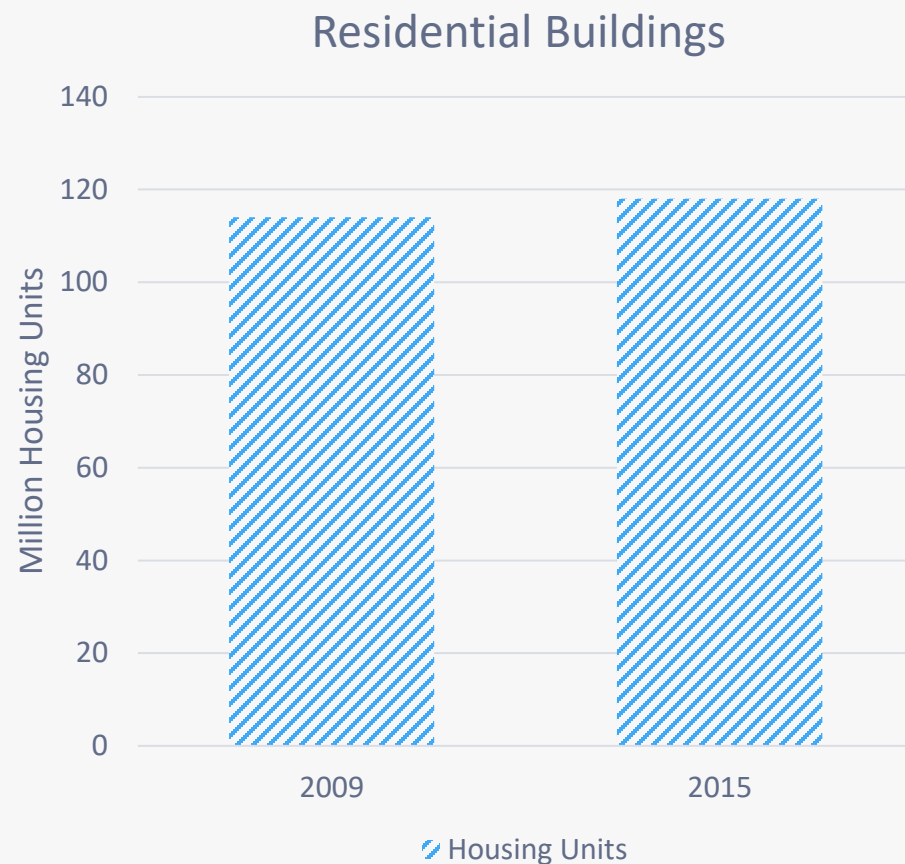


jump into STEM

Solving Market Adoption for Emerging Efficiency Technologies

Ryan Meyer, Ph.D

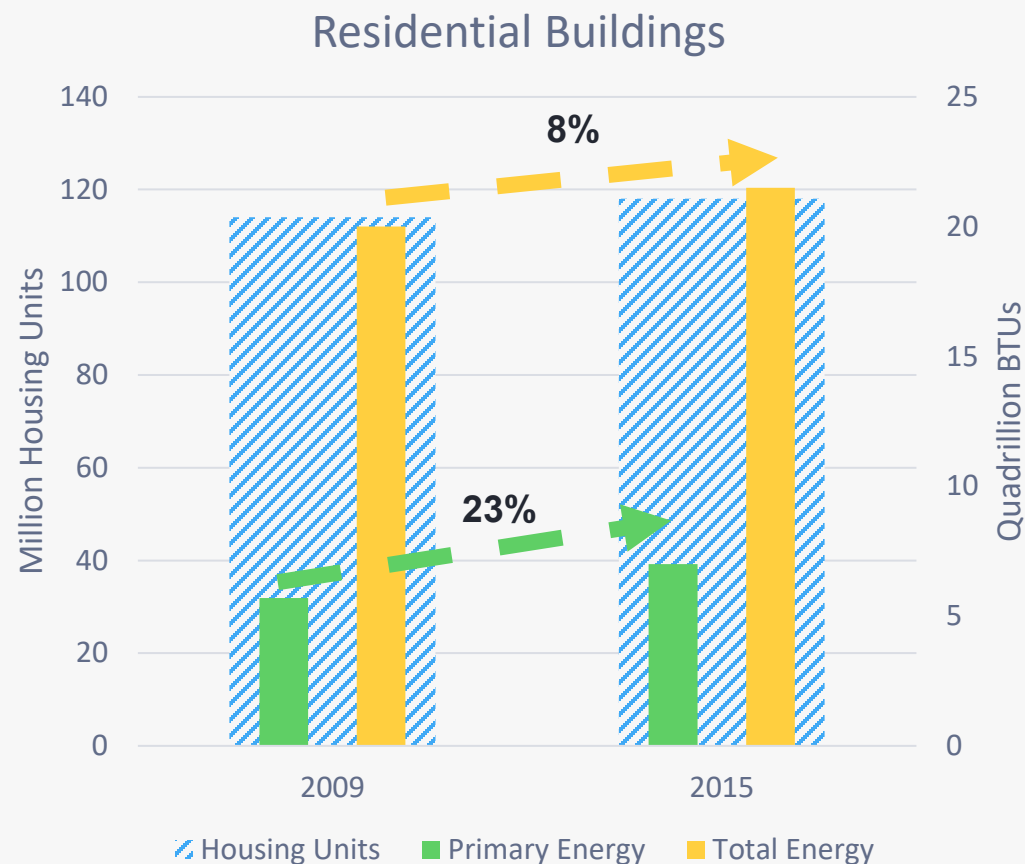
Motivation



- Housing units grew by 4% between 2009 and 2015

<https://www.eia.gov/consumption/residential/data/2009/>
<https://www.eia.gov/consumption/residential/data/2009/>
