc.			
				Mat. Sci.			
				Designers			
				Landscape			
				Const. Man			

= Content covered by Better Buildings Workforce Guidelines

= New commercial buildings content

Consistent Framework – Building Science Skills

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Building Science Skills			
1 Integration of Whole-Bldg. Sys.	**2 Building Science Principles**	**3 Operations & Maintenance**	**4 Building Testing**
1.1 Performance	2.1 Heat Transfer	3.1 User Interface/Cont.	4.1 Commissioning
1.2 Life-Cycle Cost Eff.	2.2 Material Selection	3.2 Preventative Maint.	4.2 Diag. & Forensics
1.3 Disaster Resistance	2.3 Moisture Transport	3.3 Replacement/Renov.	4.3 Perf. Mon./Assess.
I.4 Int. Design & Const.	2.4 Control Layers		4.4 Ntl. Codes & Stds
1.5 Quality Management	2.5 Convective Transprt.		4.5 Cert. Programs
1.6 Bldg/Energy Model'g	2.6 Hygrothermal Anal.		
1.7 Cost Trade-Off Anal.	2.7 HVAC Systems		
	2.8 HVAC Inter. w/Struc.		
	2.9 Fenestration		
	2.10 Plumbing Systems		
	2.11 Electrical Systems		
	2.12 Lgting & Appliances		
	2.13 Indoor Air Quality		
	2.14 Control/Automation		

Consistent Framework – Proficiency Levels

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Building Science Proficiency Based on Blooms Taxonomy

6	**Create** (Design)
5	**Evaluate** (Synthesis)
4	**Analyze** (Analysis)
3	**Apply** (Application)
2	**Understand** (Comprehension)
1	**Remember** (Knowledge)

Consistent Framework - Building Science Education Matrix

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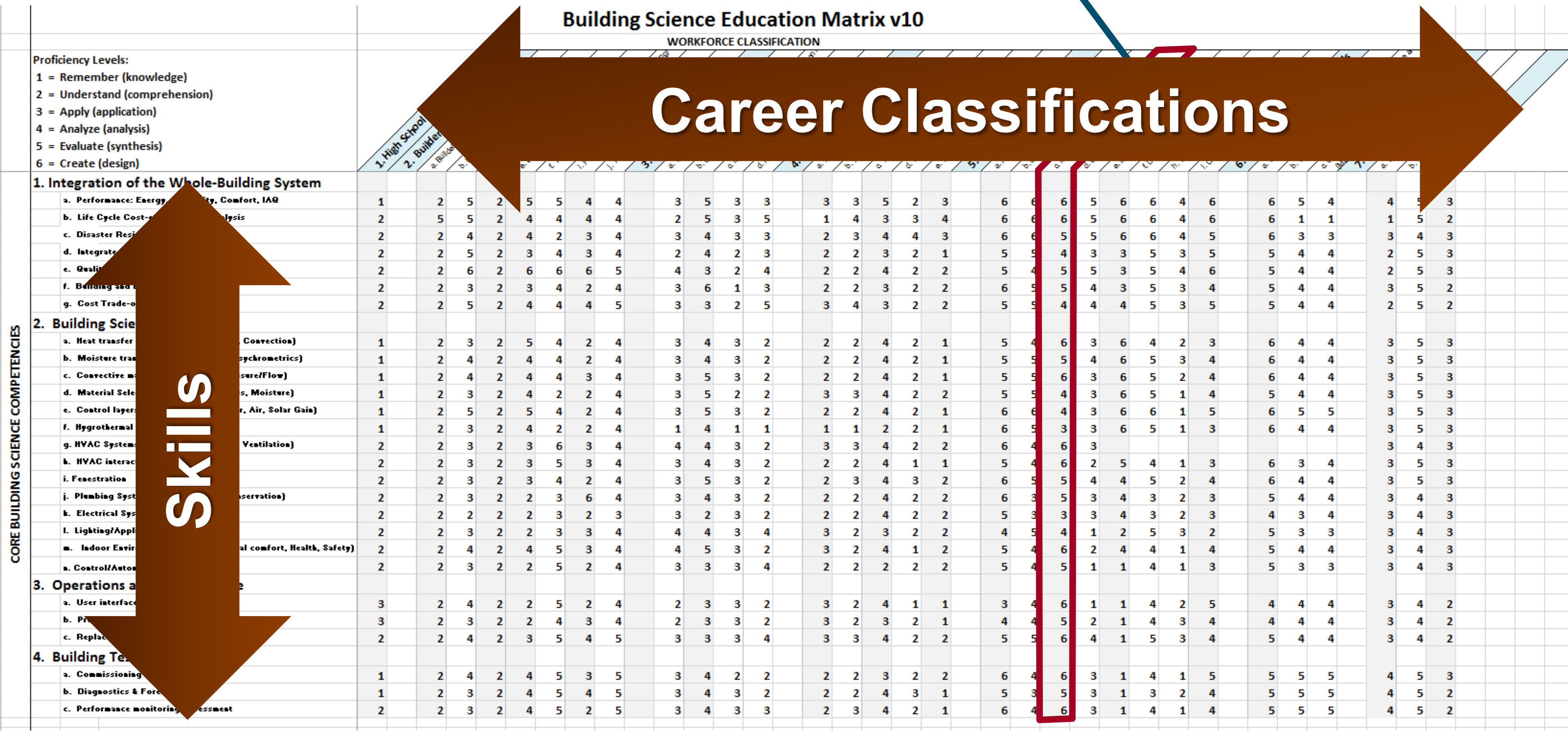
Mechanical Engineer Guideline

