U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Cross-Cutting Project Medley:

Presented by the BTO Fellows

Janet Reyna, Robert Fares, Mike Specian, Valerie Nubbe, Madeline Salzman, Jordan Hibbs, and Cedar Blazek

April 30, 2018

Outline

- **Introduction**
  - What are Fellows?
  - Types of fellowships (ORISE, AAAS, PMF)
- **Fellows Presentation of Cross-Cutting Work**
  - 5 fellows will discuss a project of interest
- **Conclusions**
  - Opportunities for fellows in the future
- **Q&A Session**
  - General questions to all of the panel
- **Meet and Greet**
  - Ask fellows about their projects

What Do Fellows Do At BTO?

- **Fellows have lots of flexibility to pursue projects of interest**
- **Fellows often act as "in-house consultants" working on cross-cutting areas and developing ideas**
  - New initiatives
  - Funding call development
  - Managing programs
  - Research
  - Proposal review
  - Literature reviews
- **BTO gets great new ideas; Fellows get marketable experience and do high-impact work**

What Do Fellows Do Afterwards?

- Federal Government
- National Laboratories
- Academia
- Consulting
- Non-profit sector

Fellowship Comparison

- BTO generally hires three types of fellows:

	ORISE	AAAS	PMF
Length	3 – 5 years	2 years	2 years
Federal Employee?	No	No	Yes
Minimum Education	Bachelors	PhD	Masters
Health Insurance	Yes	Yes	Yes
Other Benefits	No	No	Yes

Most Flexible

Most Structured

Oak Ridge Institute for Science and Education (ORISE) Fellowship

Janet Reyna

Eligibility

- **Required**
  - US Citizen or Green Card Holder
  - Ph.D., Master's, or Bachelors degree in an energy-relevant field of science, engineering or other highly quantitative field such as economics (occasionally exceptions for prior experience)
- **Preferred**
  - Superior academic performance and publication record.
  - Strong analytical, research and communication (oral and written) skills and demonstrated capacity for creative thinking.
  - Strong technical background and expertise in an energy-technology-related field.
  - Interested in being part of a multi-disciplinary, fast-paced environment, focused on energy technology research and development.
- https://www.energy.gov/eere/education/energy-efficiency-and-renewable-energy-science-technology-and-policy-program

ORISE – Application Process

- Online application - specific for a role on a BTO team
- Skype / Phone interview
- In-person interview

- Hiring decision with BTO
- Appointed one year at a time, up to five years

ORISE Quirks and Benefits

- ORISE Fellows work with a mentor to develop an education plan in line with goals
- ORISE Fellows are not federal employees so they have a lot of flexibility in projects, development opportunities, and travel
- ORISE Fellows have dedicated funding for professional development and travel
- ORISE Fellows get fully funded health insurance for themselves and their families

American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellowship

Mike Specian

Presidential Management Fellowship (PMF)

Jordan Hibbs

Historical Background

- **1977: Executive Order (EO) 12008 created the Presidential Management Intern (PMI) Program**
- **1982: EO 12364 opened to non-public policy students**
- **2003: EO 13318 changed from PMI Program to Presidential Management Fellows (PMF) Program**
- **2010: EO 13562 reinvigorated the PMF Program**
  - Created the Pathways Programs, which includes the PMF Program
  - Expanded eligibility

Eligibility

- Eligibility is based on completion of advanced degree requirements by August 31st of the following year of the annual application.
- - OR - If you have completed an advanced degree from a qualifying college or university during the previous two years from the opening date of the PMF Program's annual application announcement, you are eligible to apply.
- Advanced Degree means a professional or graduate degree (e.g., master's, Ph.D., J.D.).

Application Process

- **Online assessment**
  - Applicants assessed on the following competencies:
    - Problem Solving
    - Interpersonal Skills
    - Motivation to Serve
    - Adaptability
    - Integrity
    - Oral/Written Communication
- **Resume**
- **Transcript**

Semi-Finalist

- **In-Person Assessments**
  - Writing assignment
  - Panel interview
  - Group assessment
- **Eliminated In-Person Assessment Process in 2017**

Finalist

- **Hiring Event/Job Fair**
  - Negotiation
  - Appointment

PMF Appointment

- Two-year, full-time paid position with benefits
- Initial appointment at the GS-9, 11, or 12 (or equivalent), based on applicant qualifications and agency needs
- Promotion potential up to the GS-13 (or equivalent) during fellowship
- May non-competitively convert to a term or permanent position
- Typical career path with limited experience (or equivalent) <u>in Washington, DC</u>:
  - Appointment - GS-9, $56,233
  - 1-year Anniversary - GS-11, $68,036
  - Program Completion - GS-12, $81,548

Federal Benefits

- Federal Benefits:
- Student Loan Repayment Program
- Public Service Loan Forgiveness Program
- Flexible Spending Accounts
- Health, Vision, and Dental Insurance
- Paid Vacations, Holidays, and Sick Leave
- Life Insurance
- Long-Term Care Insurance
- Retirement Plan and Thrift Savings Plan

PMF Requirements

- **Program fellowship requirements consist of:**
  - Minimum of 80 hours of formal interactive training each year of fellowship
  - At least one 4-6 month developmental assignment
  - Optional rotational opportunities
  - Assignment of senior-level Mentor
  - Individual Development Plan (IDP)
  - Agency-specific requirements, if any
- **Training and development geared towards target position**
- **Upon successful completion, may be non-competitively converted to a term or permanent position**

PMF Program Statistics – Class of 2016

- Applicants: 6,050
- Finalists: 552
- Finalists that received appointments: 252

Career Fields

- Accounting/Finance/MBA
- Information Technology
- Cybersecurity
- International Affairs/Policy
- Health/Medical Sciences
- Business Administration
- Public Policy
- Human Resources
- Public Administration
- Environmental Sciences
- Statistics
- Federal Acquisitions

BTO Cross-Cutting Work

Robert Fares, Mike Specian, Valerie Nubbe, Madeline Salzman, and Jordan Hibbs

Robert Fares

- **AAAS Science and Technology Policy Fellow** *2nd Year*
- **Emerging Technologies Team (ET)**
- **Ph.D. in Mechanical Engineering**
  University of Texas at Austin
- **Areas of expertise: energy storage, electricity markets, thermal/fluid systems, heat transfer**
- **Writer for the *Scientific American* blog "Plugged In"**

