Better Buildings®
U.S. DEPARTMENT OF ENERGY

Better Buildings Residential Network
Peer Exchange Call Series

The Solar – Energy Efficiency Nexus Update

March 14, 2024

U.S. DEPARTMENT OF ENERGY

Agenda and Ground Rules

- Moderator
  - **Jonathan Cohen,** Better Buildings Residential Network, U.S. DOE Residential Buildings Integration Program (RBI)
- Agenda Review and Ground Rules
- Residential Network Overview and Upcoming Call Schedule
- Opening Poll
- Featured Speakers
  - **Sarah Wilder,** U.S. Department of Energy (DOE)
  - **Katie Richardson,** National Renewable Energy Laboratory (NREL)
  - **Jerry Henderson**, Energy Assurance Company
- Open Discussion
- Closing Poll and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.
2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.

Join the Network

Member Benefits:

- Recognition in media, social media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year, or equivalent.

Upcoming Calls (2nd & 4th Thursdays):

- *3/28: How Does Energy Efficiency Relate to Housing Affordability for Americans*
- *4/11: No Peer Exchange Call due to 2024 National Home Performance Conference*
- *4/25: TBA*

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call



Sarah Wilder

U.S. DOE

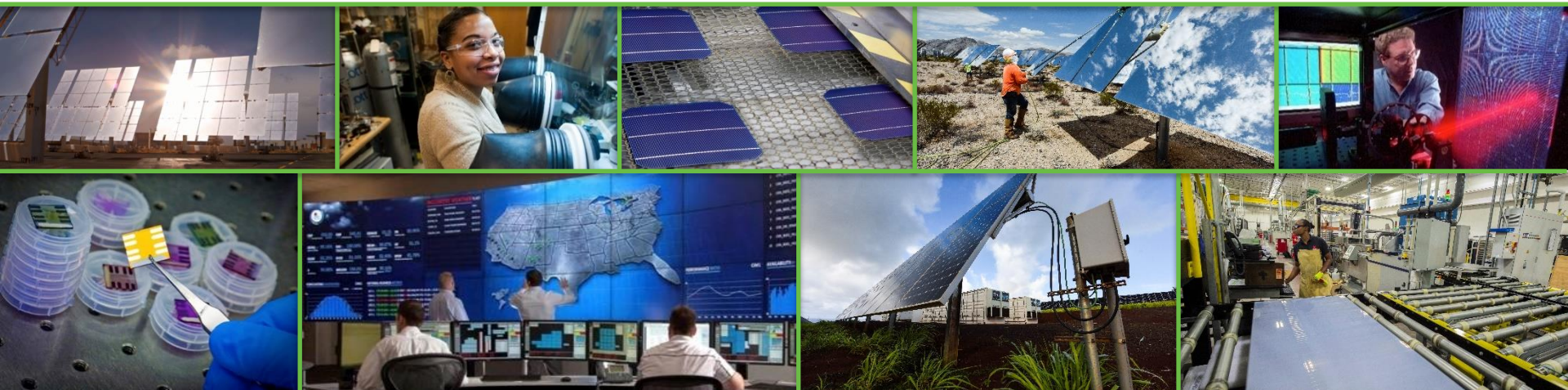
U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

The Solar - Energy Efficiency Nexus

Sarah Wilder, Program Analyst

Solar Energy Technologies Office



Solar Energy Technologies Office

Our mission is to accelerate the advancement and deployment of solar technology in support of an equitable transition to a decarbonized economy no later than 2050, starting with a decarbonized power sector by 2035.

To achieve this mission, solar energy must:

- Be affordable and accessible for all Americans
- Support the reliability, resilience, and security of the grid
- Create a sustainable industry that supports job growth, manufacturing, and the circular economy in a wide range of applications

Solar Growth & Economic Impact

Solar capacity has grown **24-fold** in the last 10 years. Solar energy accounted for **50% of all new generating capacity** installed in 2022.



10,000+

Solar businesses in the U.S.