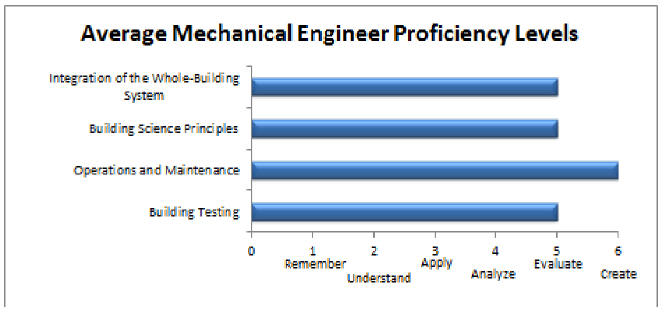
Work in Progress



Consistent Framework – Sample Guideline

Building Science Education Guidelines for Mechanical Engineers

A summary of the proficiency levels[1] for the core competencies are displayed in the graphic below. For each core competency level described in this checklist, it is assumed that the organization or student is proficient in the level described, as well as all the cognitive levels below that level.



As the entity responsible for managing home energy certifiers, a mechanical engineer should be proficient in the following categories:

Topic	Proficiency Level	Checkbox
Integration of the whole-building system	Average = 5	
Simultaneous consideration of energy, durability, comfort and IAQ	6	☐
Annualized cash flow	6	☐
Building techniques related to natural and man-made disasters	5	☐
Integrated design and construction	4	☐
Quality management	5	☐
Building energy modeling	5	☐
Cost trade-off analysis (optimized first costs)	4	☐

[1] The average level shown here is the whole number that best represents the combination of individual scores from each sub-category

Topic	Proficiency Level	Checkbox
Building science principles related to the enclosure	Average = 5	
Heat transfer (convection, conduction and radiation)	6	☐
Moisture transport of liquid	5	☐
Convective air transport due to pressure differences	6	☐
Material selection (IAQ, thermal mass, moisture)	4	☐
Controls layers (heat, vapor, water, air and solar gain)	4	☐
Hygrothermal analysis	3	☐
HVAC systems (heating, cooling and ventilation)	6	☐
HVAC interactions with the enclosure	6	☐
Fenestration considerations	5	☐
Plumbing systems (heating, distribution, conservation)	5	☐
Electrical systems	3	☐
Lighting/appliances and miscellaneous loads	4	☐
Indoor environmental quality (temperature uniformity and indoor pollutants)	6	☐
Control/automation systems	5	☐
Operations and maintenance	Average = 6	
User controls (ex: thermostat)	6	☐
Preventative maintenance (ex: cleaning air filters)	5	☐
Determination of appropriate replacement choices	6	☐
Building testing and certification	Average = 5	
Commissioning	6	☐
Diagnostics and forensics	5	☐
Monitoring	6	☐
National codes and standards	3	☐
Certification programs	3	☐

The ______________________________ mechanical engineer certification body has incorporated all of the relevant information in the above checklist into their training materials.