https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_5.pdf

Motivation



- Housing units grew by 4% between 2009 and 2015
- Primary and total energy consumption grew by more

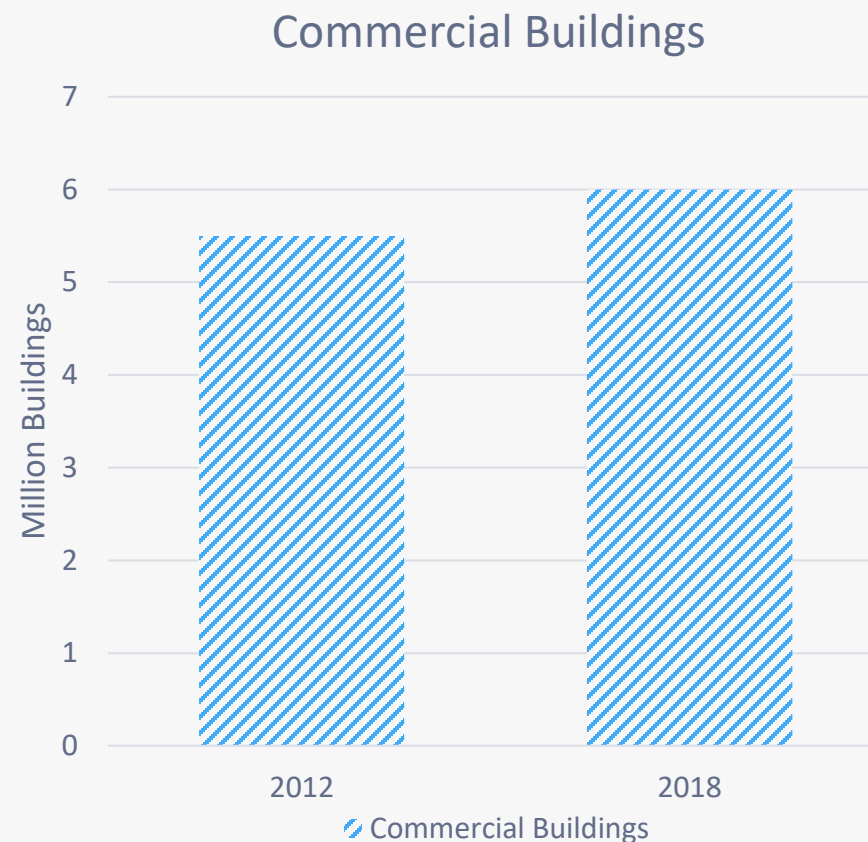
<https://www.eia.gov/consumption/residential/data/2009/>
<https://www.eia.gov/consumption/residential/data/2009/>
https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_5.pdf