$35 billion

Value of the U.S. solar market in 2022

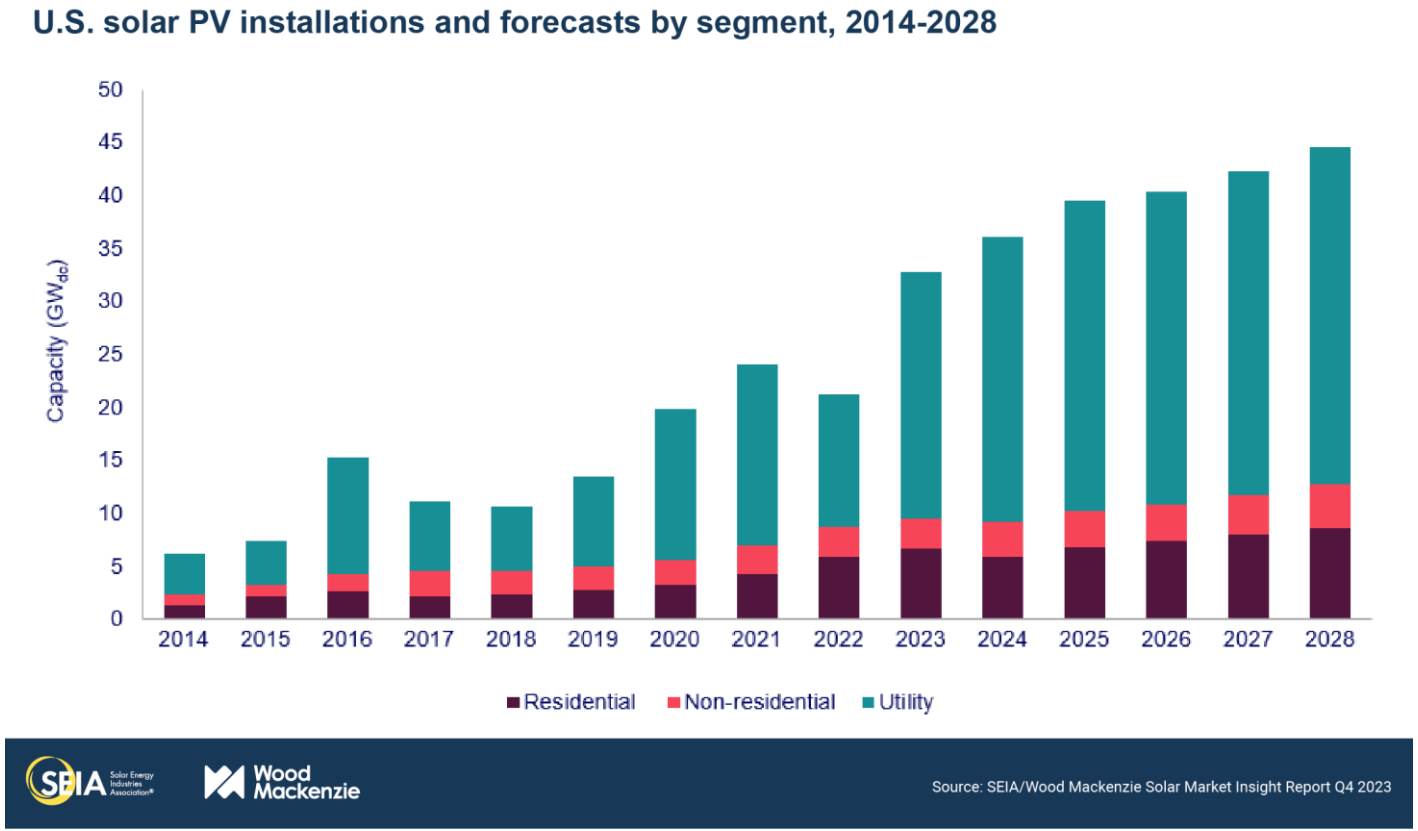


53% ↓

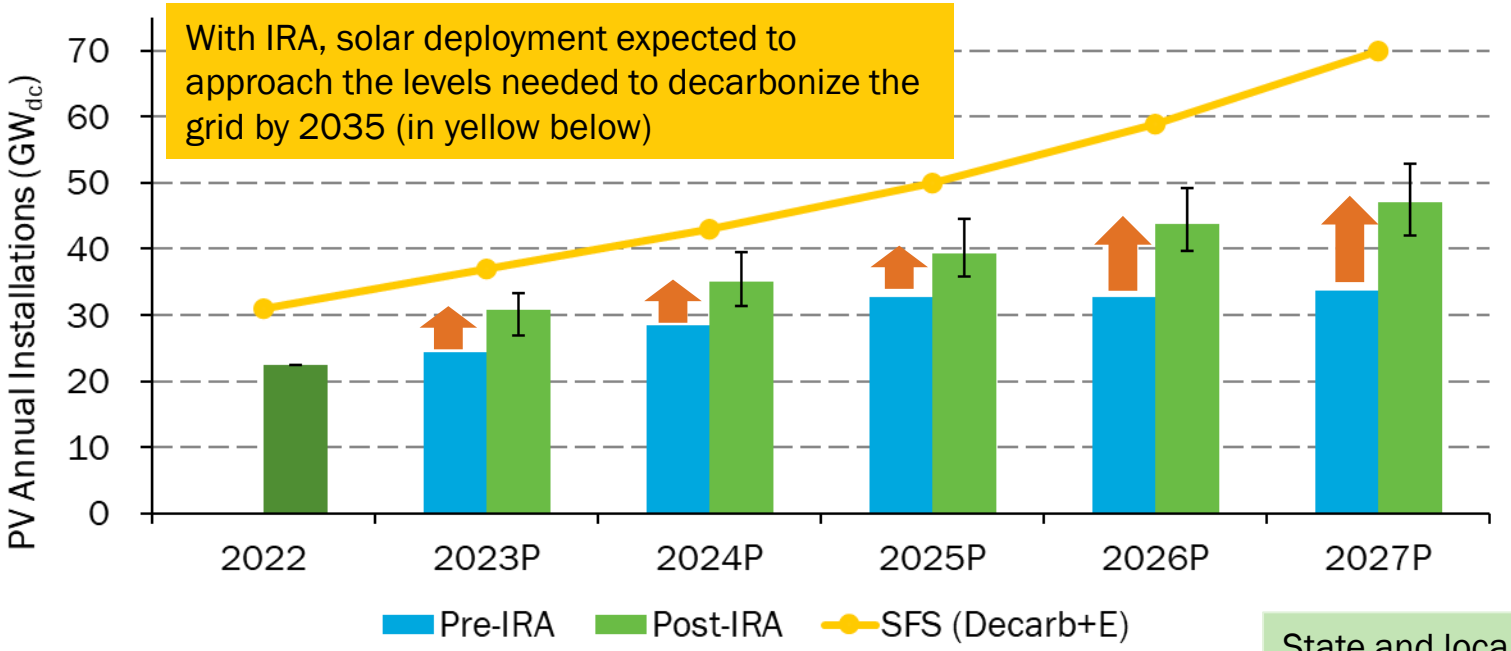
Solar PV prices have dropped over the last 10 years

Source: Data from SEIA/Wood Mackenzie Power & Renewables U.S. Solar Market Insight Report

Forecasted Solar PV Growth



Estimated Impact of IRA on U.S. PV Deployment



~30% increase in yearly projections after IRA

Notes: P = projection. Colored bars represent average projections, and error bars represent high and low projections, line represents the decarbonization and electrification (Decarb+E) scenario from the Solar Futures Study (SFS).
Sources: BNEF, 2Q 2022 Global PV Market Outlook, 5/27/22; BNEF, 2Q 2023 Global PV Market Outlook, 5/22/23; Wood Mackenzie and SEIA, Q2 2022 US Solar Market Insight, 6/22; Wood Mackenzie and SEIA, Q2 2023 US Solar Market Insight, 6/23. U.S. Department of Energy, Solar Futures Study, 9/21.

State and local governments, as well as corporations, have also been driving demand with their own policies and incentives.

What was in the Inflation Reduction Act (IRA)?

The bill contained an estimated **$370 Billion in clean energy investments**. The law also advanced the President's Justice40 Initiative, which committed to delivering 40% of the overall benefits of climate, clean energy, and related federal investments to communities that have been marginalized, overburdened by pollution, and underserved by infrastructure and other basic services.

The bulk of the funding for clean energy in IRA comes in the form of tax credits.

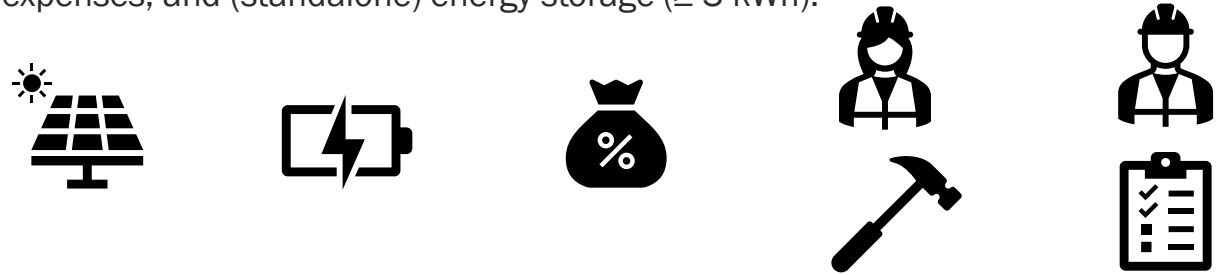
- Advanced Manufacturing Production Credit (MPTC or 45X)
- Advanced Energy Project Credit (48C)
- Production Tax Credit (PTC)
- Investment Tax Credit (ITC)
- Residential Clean Energy Credit (25D)

The Residential Clean Energy Tax Credit (25D)

The residential clean energy credit (25D) can be taken on the costs of a residential solar PV system installed during the tax year.