Signature ____

Skills		Proficiency 1	2	3	4	5	6
1 Integration of Whole-Building System	1.1: Performance: Energy, Durability, Comfort, IAQ						
	1.2: Life-Cycle Cost-Effectiveness Analysis						
	1.3: Disaster Resistance/Resiliency			Content			
	1.4: Integrated Design and Construction						
	1.5: Quality Management						
	1.6: Building and Energy Modeling						
	1.7: Cost Trade-Off Analysis						
	2.1: Heat Transfer (Conduction, Radiation, Convection)						
	2.2: Moisture Transport (Liquid, Vapor, Pxychrometri…						
	2.3: Convective Mass (air) T…port (Pressure/Flow)						

Level 1: Identify and state the units for: heat flux, heat rate, thermal conductivity, temperature gradient, emissivity, heat transfer coefficient

Level 2: Define key terms including conduction, convection, radiation, energy, steady state.

Level 3: Calculate heat transport, conductivity, area or temperature difference through a solid using Fourier's law.

Level 4: Draw a heat transfer diagram that shows each mode of heat transfer in context with the geometry

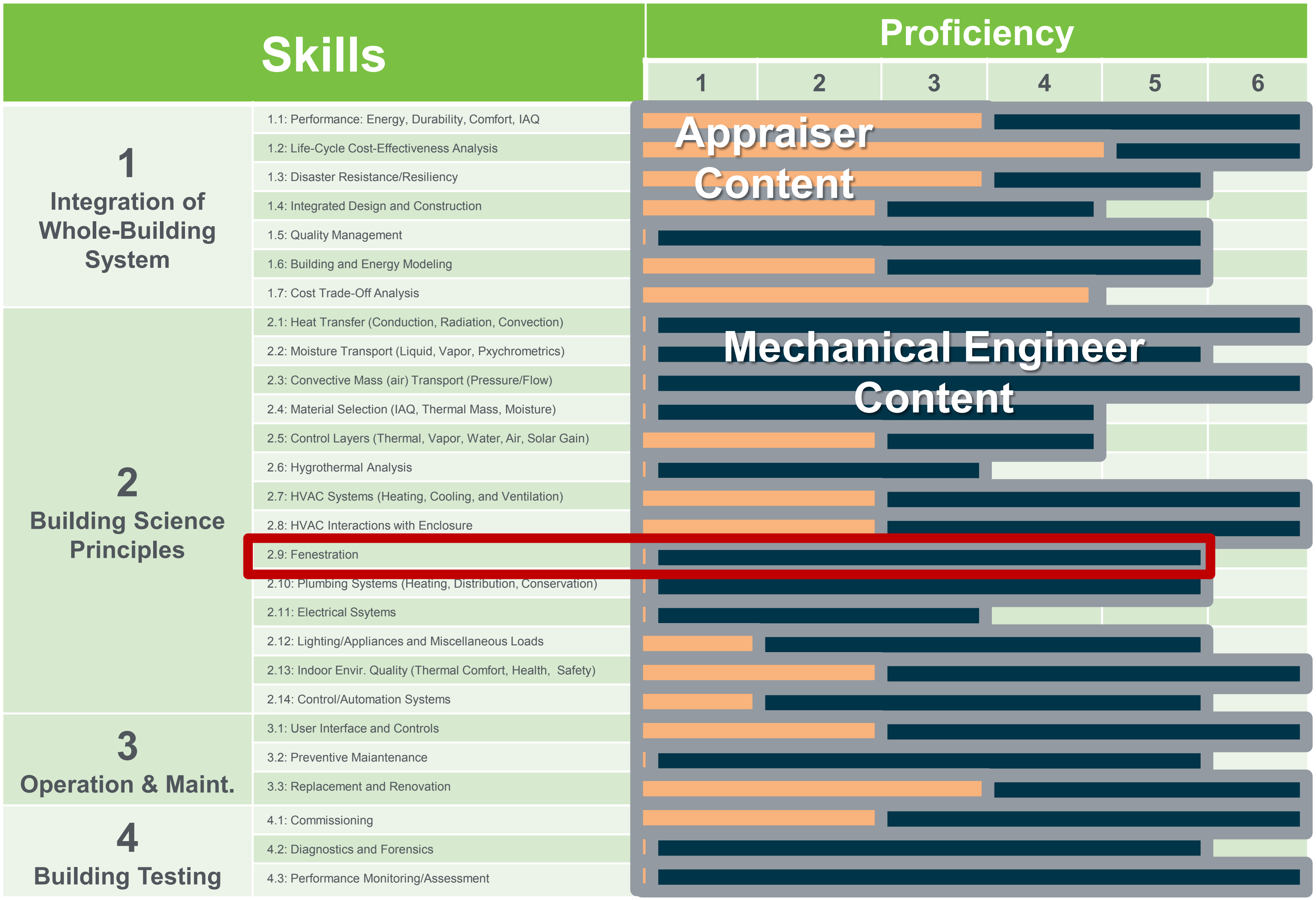
Level 5: Determine the mode of heat transfer most important or likely to occur in a system if given information about the substances/ processes involved.

