IBUILD

GRADUATE RESEARCH FELLOWSHIP

October 10, 2023
Informational Session

U.S. DEPARTMENT OF ENERGY

OAK RIDGE National Laboratory

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

IBUILD info session agenda

What is the IBUILD fellowship?

Moody Altamimi, *Oak Ridge National Laboratory, Office of Research Education*

Why Buildings?

Amir Roth, *Department of Energy, Building Technologies Office*

IBUILD fellowship overview

Rachel Hill, *Oak Ridge Institute for Science Education*

Q&A

Welcome from DOE's Building Technologies Office

Amir Roth, Ph.D., DOE Technology Manager for Building Energy Modeling (and Building Controls) (and Analysis)

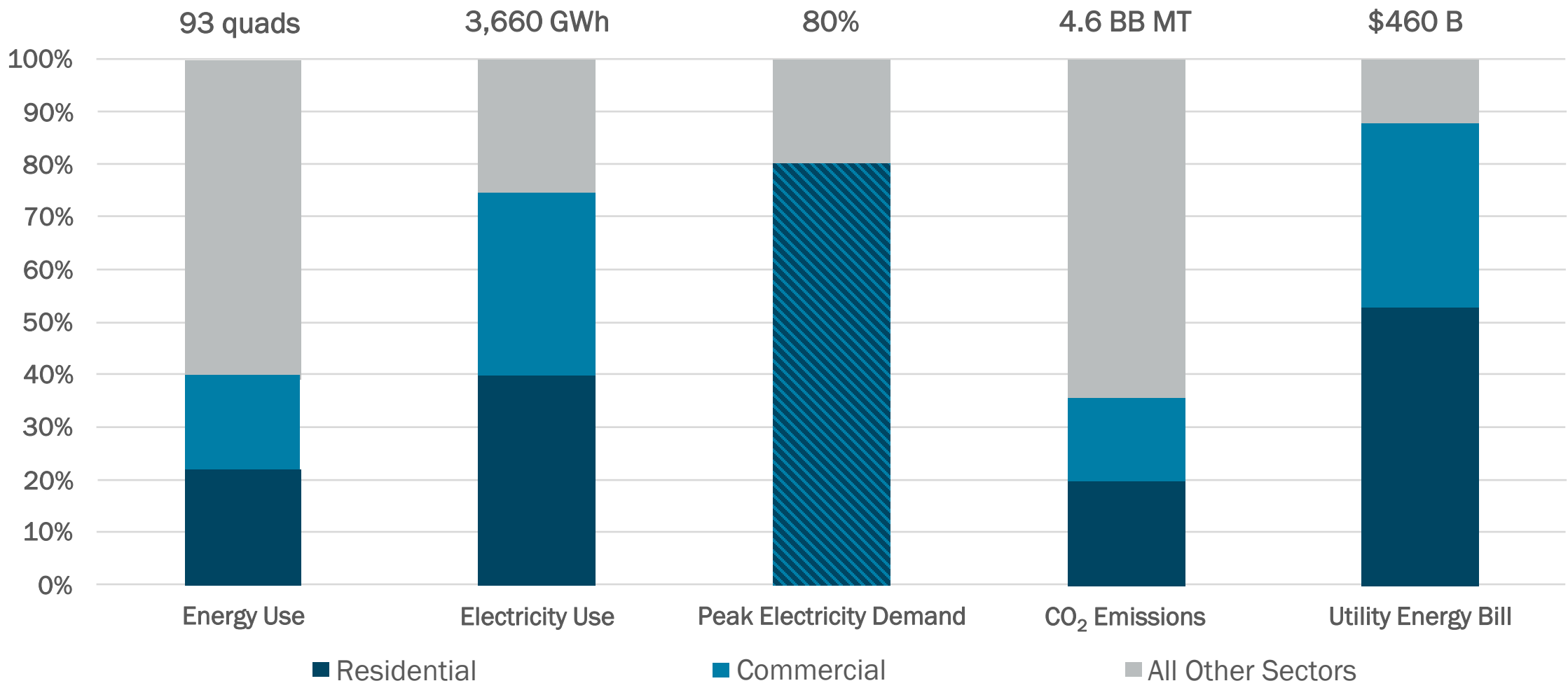
October 10, 2023







Why Buildings? Largest Sector of the U.S. Energy Economy



BTO is working to achieve a carbon-neutral U.S. building sector by 2050

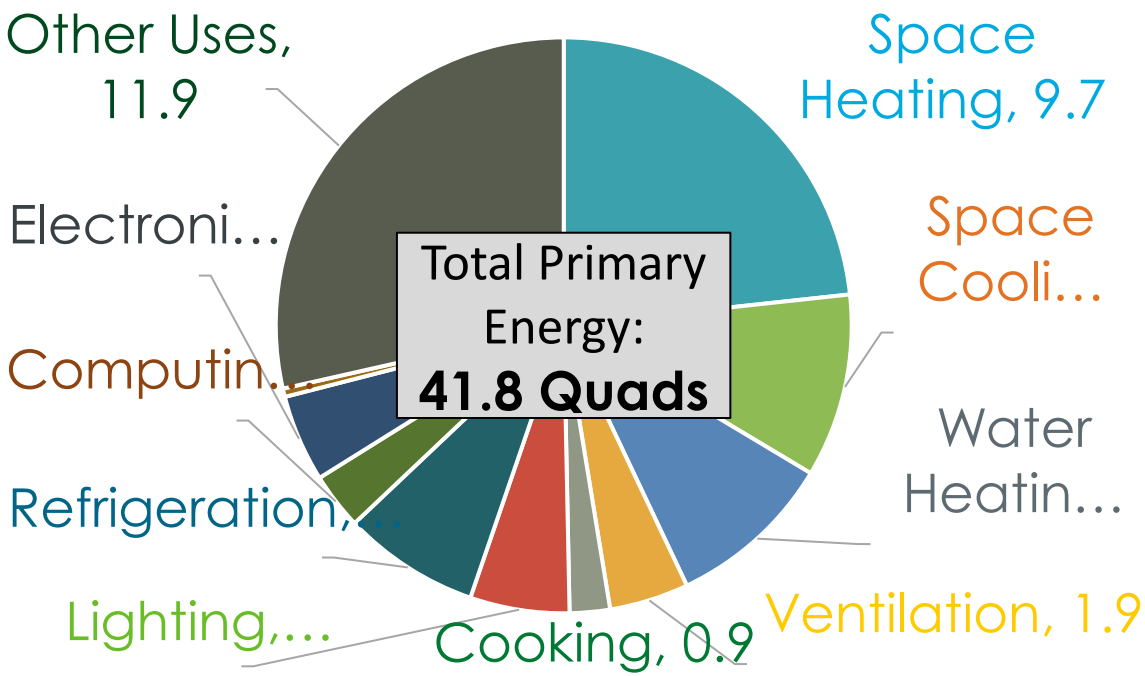
Sources: US EIA (Monthly Energy Review, Annual Energy Outlook 2021, Electric Power Monthly, Natural Gas Summary)

More Fun Stats

5.9 mn "commercial buildings"
99 bn ft2
(~1.5 bn new ft2 / year)
Service life: 55 years

123 mn "housing units"
237 bn ft2
(~1.5 mn new units / year)
Service life: 85 years

Where does the energy go?



1 "quad" = 293 TWh = 293 bn kWh

Source: EIA Monthly Energy Review; U.S. Energy Information Administration (CBECS 2012/RECS 2015); NAREIT Reits by the Numbers; Harvard University (The State of the Nation's Housing 2020)

Building Technologies Office (BTO)

"BTO develops, demonstrates, and accelerates the adoption of cost-effective technologies, techniques, tools and services that enable high-performing, energy-efficient and demand-flexible residential and commercial buildings in both the new & existing buildings markets, in support of an equitable transition to a decarbonized energy system by 2050, starting with a decarbonized power sector by 2035."