- This includes PV panels, balance-of-system equipment (such as racking or inverters), installation costs (including permitting fees and inspection costs), sales tax on eligible expenses, and (standalone) energy storage (≥ 3 kWh).





So, should I get solar now?

Yes! and now you can also add storage to your existing system.

Placed in service by end of calendar year:	2020-2021	2022	2023-2032	2033	2034	2035
Percent of the costs of a residential solar PV system installed that can be taken as a tax credit	26%	30%	30% (now includes standalone storage installations ≥ 3kWh, so you can add storage to your PV!)	26%	22%	0%

What is in the Inflation Reduction Act (IRA)?

There is also funding made available in IRA that could impact solar deployment.

Grants

- $27B for Greenhouse Gas Reduction Fund through the EPA
  - $7B for Solar for All, $14B for National Clean Investment Fund, $6B Clean Communities Investment Accelerator
- $3B for Environmental and Climate Justice Block Grants through the EPA
- $1.7B for Rural Energy for America Program (REAP) through the USDA

  +$304M in grants or loans for underutilized technologies and technical assistance for REAP applicants
- $760M in grants to facilitate siting high voltage interstate transmission through DOE
- $145M for Tribal Electrification through the Bureau of Indian Affairs
- $25M for Solar Canals through Interior

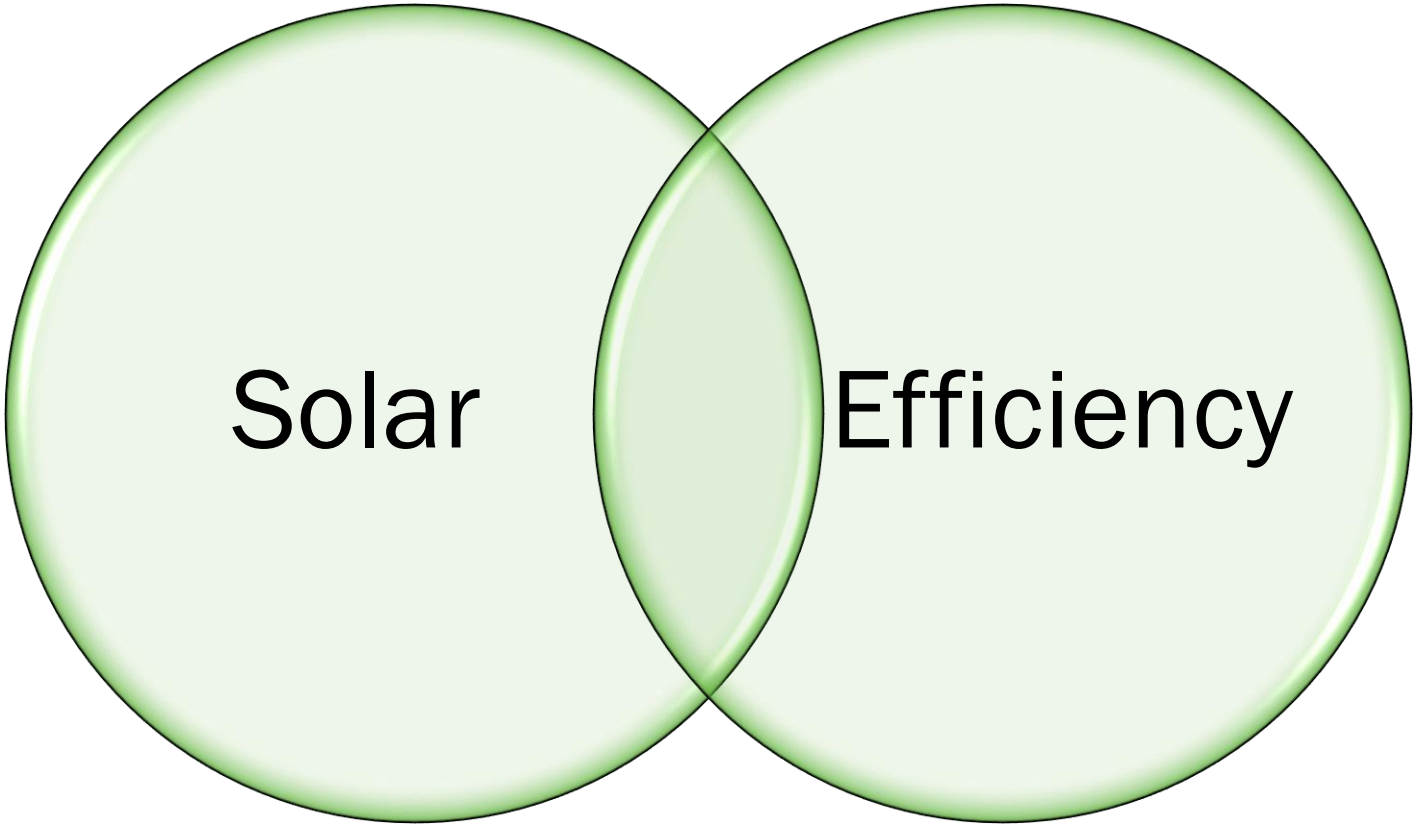
Loans

- $40B for the DOE Loan Program Office

  + $250B to repurpose, retool, repower, or replace defunct energy infrastructure as well as remediate or reduce emissions of operating infrastructure
- $18B for the Tribal Energy Loan Guarantee Program through DOE
- $9.7B for Rural Electric Co-ops for the purchase of RE or RE systems through USDA
- $4B in loans for affordable housing energy efficiency (which could include solar) through HUD
- $2B in loans for electric transmission through DOE
- $1B in electric loans for rural RE through USDA

IRA also requires that for 10 years, in order to place solar on Federal lands, certain oil and gas leasing requirements must be met.

The Nexus





QUESTIONS

Thank you for listening!

SETO Newsletter – Stay in Touch!



SIGN UP NOW:
energy.gov/solar-newsle

The SETO newsletter highlights the key activities, events, funding opportunities, and publications that the solar program has funded.