Level 6: Design an integrated hybrid thermal envelope

2. Building Science Principles - 2.1 Heat Transfer

Building Science Education Solution Center Content

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy



Guidelines Timeline

Live Demo

Content is Needed

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Building Science Skills	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
1. Integration of the Whole-Building System						
a. Simutaneous consideration of energy, durability, comfort, IAQ						
b. Life cycle cost-effectiveness analysis						
c. Disaster resistance/resiliency						
d. Integrated design and construction (R/C)						
e. Quality management						
f. Building and energy modeling						
g. Cost trade-off analysis						
2. Building Science Principles						
a. Heat transfer (conduction, radiation, convection)	√	√	√			
b. Moisture transport (liquid, vapor, psychrometrics)	√	√	√			
c. Convective mass (air) transport (pressure/flow)						
d. Material selection (IAQ, thermal mass, moisture)						
e. Control layers (water, air, vapor, thermal, solar)						
f. Hygrothermal analysis						
g. HVAC Systems (heating, cooling, ventilation, dehumidification)	√	√	√			
h. HVAC interactions with enclosure						
i. Fenestration	√	√	√	√	√	
j. Plumbing systems (heating, distribution, conservation)						
k. Electrical systems						
l. Lighting, appliances & misc. loads						
m. Control/Automation systems (R/C)						
n. Indoor environmental quality (thermal comfort, health, safety)	√	√	√			
3. Operations and Maintenance						
a. User interface and controls						
b. Preventative maintenance						
c. Replacement & renovation						
4. Building Testing						
a. Commissioning						
b. Diagnostics & forensics						
c. Performance monitoring/assessment						
d. National codes and standards	√	√	√			

Collective Impact Campaign

Target Stakeholders:

- Educational Institutions
  (small programs to big universities)
- Trade associations and general public

***Kania and Kramer, Stanford Social Innovation Review, 2011**

Targeted Stakeholders

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Trade Associations

- Licensing Exams
- Continuing Education

Universities/Colleges

- Existing curriculum infusion
- New classes
- Structured minor
- State Licensing Exams

General Public

- High Schools

Stakeholder Classifications

Collaborators

- Content used on Building Science Education Solution Center (BSESC) website
- Integration of building science modules into existing curriculum
- Peer reviewer of content