TEXAS
The University of Texas at Austin

SCIENTIFIC AMERICAN

Plugged In

Mike Specian

- **AAAS Fellow** *1st year*
- **Emerging Technologies Team (ET)**
- **Ph.D. in Astrophysics (2015)** *Johns Hopkins University*
- **Previously: National Academies (Mirzayan Fellow), Baltimore City Office of Sustainability, National Climate Assessment**
- **Currently: Sensors, Data Analytics, GEB, Storage, Resiliency, Cybersecurity, Microgrids**

Valerie Nubbe

- **ORISE Fellow** *2nd year*
- **Operations:** Analysis Team
- **BA/MS in Civil and Environmental Engineering**
  Northwestern University
- **Northwestern Solar Decathlon Team**

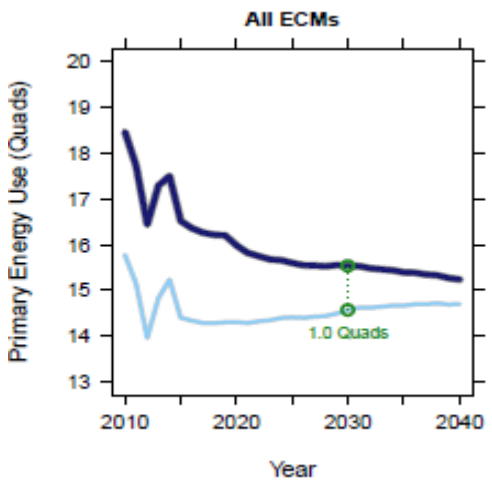
Source: https://www.solardecathlon.gov/2017/photos-gallery-northwestern.html

Scout

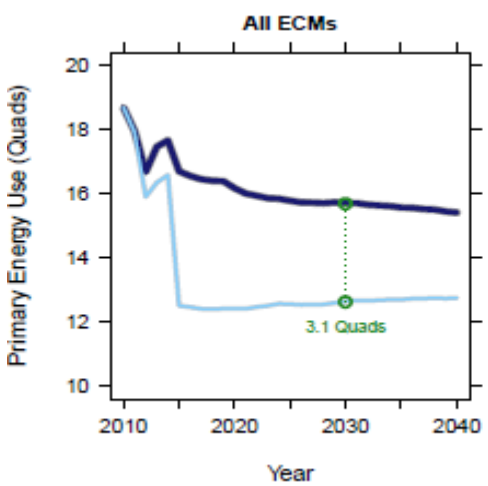
- **What is Scout?**
  - Open source BTO software tool for estimating the national energy, CO2, and cost impacts of building energy efficiency measures
  - Creates level playing field for efficient measure evaluation
  - Used for quantitative analysis and R&D planning
- **Originally created by 2 previous BTO fellows in 2017**
  - Jared Langevin (LBNL) and Chioke Harris (NREL)

Scout Use at BTO

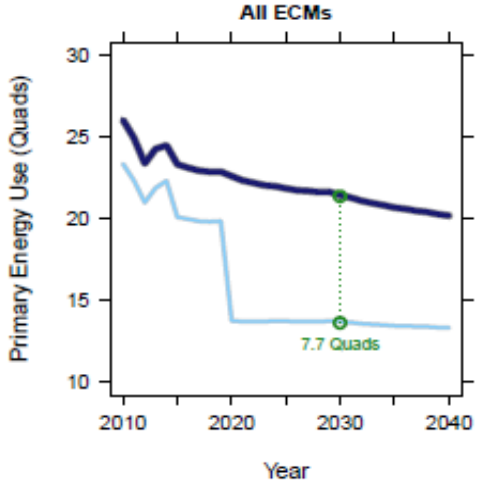
- Assess the impact potential of R&D areas of interest
- Guide development of MYPP and roadmap goals and tracking progress