Motivation



- Commercial buildings grew by 9% between 2012 and 2018
- Square footage grew by 11%

https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_7.pdf
<https://www.eia.gov/consumption/commercial/pdf/CBECS%202018%20Preliminary%20Results%20Flipbook.pdf>
<https://www.eia.gov/consumption/commercial/data/2012/bc/pdf/b1-b2.pdf>

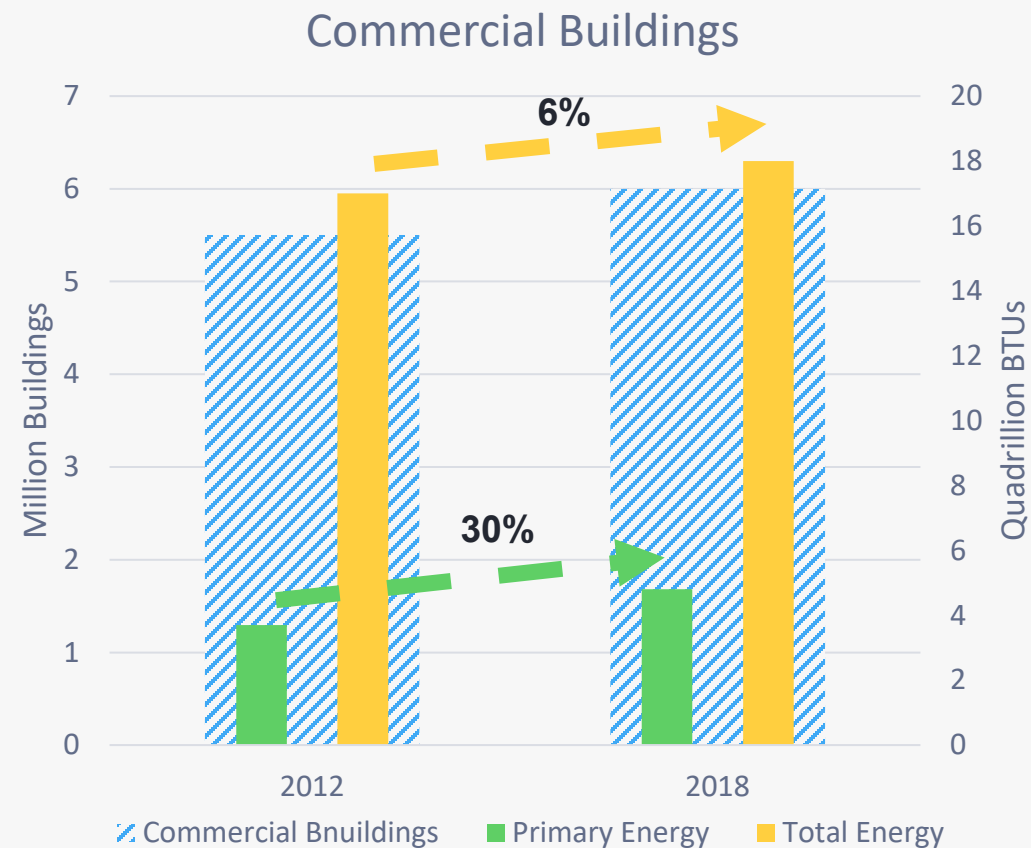


Motivation

