Providing effective energy strategies for buildings and communities
The Smart Energy Design Assistance Center (SEDAC) is an applied research program at University of Illinois.

Our mission: Reduce the energy footprint of Illinois and beyond.
BEE Fundamentals Partners & Participants

Illinois Environmental Protection Agency
Lewis & Clark Community College
McHenry County College
Moraine Valley Community College
Southwestern Illinois College
Triton College
Illinois Central College
Kishwaukee College
Olive-Harvey College
Oakton Community College
Illinois Eastern Community College
John A Logan College
Hartland Community College
Rend Lake College
Harper College
University of Illinois
University of Chicago
Northern Illinois University
Chicago Public Schools
Ameren Illinois / Leidos
Illinois Green Alliance (IGA)
Illinois Green Economy Network (IGEN)

Kauai Community College
Honolulu Community College
UH Maui College
Brigham Young University-Hawaii
Leidos – Hawaii Energy
Hawaiian Electric
Island Green Architecture
Bowers + Kubota Consulting
STUDIO OXEYE
D.R. Horton
Saito Design Associates
Plumbing & Mechanical Contractors Association of Hawaii (PAMCA HI)
Islandwide mechanical service
Oahu Air Conditioning Service, Inc.
TMA Architects
Economy Plumbing & AC
Bowers and Kubota Consulting
Mason Architects
S. Biniaris Architect
Colliers

Kauai County
Maui County Office of Economic Development
City & County of Honolulu
County of Hawaii
Hawaii Community Development Authority
Hawaii Department of Education and many more

Western Nevada College
College of Southern Nevada
Truckee Meadows Community College

Clark County School District
Nevada Builders Alliance
Home Energy Connection
GRN Vision
Desert Research Institute
International Code Council (ICC)
Envirolution
Plumbing, Heating, Colling Contractors of Nevada (PHCC NV)
Home Energy Connection

Clark County
City of Las Vegas
City of North Las Vegas
City of Henderson
City of Mesquite
City of Elko
City of Sparks
City of Reno and many more

SEDAC
SMART ENERGY DESIGN ASSISTANCE CENTER
This program introduces community college students and young professionals to energy efficiency and energy code topics to prepare the next generation of professionals to integrate energy efficiency into their work.

What is BEE Fundamentals?

Building Energy Education fundamentals
Who is the **target audience?**
- Community college instructors & students, entry level building professionals

Does the program prepare students for a **specific job or certification exam?**
- No. Provides fundamental knowledge relevant for many jobs and exams.
How **long** is the training program?

- 15 modules (~60 minutes of content), broken up into smaller chunks

What **background knowledge** is required to teach the modules?

- Appropriate for those who teach courses in building design and construction, HVAC, architecture, mechanical engineering, energy management, and sustainability
There are many different energy efficiency jobs.
Energy efficiency jobs span a range of skills.

**Building Related Jobs:**
- Design
- Construction
- Operation

**Policy & Planning:**
- Marketing
- Proposal Writing
- Research

**Analysis & Computation:**
- Calculate Savings
- Manage Data
- Generate Reports

**Financial:**
- Sales & Cashflow Analysis
- Project Financing
- Project Management

**Customer Service & Training**
- Sell Products and Services
- Quality Control
- Teach Students
Careers in Energy Efficiency

Building related jobs address energy efficiency.

**Architects & Engineers**
- design for efficiency
- ensure code compliance and safety

**Contractors and Construction Managers**
- build efficiently
- make buildings more efficient when they renovate

**Installers & Technicians**
- install efficient equipment
- make sure it is operating properly

**Building Operators**
- ensure that buildings run smoothly and efficiently
- maintain efficiency

DESIGN

BUILD

INSTALL

OPERATE

https://unsplash.com/: clockwise from upper left: Ryan Ancill, Gregson Joralemon, Emmanuel Ikwuegbu, Christopher Burns
There are many non-construction, technical energy efficiency jobs, too.

**Industrial:** Factories and manufacturing have big energy efficiency opportunities

**Product Development:** Engineers and designers develop products to support energy efficiency in other sectors

**Program Implementation:** Identify opportunities for clients to take advantage of utility energy efficiency programs

**Public Works:** Reduce the energy use of vital public services such as water treatment and public transportation.
There are many non-construction, technical energy efficiency jobs, too.

**Sales and marketing:** Sell energy efficiency products and services

**Accounting:** Help finance and facilitate energy efficiency projects

**Program management:** Help manage utility energy efficiency programs

**Policy making:** Help develop the policies that prioritize energy efficiency

**Educating:** Educate people about the benefits of energy efficiency
Figure 2: Plans to Leave the Building Regulatory Profession

- Less than 5 years: 31%
- 5 to 15 years: 51%
- 16 to 25 years: 14%
- 26 to 35 years: 4%
- 36 to 45 years: 0%
- 46 years or more: 0%

Figure 10: Reasons for Pursuing Career as Code Professional

1. Exciting work environment, 16.4%
2. Engagements with code officials, 18.0%
3. Friend/family/colleague suggestion, 25.1%
4. Respect for the profession, 35.9%
5. Job security, 48.2%
6. Salary/benefits, 43.7%
Code Professional Career

“... far more rewarding, as you maintain vigilance over all structures built in your jurisdiction to ensure they meet the minimum standards of the laws and codes.”