2010 Technologies



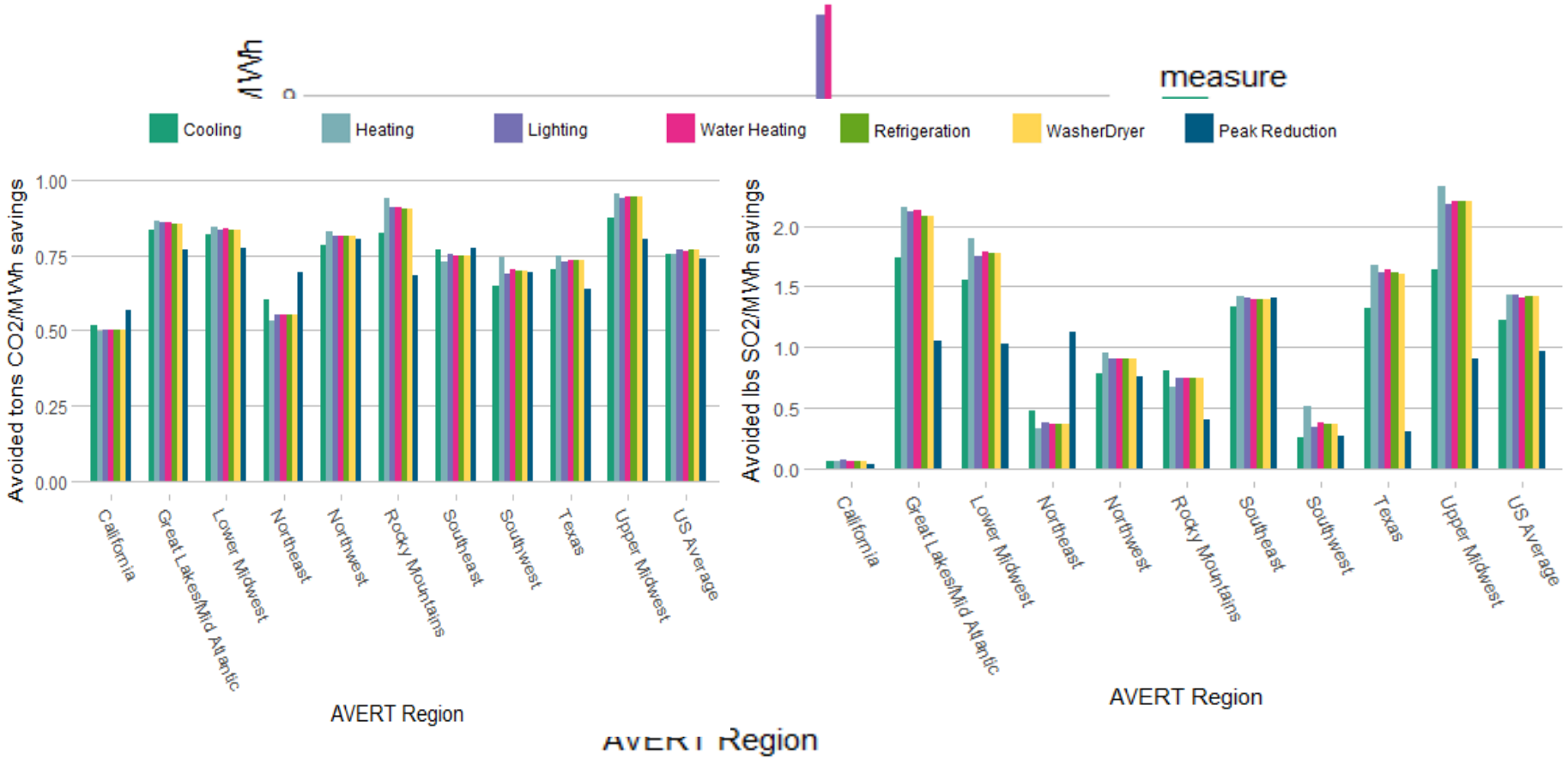
2015 Technologies



2020 Target Technologies

ACEEE Summer Study Paper

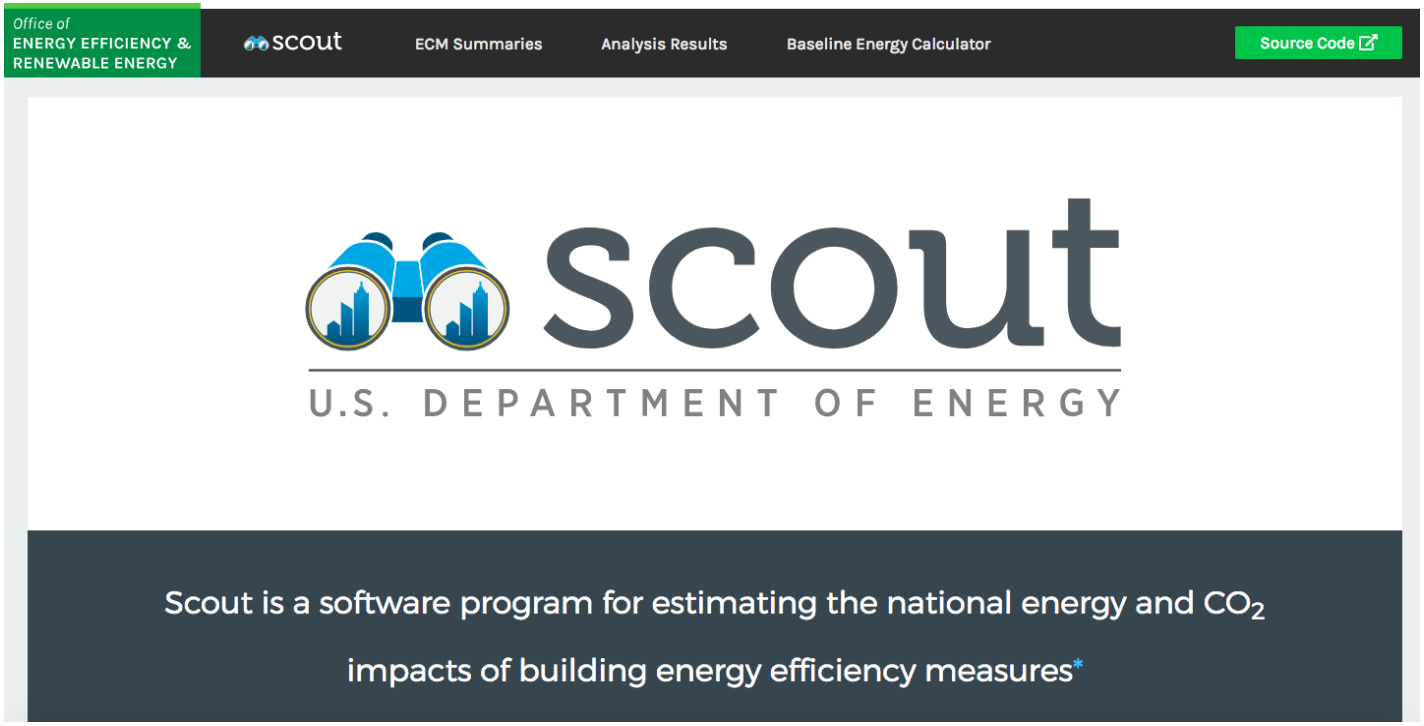
- *Is every kWh the same? How do energy efficiency measures stack up across regions?*