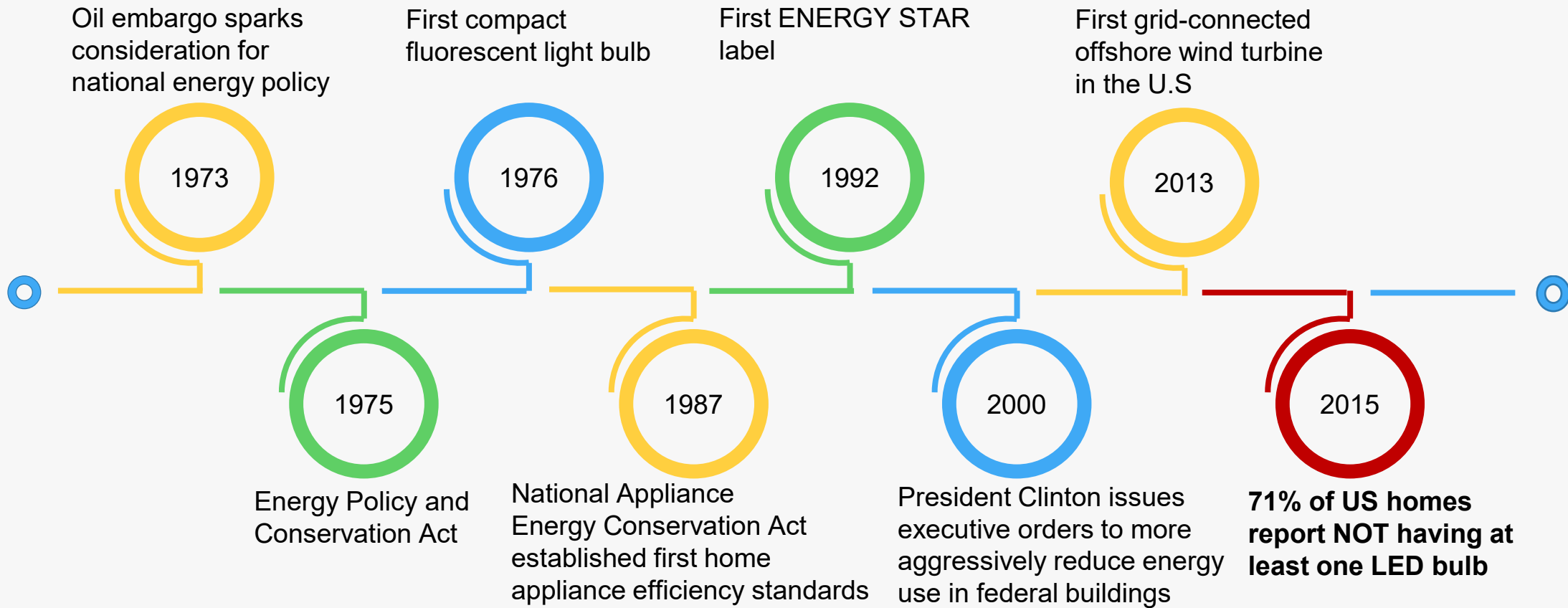


- Commercial buildings grew by 9% between 2012 and 2018
- Square footage grew by 11%
- Average EUI increased from EUI~43 to EUI~49

https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_7.pdf
<https://www.eia.gov/consumption/commercial/pdf/CBECS%202018%20Preliminary%20Results%20Flipbook.pdf>
<https://www.eia.gov/consumption/commercial/data/2012/bc/pdf/b1-b2.pdf>