R&D

HVAC (heat-pumps!), water-heating & refrigeration
Envelope and Windows
Thermal Energy Storage
Lighting, Appliances & MELS
Sensors & Controls
Energy Modeling (best for last)

Voluntary Mechanisms

Technology demonstrations
Technical assistance
Ratings & recognition programs
Case studies & best practice guides
Stakeholder engagement
Workforce development
Partnerships

Codes & Standards

Equipment standards
Whole-building model codes
Technical assistance
Nation-scale analysis

DOE Success Stories

- $1,200
- $200/year

- $550
- $50/year

- $8/year
- 60 Watts
- 1,000 hours

- $2/year
- 15 Watts (or less)
- 25,000 hours

- Single-pane
- High heat loss

- Double-pane & low-e
- Low heat loss
- 3x more efficient

Due to appliance standards, a typical household saves about **$320** annually off their energy bills today.

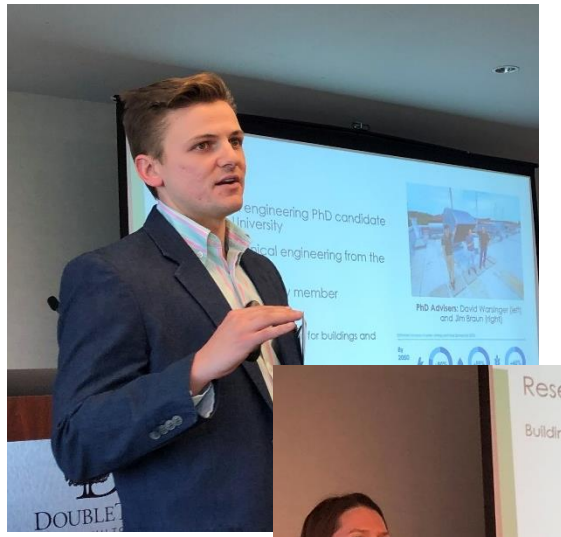
As people replace appliances with newer models, they can expect to save about **$530** annually 2030.

Recent Emphasis Areas

- **“Decarbonization”** – electrifying gas-based heating, water-heating & cooking
- **Time of use and demand flexibility** – when you use energy as important (or more) as how much you use (want to time use to match renewable generation)
- **Community scale projects** – leveraging shared thermal, electrical, and storage resources; saving energy and demand savings at feeder/substation scale
- **Building Performance Standards (BPS)** – annual code triggers and compliance
- **Embodied carbon** – emissions associated with building materials and processes
- **Advanced construction and retrofit** – has not meaningfully changed in 100 years
- **Occupant health** – not just Covid, CO2, indoor emissions, wildfire smoke, etc.
- **Resilience** – safety & critical services during extreme events & outages
- **Diversity, Equity, and Justice** – benefits, outcomes, and jobs
- **Infrastructure (BIL) and Inflation Reduction (IRA) programs** – technical assistance

“Annual” Peer Review

- Week-long event in Washington, DC (Crystal City, VA)
- External review of BTO projects by subject matter experts and stakeholders
- Plenaries, panels, and side sessions (including IBUILD session!), session
- Historically in Apr., but next one is tentatively scheduled for Nov. 2024.



OAK RIDGE National Laboratory

IBUILD Fellowship Overview

Rachel Hill, *PhD*

Associate Manager

Oak Ridge Institute for Science Education

IBUILD INNOVATION IN BUILDINGS GRADUATE RESEARCH FELLOWSHIP

IBUILD Graduate Research Fellowship overview

- IBUILD (Innovation in Buildings) is a fellowship recruiting its fourth cohort
- Funding innovative building energy efficiency research to prepare future generation of building technology professionals
- Sponsored by DOE **B**uilding **T**echnologies **O**ffice (**BTO**)
  - Provides resources and strategies to significantly reduce building energy use and intensity
- BTO funded research contribute to new technologies

How does IBUILD benefit fellows?

- **Research and educational support** to conduct innovative research at **their home institution** in an area with demonstrated relevance to building energy efficiency
- **Professional development** through experience by delivering oral presentations, writing research papers, and participating in IBUILD webinars
- **Mentoring** to support career exploration
- **Networking** with IBUILD Fellows, mentors, and other building technology researchers
- **Internship** support through funding for travel to internship site

Who should apply?