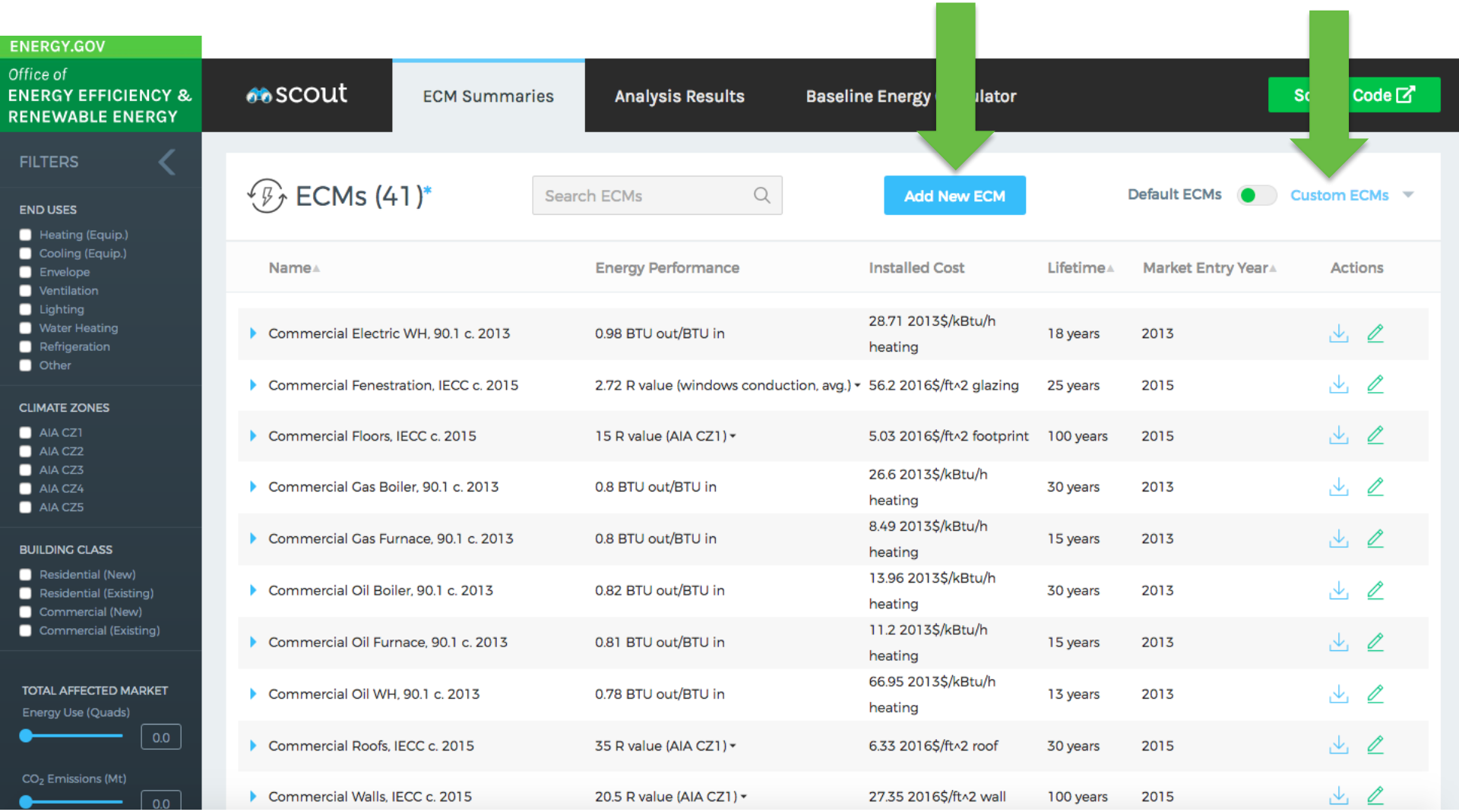
Authors: Kara Podkaminer, Valerie Nubbe, Ben King, Ookie Ma (DOE); Jared Langevin (LBNL); Jack Mayernik, Chioke Harris, Eric Wilson (NREL)

User Interface

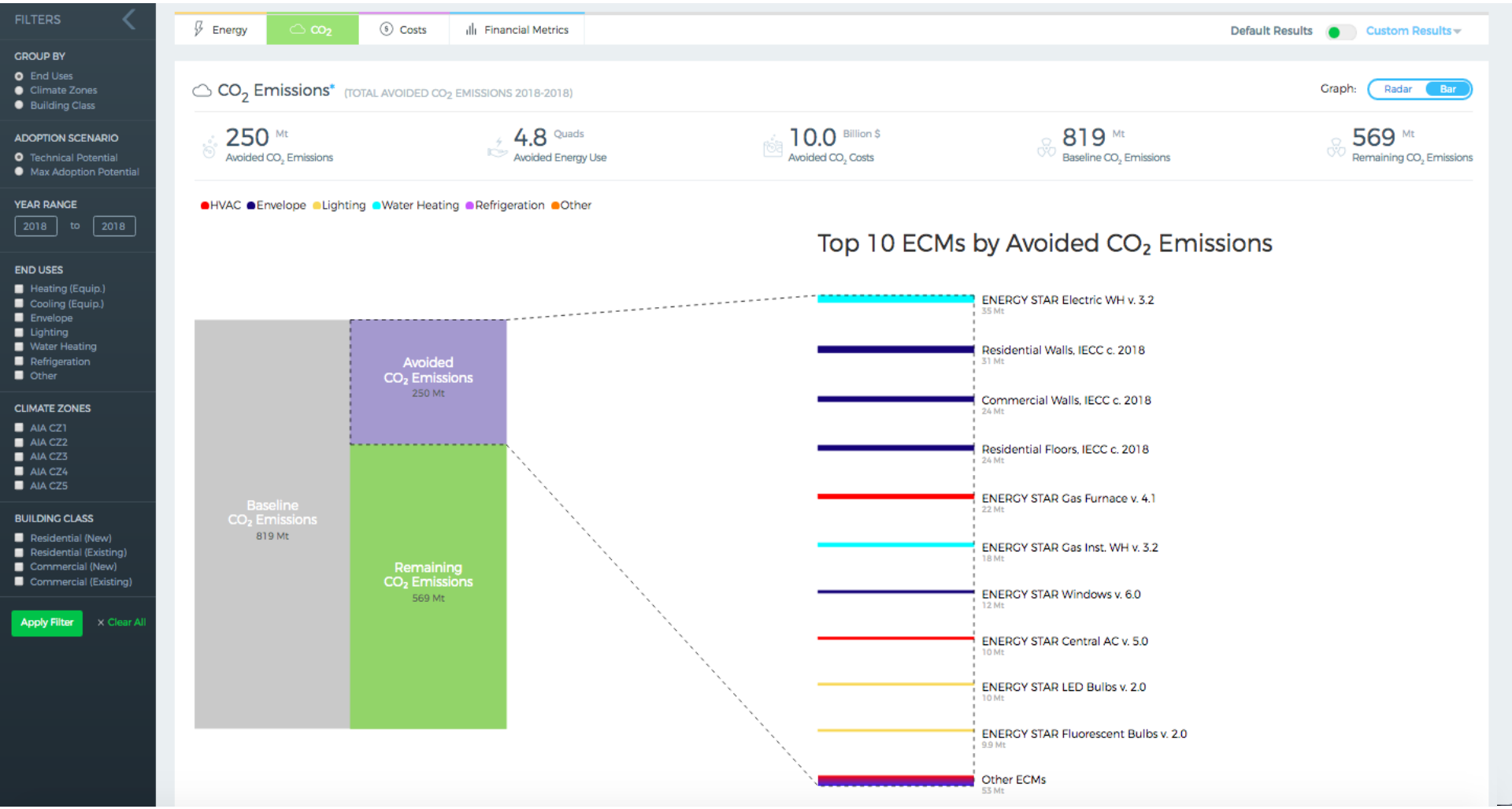
- **Developed a Scout web user interface to**
  - Increase the accessibility of Scout measures and results
  - Enable quicker and easier creation of Scout measures
  - Evaluation of measure portfolio benefits and drawbacks
  - Provide a common point of access for the Scout engine