“I believe that my 25 years in the field of commercial construction as an apprentice, journeyman, foreman and supervisor served me well when I made the decision to enter the inspection field.”

“Extremely rewarding, always helping people, always learning, never a dull moment, always in demand.”

“Get all of the vocational training you can, and work in the building trades field, so you have a good understanding of how a structure should go together. Work for a good, reputable contractor for at least two years and train, train, train.”

Why BEE Fundamentals?

“We’re going to keep struggling with code compliance until energy code training permeates the building trades.”  
- IL Code Official

“We offer basic, introductory exploration of the topic…it would be great to focus more on the IECC and how it relates”  
- IL Instructor

“I don’t just keep using the same book over and over…I like to keep [my students] appraised of what’s going on in the world today”  
- NV Instructor

“Most people tend to learn better when they are able to have hands-on experience or see live examples instead of only reading about it.”  
- HI Code Consultant

SEDAC, Interview with Code Professionals and Instructors, 2021
What We’ve Learned:
Training Needs Assessment
Methods

- Literature review & feedback from code officials, instructors in IL, NV and HI.
- Surveyed about 60 community college programs & curricula
- Reviewed literature on barriers & best practices
Interviewees agreed that there is a need for more energy code/energy efficiency training in the building trades.

“We’re going to keep struggling with code compliance until energy code training permeates the building trades.”

- IL Code Official
Results

Strong Interest in additional training

86% of instructors are interested in enhancing energy and energy code education in their programs.

“We offer basic, introductory exploration of the topic...it would be great to focus more on the IECC and how it relates”  - IL Instructor
Results

What content should be taught?

- Energy code/energy efficiency basics
- Whole-building approach
- Information about new practices, technologies
- Information about careers in codes, energy efficiency

“I don’t just keep using the same book over and over...I like to keep [my students] appraised of what’s going on in the world today”

- NV Instructor
How should the content be taught?

<table>
<thead>
<tr>
<th>Engaging teaching methods</th>
<th>Not engaging teaching methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Short videos</td>
<td>• Lectures</td>
</tr>
<tr>
<td>• Demonstrations</td>
<td>• Route memorization</td>
</tr>
<tr>
<td>• Building science basics</td>
<td></td>
</tr>
<tr>
<td>• Self-directed learning activities</td>
<td></td>
</tr>
<tr>
<td>• Experiential learning</td>
<td></td>
</tr>
</tbody>
</table>

“Most people tend to learn better when they are able to have hands-on experience or see live examples instead of only reading about it.”

- HI Code Consultant
Is it feasible to integrate new content into existing curriculum?

### Feasible
- Small, add-on elements
- Resources to reinforce existing content

### Not feasible
- Major changes, additions
- Stand-alone courses

**Barriers** to making major changes:
- Class time
- Established learning objectives
- Administrative approval
- Advisory committee approval
- Transfer requirements

“For anything you add, something has to be removed.”

- IL Instructor
What We’ve Developed:
Building Energy Education (BEE) Fundamentals
BEE Fundamentals Program Webpage

https://smartenergy.illinois.edu/bee_fundamentals/

Teach energy efficiency through energy code basics

Hands-on Curriculum | Instructor Training | Resources

Instructor Toolkit: How to Use our Curriculum

Access our Modules! Login to our Moodle Site
Instructor Toolkit

https://smartenergy.illinois.edu/instructor-toolkit
Moodle

https://learn.smartenergy.illinois.edu/
Moodle: How to Navigate

https://www.youtube.com/watch?v=SwMPYh26E0c&ab_channel=SEDACILLINOIS
BEE Fundamentals Webinars & Workshop

https://smartenergy.illinois.edu/bee_fundamentals/

PROGRAM LAUNCH

HAWAII LAUNCH WEBINARS

Part 1: April 7, 2022, 12:00-1:30 pm HST
Register here

Part 2: April 14, 2022, 12:00-1:30 pm HST
Register here

Part 3: April 21, 2022, 12:00-1:30 pm HST
Register here

Hawaii Launch Part 1 Agenda
Hawaii Launch Part 2 Agenda
Hawaii Launch Part 3 Agenda

NEVADA LAUNCH WEBINAR

April 20, 2022 from 10am-12pm PST
RSVP via email: info@energy.nv.gov

Nevada Launch Agenda

NEVADA LAUNCH WEBINAR

April 20, 2022 from 10am-12pm PST
RSVP via email: info@energy.nv.gov

Nevada Launch Agenda

ILLINOIS LAUNCH WEBINAR

April 22, 2022 from 2-4pm CST
Register here

Illinois Launch Agenda

TRAIN-THE-TRAINER WORKSHOP

(for All States)

April 29, 2022
2:00-4:00 pm CST (12 – 2pm PST, 9 – 11am HST)
Register here

Train the Trainer Workshop Agenda
Questions?

sumihan@illinois.edu
217-300-1820