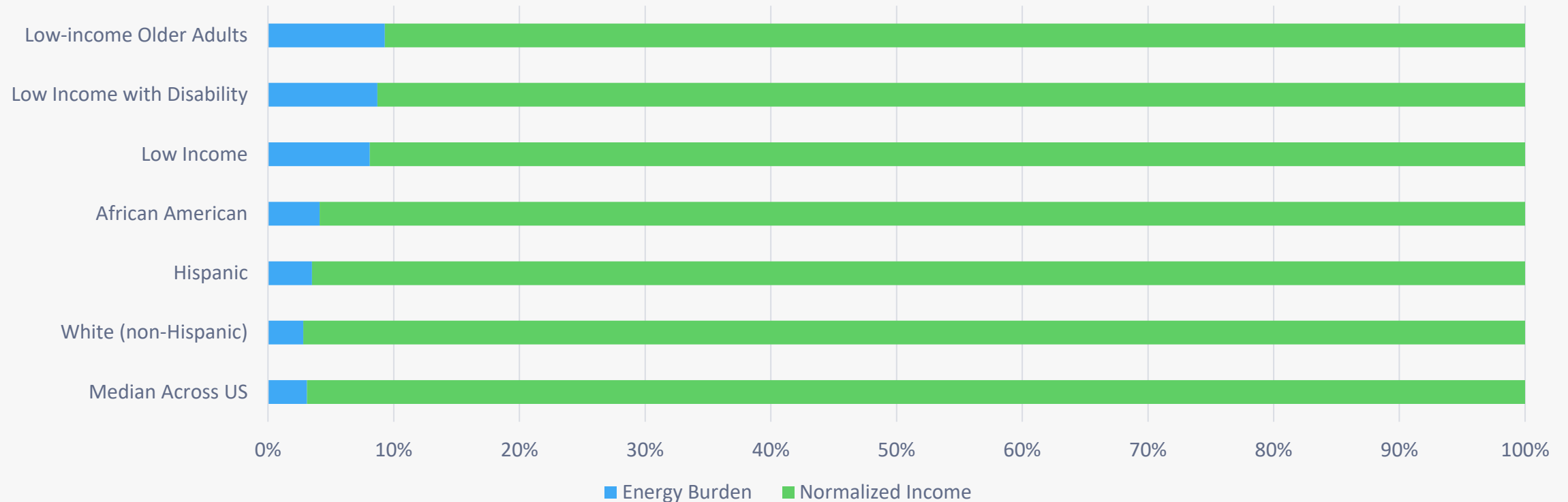
Motivation



Access to Energy Efficiency



Energy Burden Gap



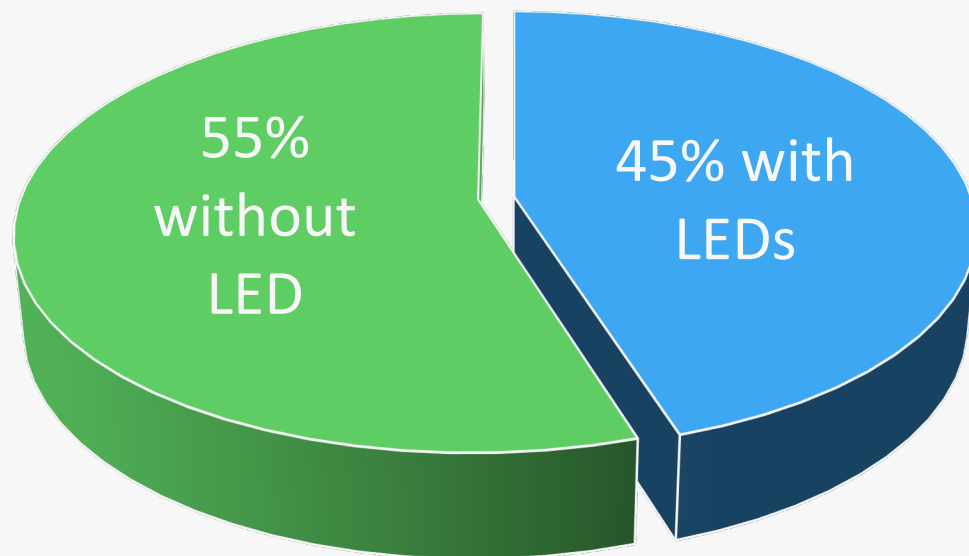
Drehobl, A. Ross, L., & Ayala, . (2020). How high are household energy burdens? An assessment of national and metropolitan energy burden across the united states. <https://www.aceee.org/sites/default/files/pdfs/u2006.pdf>

Motivation

Market transformation does not occur overnight, and sometimes strategic intervention is necessary to accelerate technology adoption especially for stakeholders in socioeconomically vulnerable and historically excluded, underserved, and frontline communities – this is your challenge.