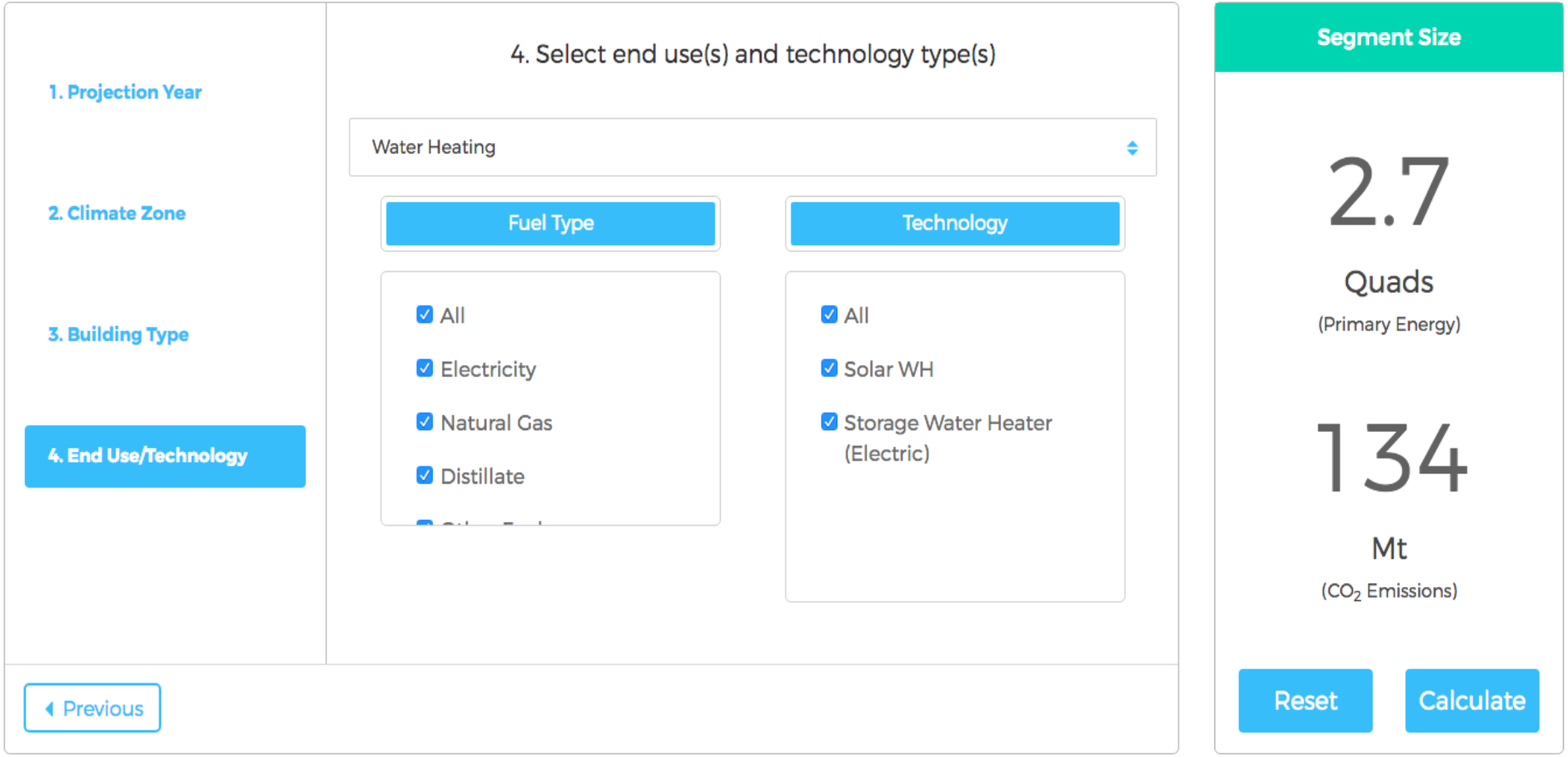
User Interface: ECM Summaries



User Interface: Analysis Results

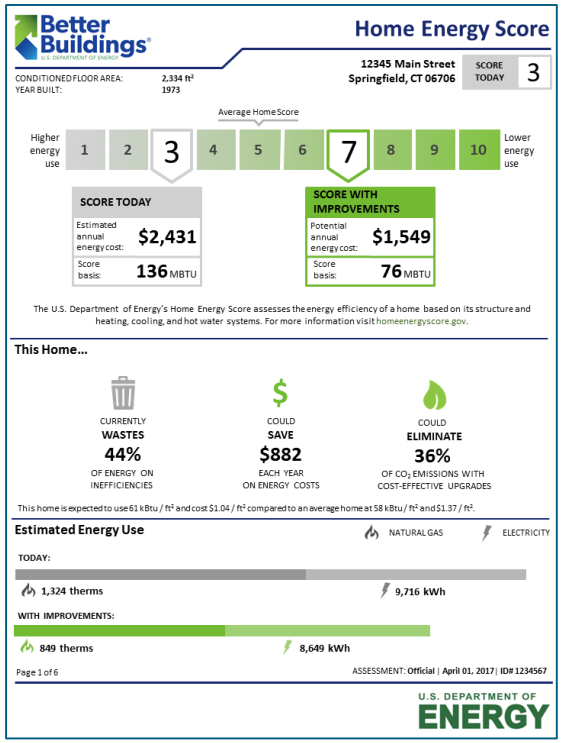


User Interface: Baseline Calculator



Madeline Salzman

- **ORISE Fellow** *3rd year*
- **Residential Buildings Integration (RBI)**
- **MPS** *Clinton School of Public Service*
- **BA** *Washington University in St. Louis*