- PhD students with at least one year remaining
  - Current undergraduate seniors who will be enrolled by September 1, 2024
- Students with innovative research ideas in an area with demonstrated relevance to building energy efficiency
- Students seeking research career opportunities in building technologies (i.e., national laboratories, industry, academia)

Benefits

- $35K stipend
- Up to $25K tuition reimbursement
- Up to $12K allowance for travel, materials, and supplies
- Up to $16K health insurance allowance

Eligibility overview

- US citizen or permanent US resident
- Intend to enroll or be enrolled full-time in a research-focused PhD program
- Conduct STEM research in an area with demonstrated relevance to building energy efficiency
- Cumulative GPA: 3.0 or higher on 4.0 scale

Fellowship terms

- Attend IBUILD orientation
- Participate in IBUILD professional development programs
- Present poster at BTO Peer Review or IBUILD symposium
- Submit annual written research report

Sample fellowship year

- September 1, 2024–August 31, 2025
  - Research at home institution
- October 2024: IBUILD orientation
- October 2024–April 2025
  - Professional development and mentorship opportunities
- April 2025
  - Annual progress reports or request for renewal
- June 2025
  - Independently secured internship with possible travel funding through IBUILD

IBUILD fellowship timeline: Cohort 3

On-line application opens	September 1, 2023
Applications due	**December 1, 2023, 11:59 PM EST**
Offer notification	March 2024
Offer acceptance	April 2024
Earliest start date for proposed project periods	July 1, 2024
Latest start date for proposed project periods	September 1, 2024

What does the application include?

1. Proposed research plan
2. Research summary
3. Research goals and aspirations
4. Diversity statement
5. Résumé
6. Letters of recommendation (2 required)
7. Transcript(s)

Research Plan

- Describe a problem or issue you would like to research during your graduate studies
  - This could be a description of a current project or new research idea
- The research proposal should include:
  - Background
  - Research methodology
  - Discussion of findings (if relevant)
  - Future directions
  - Broader impacts
- The research proposal should be 2 pages maximum (including references)

Research plan evaluation

- **Broader impacts**
  - Does proposed research have potential to benefit society and advance building energy efficiency in support of the BTO mission?
- **Intellectual merit**
  - Does intellectual merit encompass potential to advance knowledge?
- **Scientific and/or technical merit of proposed research**
  - Does it demonstrate a clear understanding of challenges involved?
  - Is proposed method and approach appropriate?
  - Does applicant have access to facilities/resources?
- **Originality and innovation**
  - Does proposed research present ideas for cutting-edge technologies or approaches?

Additional details about fellowship funding

- Health insurance
- Stipend (frequency of payment)
  - Monthly – last business day of month
- Tuition payment (directly to University)
- Materials/supplies/travel
  - Submittal Forms – how to make the funding requests
    - Review and approval process
  - Examples
    - Allowable – conference travel
    - Nonallowable – personal travel
  - If it's not in your PI's budget, it might be in this one! ☺

More information about IBUILD

- **Website:** www.ibuildfellowship.org
  - Visit the **FAQ** page for regular updates
- **Questions:** ibuild@orise.orau.gov
- **Apply:** https://zintellect.com/Opportunity/Details/DOE-EERE-RPP-IBUILD-2023
- **Subscribe to the email list:** https://ibuildfellowship.org/info-session/

Q&A

Q&A

From the Q/A and Chat:

- Question: Where would be a good place to see more information on current or recent IBUILD projects?
  - Answer: https://ibuildfellowship.org/
- Question: How connected are the alumni after the Fellowship to the new cohorts?
  - Answer: We do not yet have any alumni as this is the beginning of our fourth year. We are open to ideas for how to keep the fellowship alumni connected in the future.
- Please look to the FAQ on our website for other questions and answers.

IBUILD Program Contacts

- **Amir Roth**, Department of Energy, Building Technologies Office
- **Moody Altamimi**, Oak Ridge National Laboratory, Office of Research Excellence
- **Rachel Hill,** Oak Ridge Institute for Science Education, STEM Workforce Development
- **James Haynes**, Oak Ridge Institute for Science Education, STEM Workforce Development
- **Jason Schmidt and Kuma Sumathipala,** Oak Ridge National Laboratory, Building Technologies Research and Integration Center

ibuild@orise.orau.gov

General questions? Contact www.ibuildfellowship.org