Katie Richardson

NREL



NREL Transforming ENERGY

SCEP STATE & COMMUNITY ENERGY PROGRAMS

Efficiency Planning with SLOPE for BBRN

The State and Local Planning for Energy Platform

March 14, 2024

Katie Richardson, PhD
National Renewable Energy Laboratory (NREL)

Photo from iStock-627281636

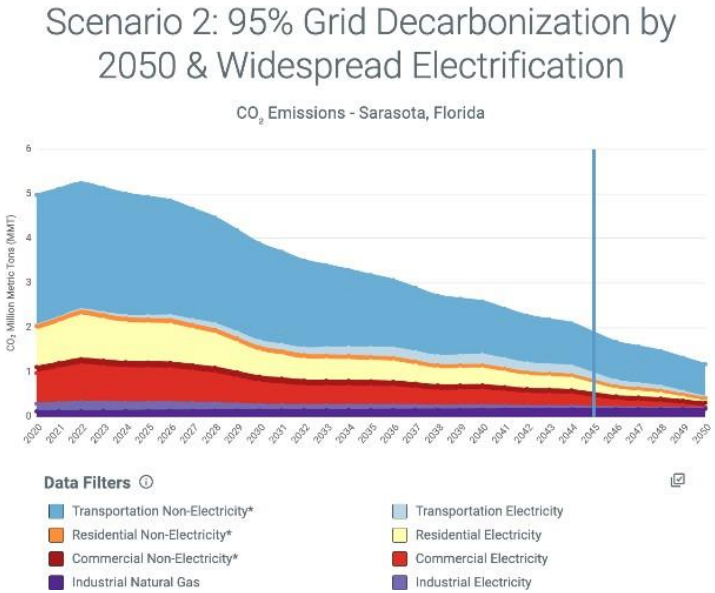
SLOPE
State and Local Planning for Energy
U.S. DEPARTMENT OF ENERGY

Supporting Data-Driven Decisions to Achieve Community Energy Goals

SLOPE is a free and easy-to-access online platform that helps energy planners at state and local levels make data-driven decisions to achieve their communities' energy goals.

- **Scenario Planner:** Explore the impacts of different energy transition scenarios on the energy consumption, carbon dioxide (CO_2) emissions, and system costs at county, state, and national scales.
- **Data Viewer:** Dive into city, county, census tracts, and state data on renewable energy, energy efficiency, and sustainable transportation potential and projections as well as jobs and equity data.

SLOPE is an Office of State and Community Energy Programs (SCEP)-led, cross-U.S. Department of Energy collaboration.



Scenario Planner: Sarasota County, Florida CO_2 Emissions under Widespread Electrification and Grid Decarbonization Scenario

slope@nrel.gov

maps.nrel.gov/slope

BIOENERGY TECHNOLOGIES OFFICE (BETO) | STRATEGIC ANALYSIS (SA) | BUILDING TECHNOLOGIES OFFICE (BTO) | GEOTHERMAL TECHNOLOGIES OFFICE (GTO) | SOLAR ENERGY TECHNOLOGIES OFFICE (SETO) | VEHICLE TECHNOLOGIES OFFICE (VTO) | WATER POWER TECHNOLOGIES OFFICE (WPTO) | WIND ENERGY TECHNOLOGIES OFFICE (WETO)

How can SLOPE data support energy planning?



PLAN GOALS AND SET MILESTONES



PRIORITIZE RESOURCES



DESIGN POLICIES AND PROGRAMS



IMPROVE EQUITY THROUGH INCLUSION



SUPPORT FUNDING APPLICATIONS

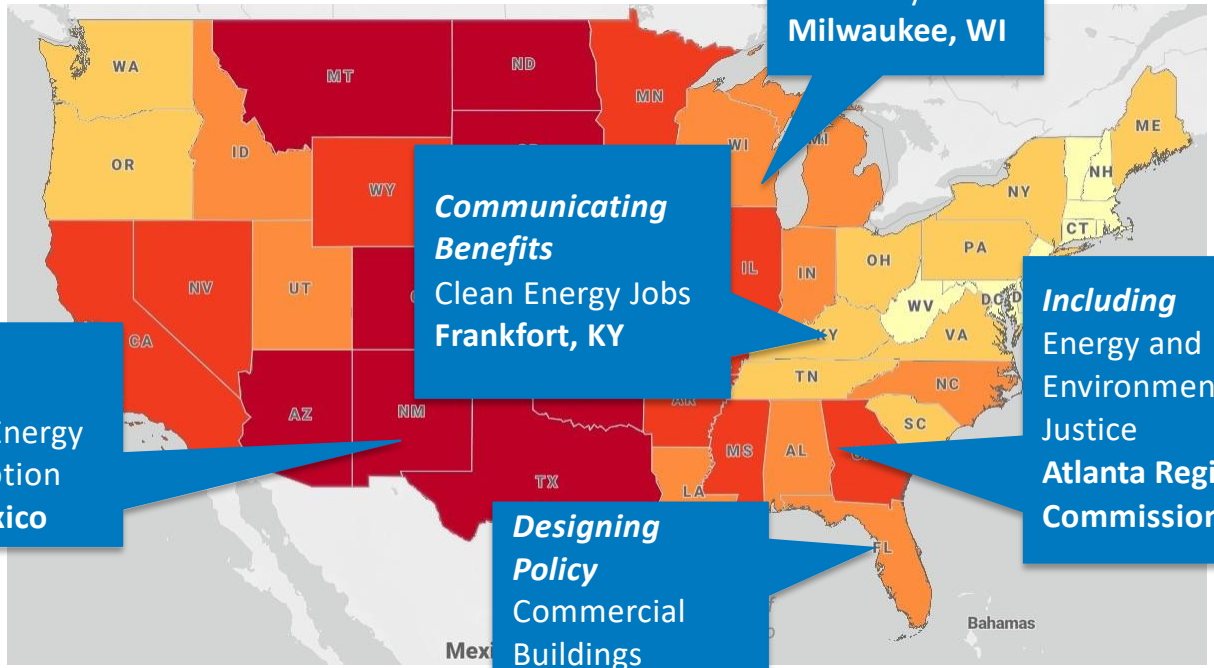


COMMUNICATE BENEFITS

SLOPE Live Demo

Scenario Planner for Energy Efficiency
Energy Burden by Census Tract
LMI Single Family Home Savings Potential
Residential Electricity Savings at State Level
Jobs potential