Better Buildings
U.S. DEPARTMENT OF ENERGY

Home Energy Score

CONDITIONED FLOOR AREA: 2,334 ft²
YEAR BUILT: 1973

12345 Main Street
Springfield, CT 06706

SCORE TODAY 3

Average Home Score

Higher energy use | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Lower energy use

SCORE TODAY
Estimated annual energy cost: $2,431
Score basis: 136 MBTU

SCORE WITH IMPROVEMENTS
Potential annual energy cost: $1,549
Score basis: 76 MBTU

The U.S. Department of Energy's Home Energy Score assesses the energy efficiency of a home based on its structure and heating, cooling, and hot water systems. For more information visit homeenergyscore.gov.

This Home...

CURRENTLY WASTES 44% OF ENERGY ON INEFFICIENCIES

COULD SAVE $882 EACH YEAR ON ENERGY COSTS

COULD ELIMINATE 36% OF CO_2 EMISSIONS WITH COST-EFFECTIVE UPGRADES

This home is expected to use 61 kBtu / ft² and cost $1.04 / ft² compared to an average home at 58 kBtu / ft² and $1.37 / ft².

Estimated Energy Use — NATURAL GAS — ELECTRICITY

TODAY:
1,324 therms
9,716 kWh

WITH IMPROVEMENTS:
849 therms
8,649 kWh

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ASSESSMENT: Official | April 01, 2017 | ID# 1234567

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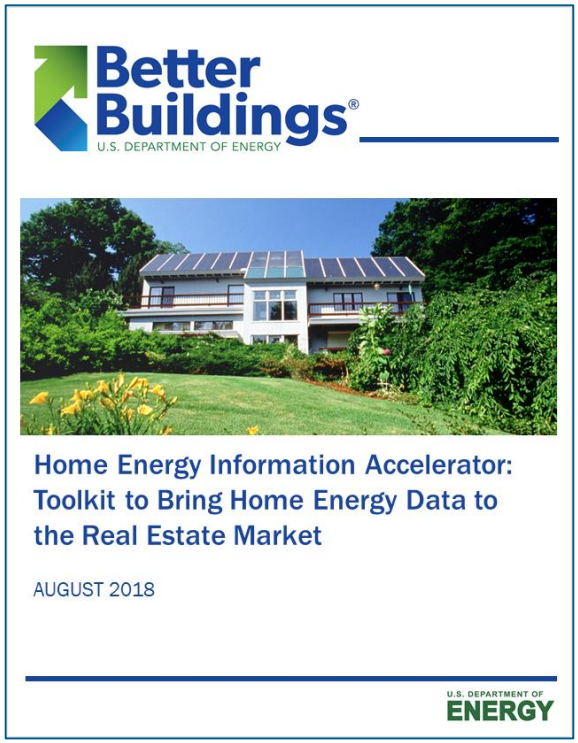
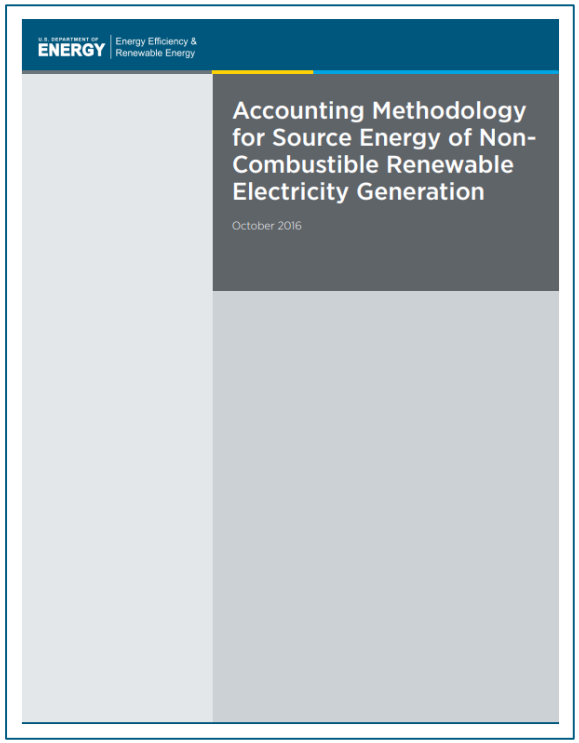

Better Buildings®
U.S. DEPARTMENT OF ENERGY

Home Energy Information Accelerator: Toolkit to Bring Home Energy Data to the Real Estate Market

AUGUST 2018

U.S. DEPARTMENT OF ENERGY


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

Accounting Methodology for Source Energy of Non-Combustible Renewable Electricity Generation