Stakeholders

- Agreement to collaborate on final guideline content for a given job classification
- Agreement to have curriculum consistent with the guidelines
- Entity and curriculum improvements that entity listed on website

BUILDING SCIENCE EDUCATION SOLUTION CENTER

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Find Your Topic By:
Job Classification
Building Science Topic
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Resources:
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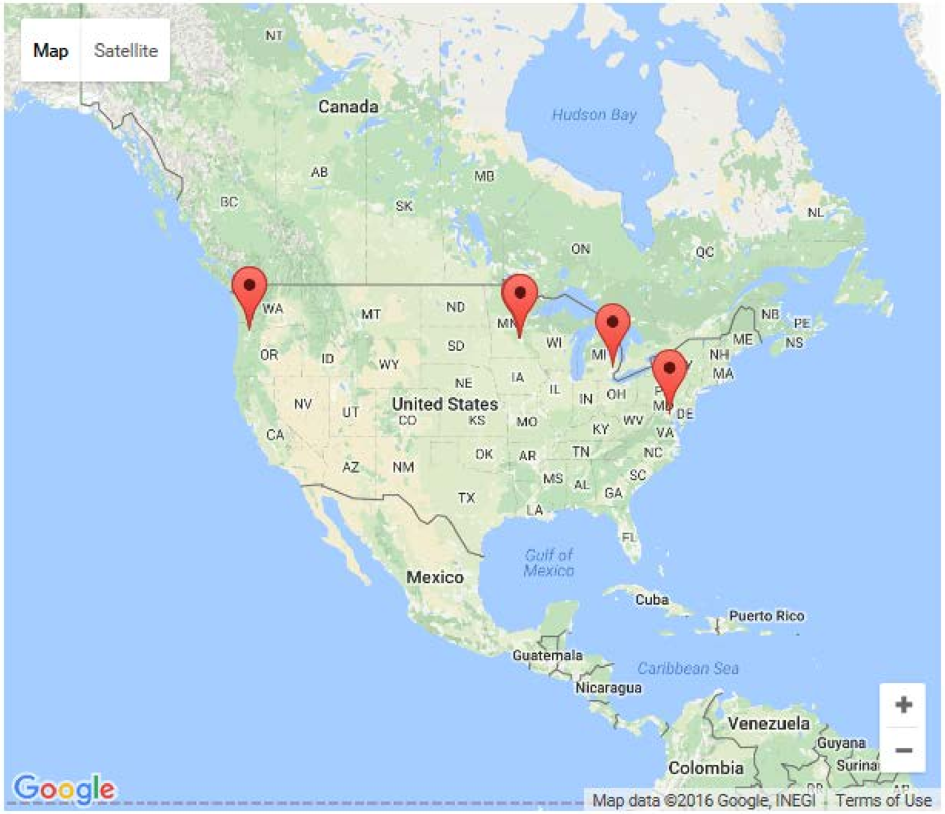
Locator Map



BUILDING TYPE

Residential (6)
Both (4)
Commercial (4)

JOB CLASSIFICATION

Material Science Engineers (2)
Mechanical Engineers (2)
Appraisers (1)
Builders/Remodelers (1)
Civil and Structural Engineers (1)

BUILDING SCIENCE EDUCATION SOLUTION CENTER

Shiley School of Engineering - University of Portland

The University of Portland is a thriving community of over 5,000 students, faculty and staff located on a bluff overlooking the booming metropolitan city of Portland, Oregon.

Featured Story:
"The University of Portland's Shiley School of Engineering recognizes that the high performance building industry is a growing field. Our School is excited to partner with the Pacific Northwest National Laboratory to bring awareness to these job opportunities and support the Department of Energy's Guidelines for Building Science Education. Thanks to Dr. Heather Dillon of the Mechanical Engineering program, who helped develop this partnership, our students will be some of the first in the country to have access to the world-class teaching materials available through PNNL and DOE."

Dean Sharon Jones – Shiley School of Engineering

Partner Website: http://engineering.up.edu/

Thank you!

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