Market Adoption Barriers

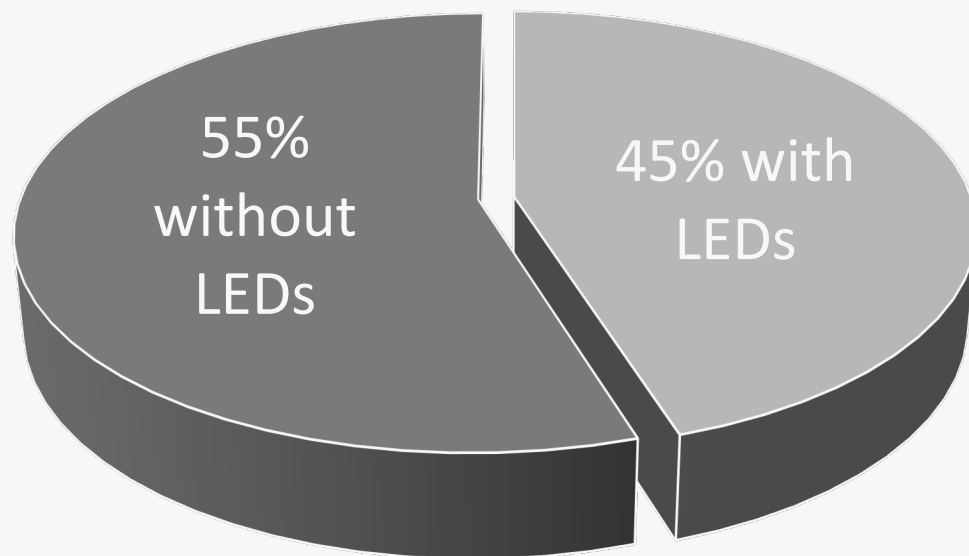
U.S. High-Income Households



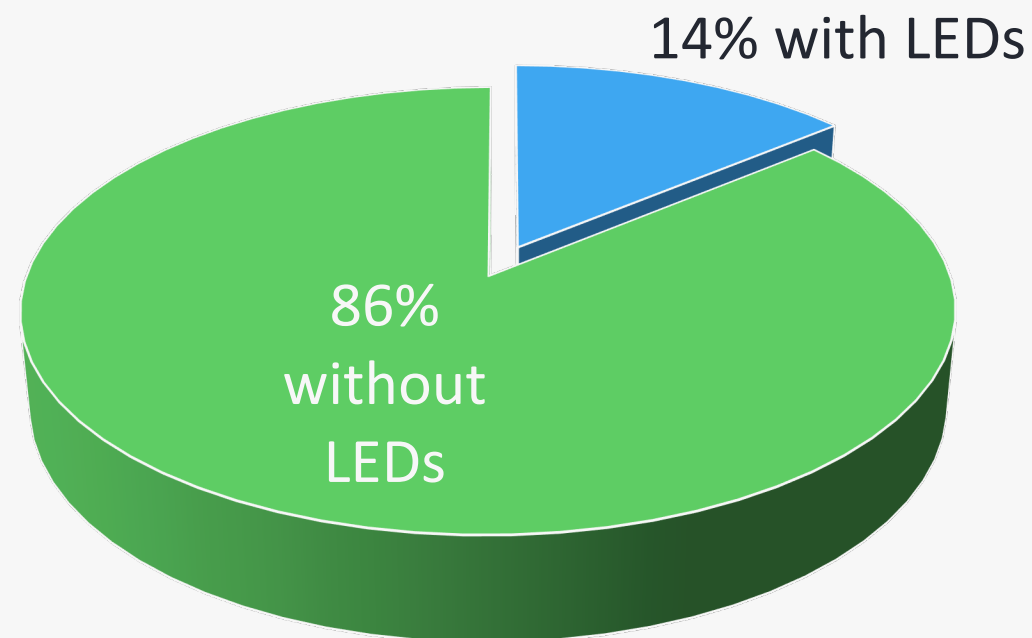
U.S. Energy Information Administration, 2017. "American households use a variety of lightbulbs as CFL and LED adoption increases."
<https://www.eia.gov/todayinenergy/detail.php?id=31112>.

Market Adoption Barriers

U.S. High-Income Households



U.S. Low-Income Households



U.S. Energy Information Administration, 2017. "American households use a variety of lightbulbs as CFL and LED adoption increases."
<https://www.eia.gov/todayinenergy/detail.php?id=31112>.

Market Adoption Barriers

- Smart thermostats have been identified as possibly in early stages of market transformation.