SLOPE Impacts for States and Local Governments



Prioritizing
Rooftop Solar and Energy Efficiency
Milwaukee, WI

Communicating Benefits
Clean Energy Jobs
Frankfort, KY

Planning
Scenario Planner Energy Consumption
New Mexico

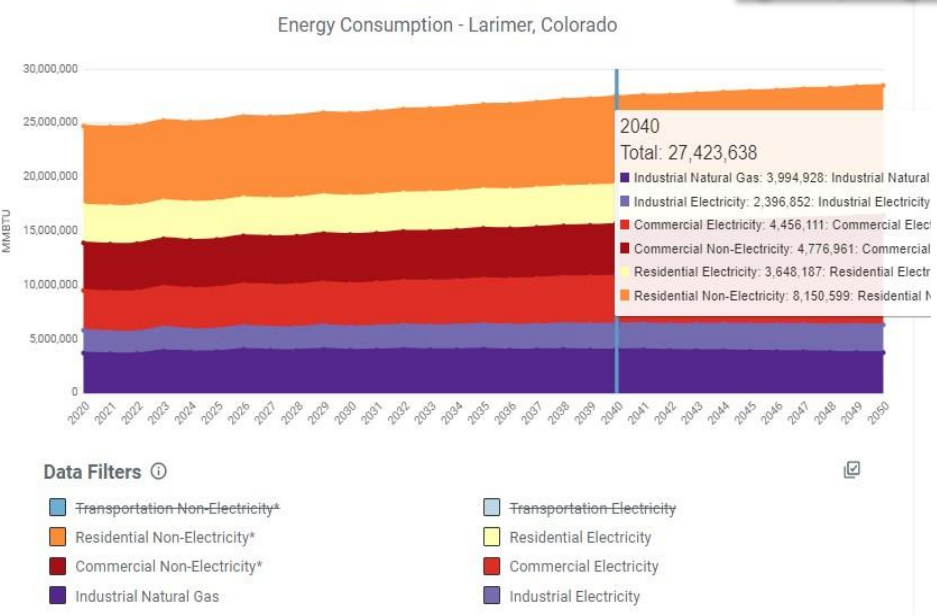
Designing Policy
Commercial Buildings
Sarasota, FL

Including
Energy and Environmental Justice
Atlanta Regional Commission

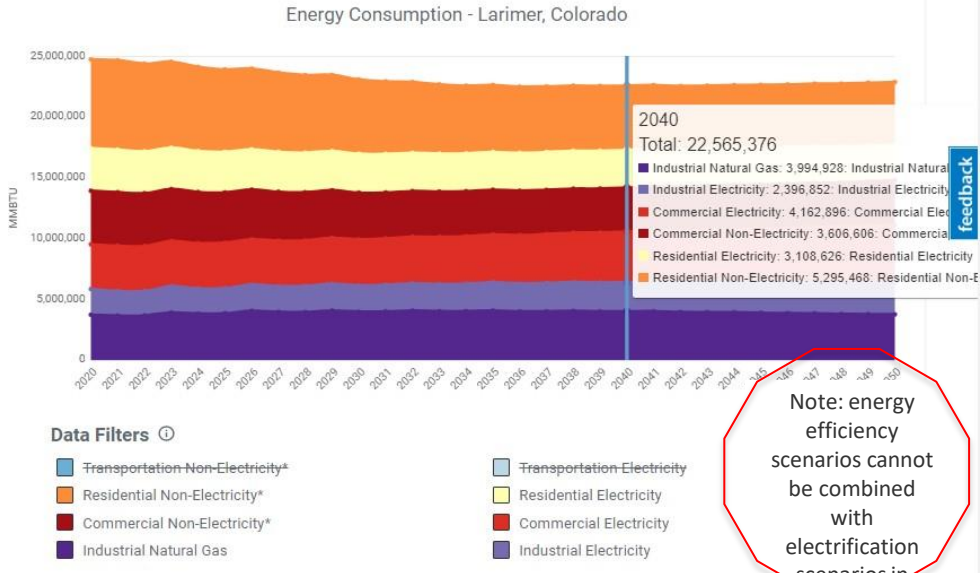
How would energy consumption in 2040 change if our county adopts energy efficient measures in buildings?

Adjust to goals / targets

Scenario 1: Reference Case



Scenario 1: Best-Available Energy Efficiency in Buildings



feedback

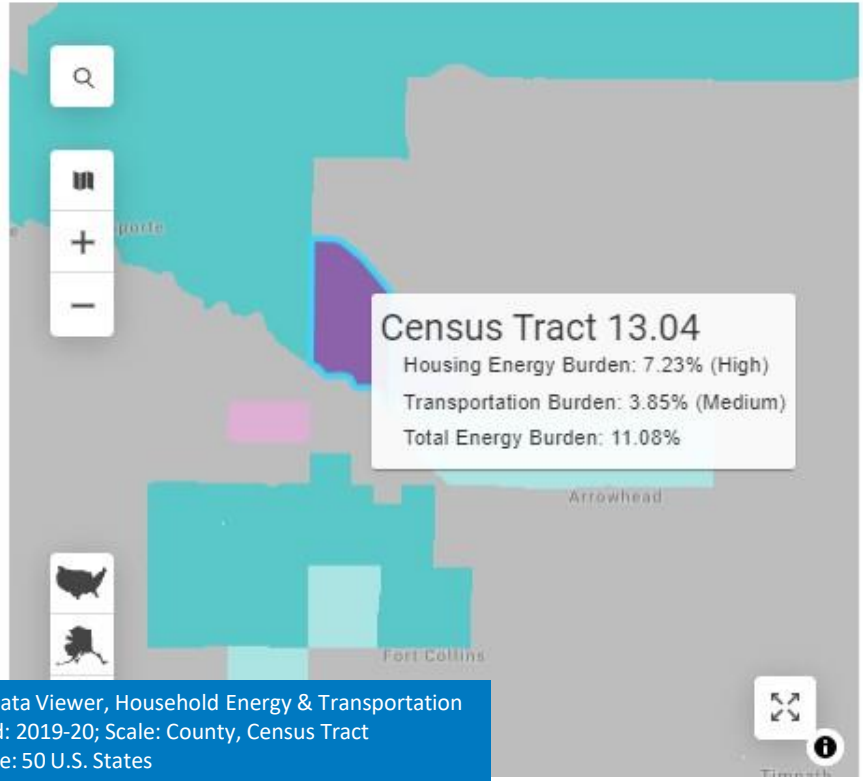
Note: energy efficiency scenarios cannot be combined with electrification scenarios in

Takeaway: Best-available energy efficiency upgrades in buildings are projected to reduce residential energy use by 29% and commercial energy use by 16% in Larimer County in

SLOPE Scenario Planner
Updated: 2019-21
Scale: State, County
Coverage: 50 U.S. States

Where can we focus outreach and investments to alleviate household energy burdens?

Household Energy and Transportation Burden



SLOPE Data Viewer, Household Energy & Transportation
Updated: 2019-20; Scale: County, Census Tract
Coverage: 50 U.S. States

Takeaway: In this census tract in Larimer County, energy bills are a relatively high percentage of household income. Targeting efficiency benefits to this neighborhood can help alleviate energy burdens where they are highest.