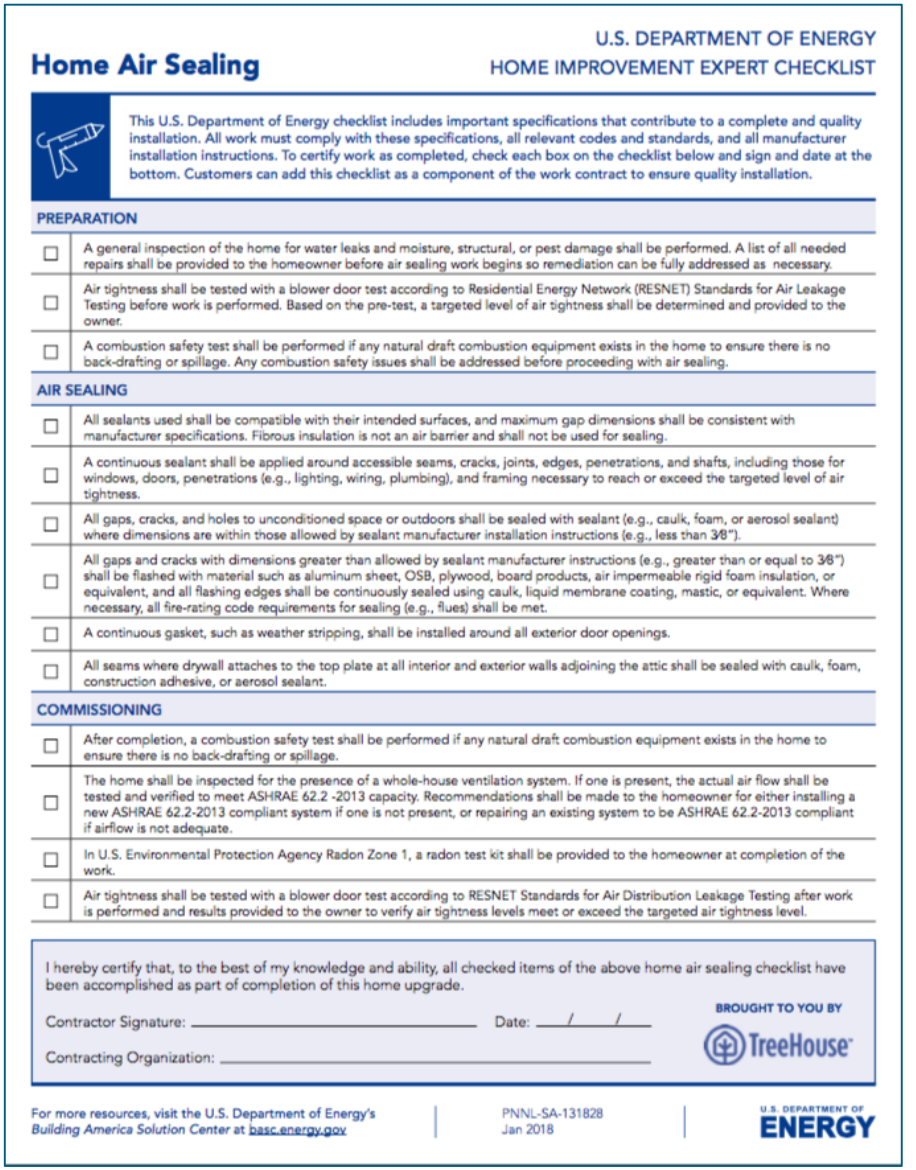
October 2016

Home Improvement Expert Checklists

Fast Facts:

- **15 million** home upgrades annually related to EE
  - **3+ million** HVAC replacements, **$15B**
- **50-75%** of HVAC are improperly installed or maintained
  - Results in **10-50%** reduced efficiency performance

Goal: Improve Market for Quality Installation Services



U.S. DEPARTMENT OF ENERGY
HOME IMPROVEMENT EXPERT CHECKLIST

Home Air Sealing

This U.S. Department of Energy checklist includes important specifications that contribute to a complete and quality installation. All work must comply with these specifications, all relevant codes and standards, and all manufacturer installation instructions. To certify work as completed, check each box on the checklist below and sign and date at the bottom. Customers can add this checklist as a component of the work contract to ensure quality installation.

PREPARATION

- ☐ A general inspection of the home for water leaks and moisture, structural, or pest damage shall be performed. A list of all needed repairs shall be provided to the homeowner before air sealing work begins so remediation can be fully addressed as necessary.
- ☐ Air tightness shall be tested with a blower door test according to Residential Energy Network (RESNET) Standards for Air Leakage Testing before work is performed. Based on the pre-test, a targeted level of air tightness shall be determined and provided to the owner.
- ☐ A combustion safety test shall be performed if any natural draft combustion equipment exists in the home to ensure there is no back-drafting or spillage. Any combustion safety issues shall be addressed before proceeding with air sealing.

AIR SEALING

- ☐ All sealants used shall be compatible with their intended surfaces, and maximum gap dimensions shall be consistent with manufacturer specifications. Fibrous insulation is not an air barrier and shall not be used for sealing.
- ☐ A continuous sealant shall be applied around accessible seams, cracks, joints, edges, penetrations, and shafts, including those for windows, doors, penetrations (e.g., lighting, wiring, plumbing), and framing necessary to reach or exceed the targeted level of air tightness.
- ☐ All gaps, cracks, and holes to unconditioned space or outdoors shall be sealed with sealant (e.g., caulk, foam, or aerosol sealant) where dimensions are within those allowed by sealant manufacturer installation instructions (e.g., less than 3⁄8").
- ☐ All gaps and cracks with dimensions greater than allowed by sealant manufacturer instructions (e.g., greater than or equal to 3⁄8") shall be flashed with material such as aluminum sheet, OSB, plywood, board products, air impermeable rigid foam insulation, or equivalent, and all flashing edges shall be continuously sealed using caulk, liquid membrane coating, mastic, or equivalent. Where necessary, all fire-rating code requirements for sealing (e.g., flues) shall be met.
- ☐ A continuous gasket, such as weather stripping, shall be installed around all exterior door openings.
- ☐ All seams where drywall attaches to the top plate at all interior and exterior walls adjoining the attic shall be sealed with caulk, foam, construction adhesive, or aerosol sealant.

COMMISSIONING

- ☐ After completion, a combustion safety test shall be performed if any natural draft combustion equipment exists in the home to ensure there is no back-drafting or spillage.
- ☐ The home shall be inspected for the presence of a whole-house ventilation system. If one is present, the actual air flow shall be tested and verified to meet ASHRAE 62.2 -2013 capacity. Recommendations shall be made to the homeowner for either installing a new ASHRAE 62.2-2013 compliant system if one is not present, or repairing an existing system to be ASHRAE 62.2-2013 compliant if airflow is not adequate.
- ☐ In U.S. Environmental Protection Agency Radon Zone 1, a radon test kit shall be provided to the homeowner at completion of the work.
- ☐ Air tightness shall be tested with a blower door test according to RESNET Standards for Air Distribution Leakage Testing after work is performed and results provided to the owner to verify air tightness levels meet or exceed the targeted air tightness level.

I hereby certify that, to the best of my knowledge and ability, all checked items of the above home air sealing checklist have been accomplished as part of completion of this home upgrade.