<https://www.aceee.org/sites/default/files/publications/researchreports/u1715.pdf>

Market Adoption Barriers

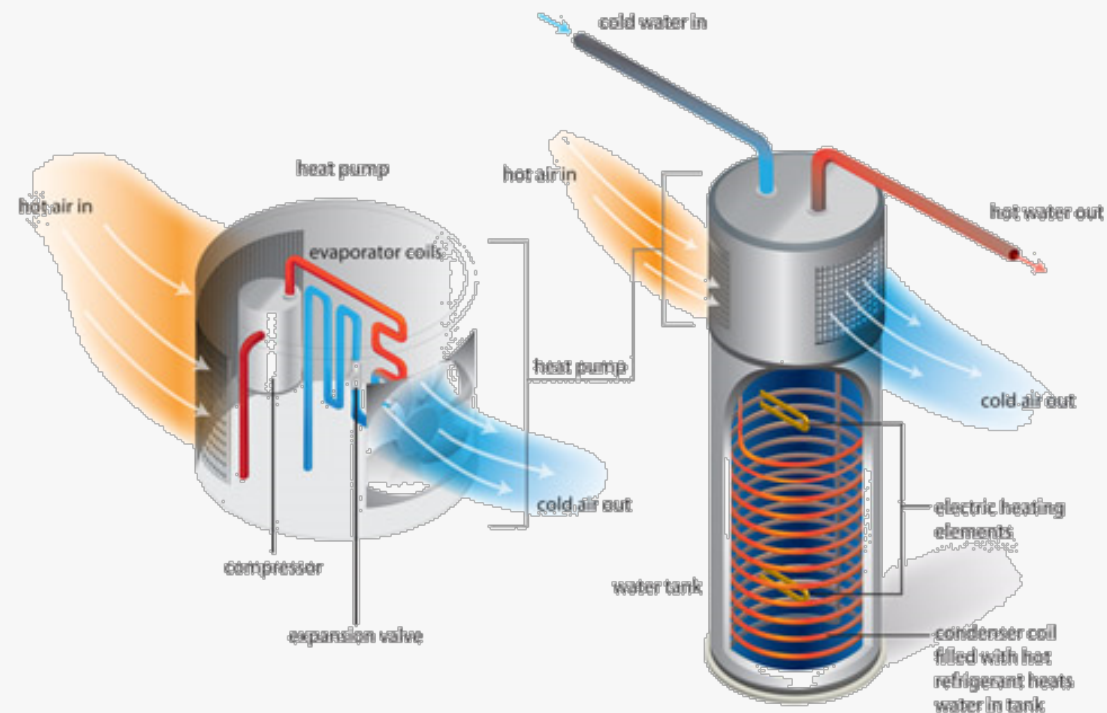
- Only 57% of low-income households have broadband internet.
- An estimated 39% of people living in rural areas lack access to basic-fixed broadband services.



Pew Research Center. 2021. "Internet/Broadband Fact Sheet." <https://www.pewresearch.org/internet/fact-sheet/internet-broadband/#who-has-home-broadband?menuItem=89fe9877-d6d0-42c5-bca0-8e6034e300aa>.

Market Adoption Barriers

- Split incentive
 - Who pays versus who gains?



https://www.energystar.gov/sites/default/files/assets/images/HeatPump_Works.jpg

Market Adoption Barriers



- Knowledge gaps
- Customer awareness
- Decision making habits.

Cort, K.A. 2013. *Low-E Storm Windows: Market Assessment and Pathways to Market Transformation*. Richland, WA: Pacific Northwest National Laboratory.
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22565.pdf.

The Challenge

Develop an innovative and holistic deployment solution to increase market adoption of an emerging technology for building energy conservation and carbon reduction, leading to increased technology deployment for stakeholders in socioeconomically vulnerable and historically excluded, underserved and frontline communities.

Additional Resources



Energy Resources

- <https://www.eia.gov>

Energy Justice Resources

- <https://iejusa.org>
- <https://www.energy.gov/promoting-energy-justice>

Market Transformation Resources

- <https://www.energy.gov/eere/fuelcells/market-transformation>
- <https://guidehouse.com/insights/energy/2019/what-makes-market-transformation-successful>
- <https://www.aceee.org/research-report/u1715>

Thank You

www.jumpintostem.org