Map Legend

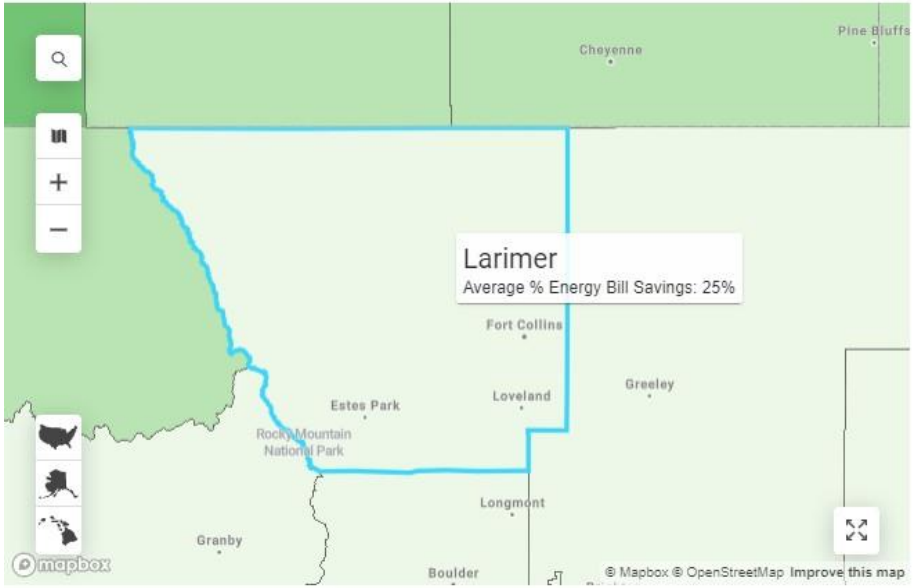
(Percent of Income)



	Low	Medium	High
Housing Energy Burden	< 3.8%	3.8 - 6.0%	> 6.0%
Transportation Burden	< 3.6%	3.6 - 4.2%	> 4.2%

How can energy efficiency lower bills for low- to moderate-income single-family homes in our county?

Average % Bill Savings from Efficiency Upgrade Package for LMI Households



Map & Graph Resolution: County **State:** Colorado **County:** Larimer

Map Legend

(Average % Energy Bill Savings)

- 51%+
- 45 - 51%
- 40 - 45%
- 35 - 40%
- 0 - 35%

Average Annual Energy Bill Savings Per LMI Single Family Home - Larimer

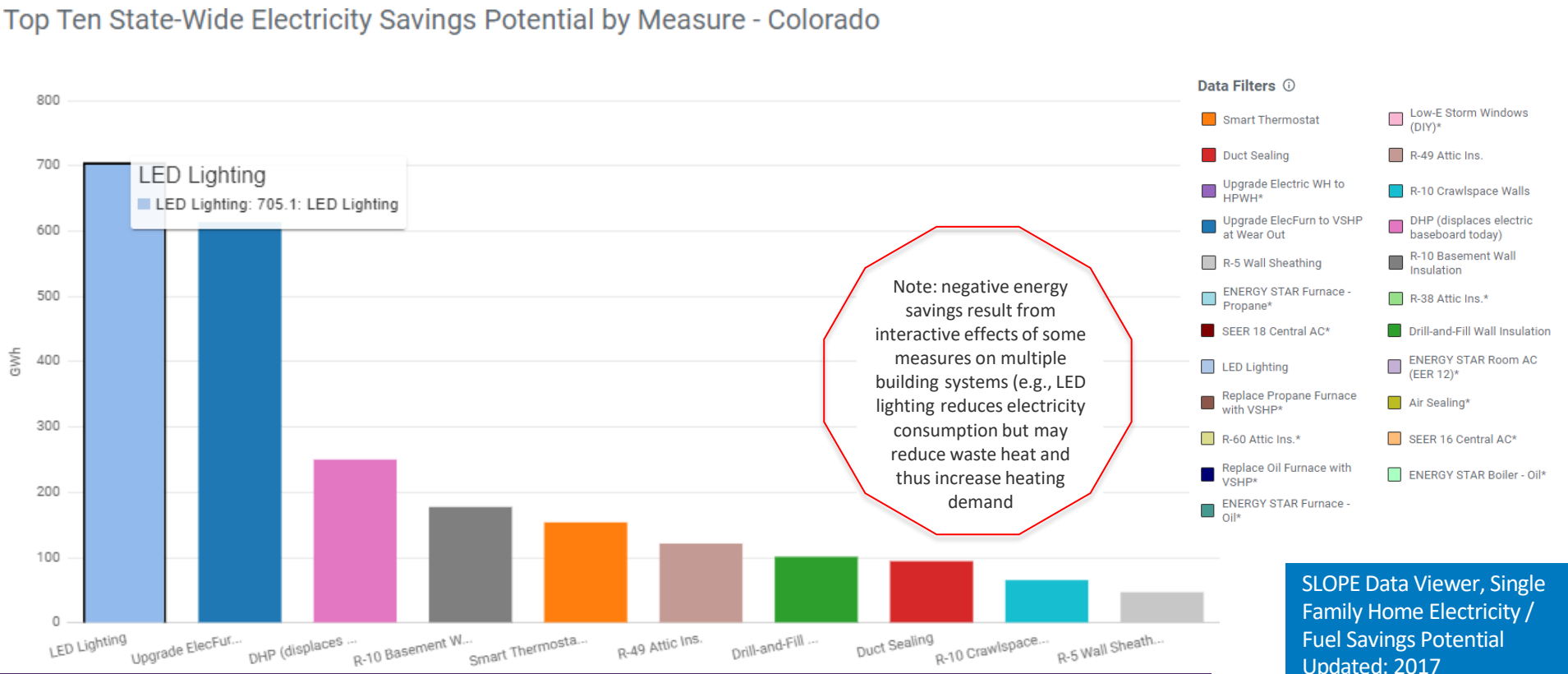


*Category included in map only

Takeaway: Electricity efficiency can save low- and moderate-income households in Larimer County more than $200 per year. Propane and natural gas savings of more than $50 per year could be achieved through efficiency measures.