Contractor Signature: _____ Date: __/__/__

Contracting Organization: _____

BROUGHT TO YOU BY TreeHouse

For more resources, visit the U.S. Department of Energy's *Building America Solution Center* at basc.energy.gov

PNNL-SA-131828
Jan 2018

U.S. DEPARTMENT OF ENERGY

PMF Appointment

- Started August 2016
- Office of Energy Efficiency and Renewable Energy's Building Technologies Office
- Commercial Buildings Integration Team

Overview

Manage projects related to energy efficiency in commercial buildings

My Portfolio

- High Impact Technology Catalyst
- Better Buildings Technology Research Teams
- Technology Campaigns
- Financial Assistance Awards

High Impact Technology (HIT) Catalyst

Supports research and development into building systems optimization and technology solutions that will improve whole building performance resulting in ultra-low energy buildings.

Lawrence Berkeley National Laboratory

Pacific Northwest National Laboratory

Oak Ridge National Laboratory

National Renewable Energy Laboratory

Technology Research Teams

Building Envelope

Plug and Process Loads

Refrigeration

Renewables Integration

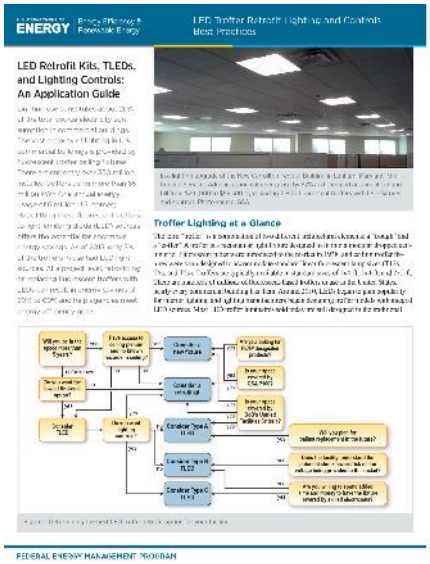
Energy Management Information Systems

Space Conditioning

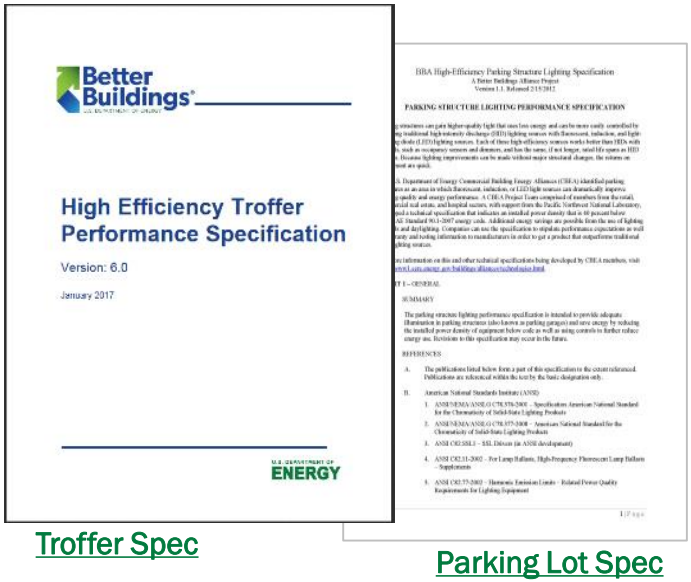
Lighting and Electrical

Lighting & Electrical Team

Troffer Retrofit Application Guide



Lighting System Specifications



Troffer Spec

Parking Lot Spec

Linda Sandahl
Pacific Northwest National Laboratory

- **Toolkit: 2016 ILC Exemplary Results**
  - Case Studies: Troffer Retrofits: CHRISTUS Health; CKE Restaurants; Clean Harbors; Cleveland Clinic; Northern Arizona University; Target; U.S. Toy Company; Army reserve 99th RSC; Army Reserve 9th MSC; Byron G. Rogers Federal Building (GSA); New Carrollton Federal Building (GSA)

Technical Project Officer (TPO)

Technical Project Officer - Level 1 certified to manage financial assistance agreements (grants, cooperative agreements and technology investment agreements) up to $10 million

FOA Projects

- **Using Network Switches to Operate and Control Lighting and Plug Loads in Commercial Building Office Spaces**
  - Performer: Center for Energy and Environment

- **Integrated Controls Package for High Performance Interior Retrofit**
  - Performer: Seventhwave, Inc.

Rotation

Department of Energy

Office of International Affairs

Office of Asian Affairs

Mentor

Geothermal Technologies Office Director

Dr. Susan Hamm

Training

- **Key Executive Leadership Certificate, American University (2017)**
  - 260 hours of training
  - 360-degree assessments
  - Executive coaching

- Homeland Security & Cybersecurity Specialization Coursework, University of Colorado (2017)
  - Cybersecurity Policy for Water and Electricity Infrastructures
  - Cybersecurity Policy for Aviation and Internet Infrastructures

Extracurricular

- **Department of Energy**
  - Young Professionals Group, Technical and Policy Skills
- **Community**
  - Women's Council on Energy and the Environment
  - United Nations Association of the National Capital Area, Sustainable Development Committee

Conclusions

Cedar Blazek

Cedar Blazek

- ORISE Fellow
  - *1st year – 2 months in!*
- Commercial Buildings Integration (CBI)
- BA Environmental Policy *Williams College*
- Background: Energy Auditing (MassSave), contractor to DOE - BTO (project management support)
- *Based at the Golden Field Office in Colorado!*

Future of Fellowships

Where do we go from here?

Contact Info

Emerging Technologies

- Janet Reyna, Janet.Reyna@ee.doe.gov
- Robert Fares, Robert.Fares@ee.doe.gov
- Mike Specian, Michael.Specian@ee.doe.gov

Operations/Analysis

- Valerie Nubbe, Valerie.Nubbe@ee.doe.gov

Residential Buildings

- Madeline Salzman, Madeline.Salzman@ee.doe.gov

Commercial Buildings

- Jordan Hibbs, Jordan.Hibbs@ee.doe.gov
- Cedar Blazek, Cedar.Blazek@ee.doe.gov

Panel Discussion

What broad questions do you have about BTO, fellowships, or our experiences at BTO in general?