SLOPE Data Viewer, LMI Single Family Home Bill Savings Potential

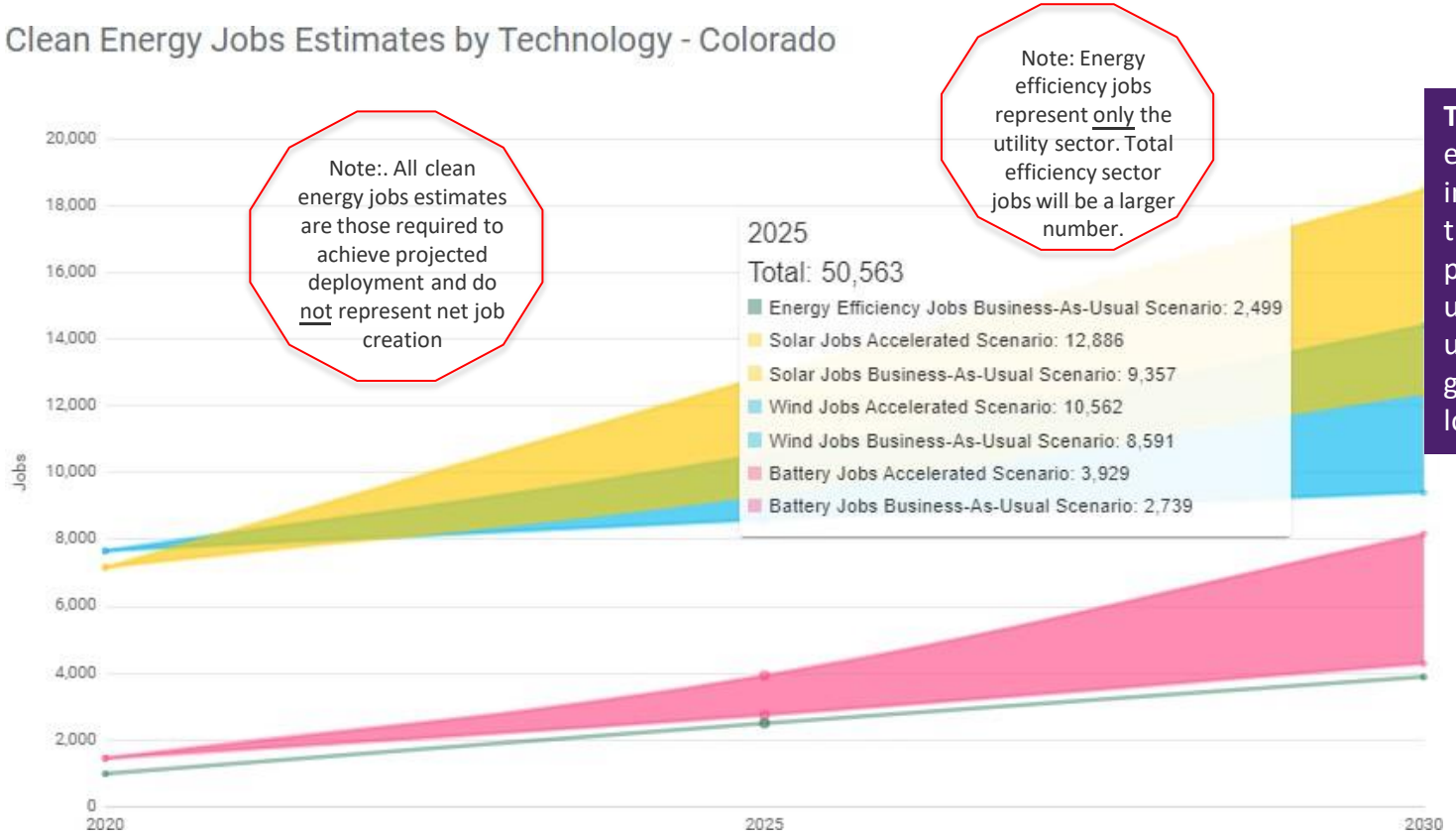
Which energy efficiency measures could have the greatest impact on reducing household electricity use in our state?



Takeaway: Upgrading to LED lighting and variable speed heat pumps when electric furnaces wear out are at the top two cost-effective residential efficiency measures with the highest electricity savings potential in

SLOPE Data Viewer, Single Family Home Electricity / Fuel Savings Potential
Updated: 2017
Scale: State
Coverage: 50 U.S. States

What workforce will be required in the next 10 years to achieve deployment of energy efficiency technologies in our state?



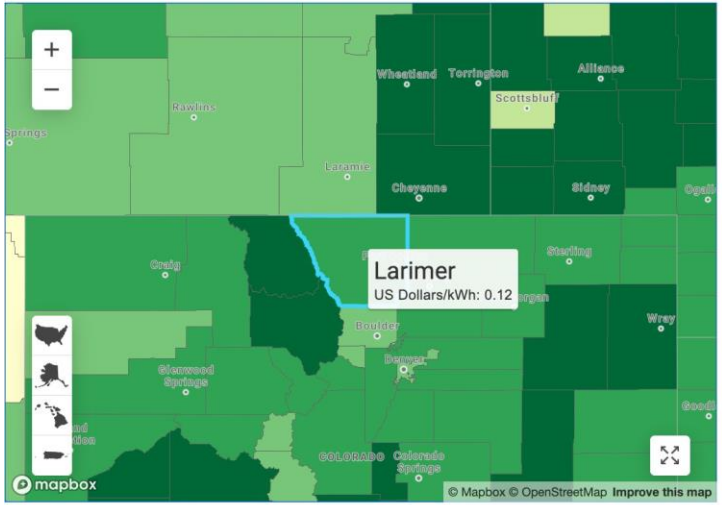
Takeaway: In Colorado, solar energy jobs are projected to increase the most. Increasing job training and education, particularly in communities with underemployment or high unemployment and high solar generation potential, can boost local economic development.

SLOPE Data Viewer, Clean Energy Job Estimates
Updated: 2022
Scale: State
Coverage: 50 States

How much does electricity cost in my community, and are there opportunities for building space heating electrification?

COST OF ENERGY - AVERAGE RESIDENTIAL ELECTRICITY COSTS

Average Residential Electricity Costs



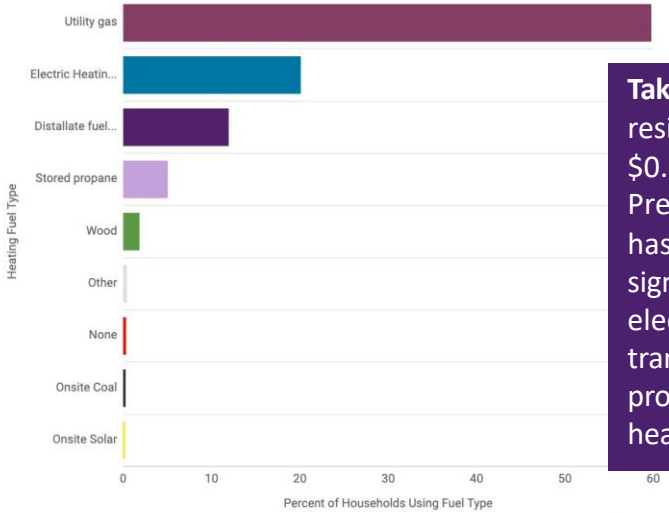
Map & Chart Resolution: County **State:** Colorado **County:** Larimer **Year:** 2020

Map Legend

(US Dollars/kWh)

- 0.14+
- 0.12 - 0.14
- 0.11 - 0.12
- 0.10 - 0.11
- 0 - 0.10

Home Heating Fuel Distribution by County - Larimer



Data Filters

- None
- Onsite Solar
- Onsite Coal
- Electric Heating
- Utility gas
- Other
- Wood
- Distallate fuel oil
- Stored propane

Takeaway: In Larimer County, residents pay an average of $0.12 / kWh for electricity. Presently only 20% of the county has electric heating, leaving significant opportunity to electrify building heating by transitioning gas, fuel, and propane customers to electric heating.

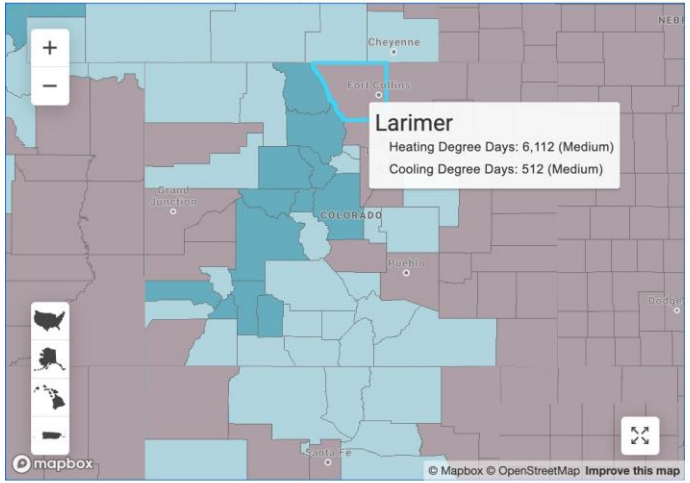
SLOPE Data Viewer,
Average Residential Electricity Costs
Data Year: 2020
Scale: County
Coverage: 50 States

National Renewable Energy Laboratory. "Average Residential Electricity Costs," *State and Local Planning for Energy*, accessed 3/7/2024, https://maps.nrel.gov/slope.

How will HVAC demand change in the coming decades as the climate changes?

RESILIENCY - DEGREE DAY PROJECTIONS

Projected Heating and Cooling Degree Days



Map & Chart Resolution: County **State:** Colorado **County:** Larimer **Year:** 2020

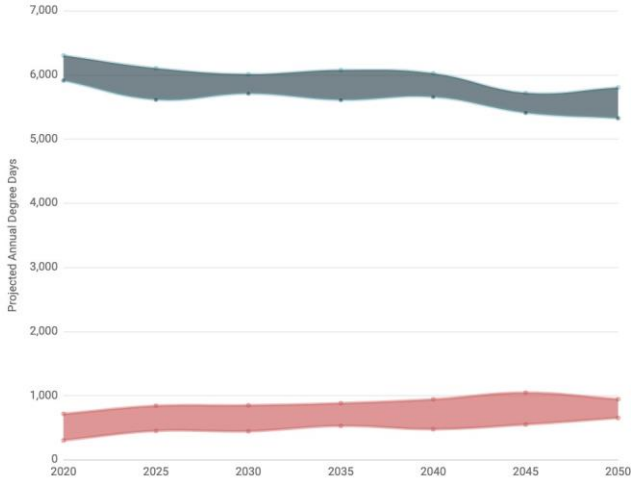
Map Legend

(Projected Annual Degree Days)



	Low	Medium	High
Heating Degree Days	< 1100 days	1100 - 9000 days	> 9000 days
Cooling Degree Days	< 450 days	450 - 2000 days	> 2000 days

Heating and Cooling Degree Days by County - Larimer



Data Filters

Heating Degree Days (buildings will require heating)

Cooling Degree Days (buildings will require cooling)

Takeaway: In Larimer County, modeling projects a median of ten percent fewer heating degree days (total degrees of heating needed in a year to warm a building to 65F in 2050 relative to 2020 demand. Meanwhile, there will be a 66% increase in the need for cooling degree days. This increase will require more electricity to maintain indoor temperatures.

SLOPE Data Viewer,
Degree Day Projections
Scale: County
Coverage: 50 States

Building Equity

How can we pursue **equity** while planning for a clean energy future?

The resources you use don't **perform equity** for you.

Instead, you must go in with ***equity in mind*** to use resources appropriately.

Thank you! Questions?

https://maps.nrel.gov/slope/

NREL/PR-6A20-87612

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Photo from iStock-627281636

NREL
Transforming ENERGY



Jerry Henderson

Energy Assurance Company

U.S. DEPARTMENT OF ENERGY



Energy Assurance Company

Solar PV – Solar Thermal – Energy Storage – Energy Conservation

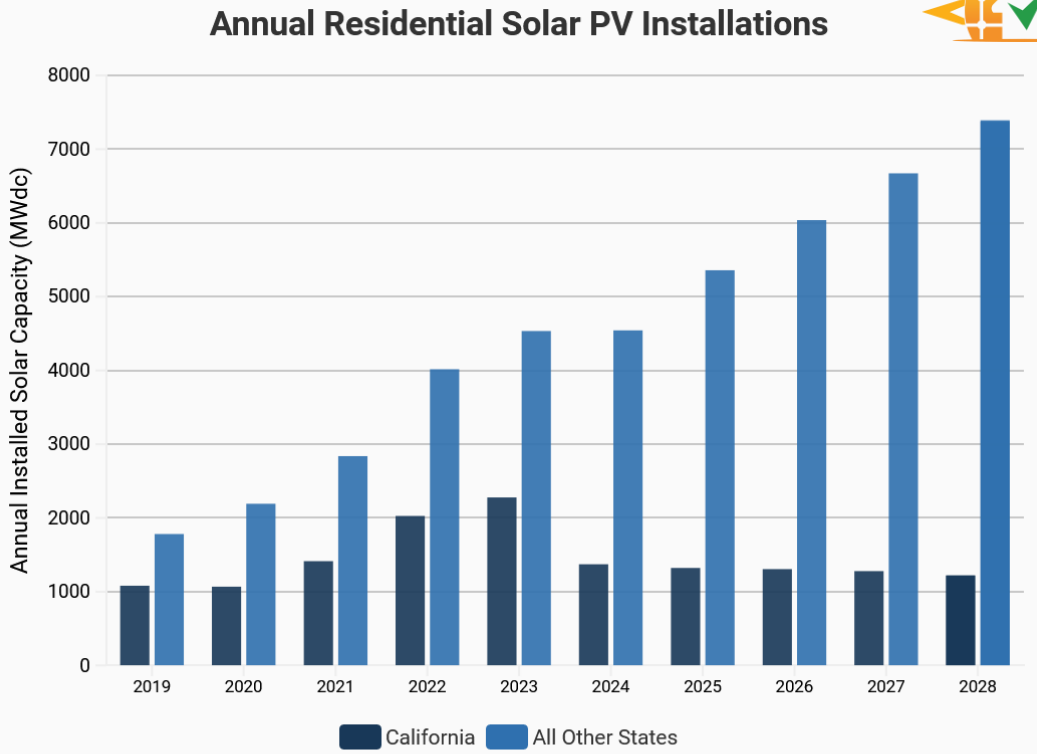


OUR COMPANY

Energy Assurance Company provides Inspection Services, Technical Support, Client Management, Codes & Standards Compliance, Customized Training, and Program Development.

We work with Government Agencies, Utility Incentive Programs, Financing Partners, Code Agencies, Installers, and Educational Institutions

Growth in Solar



Source: SEIA/Wood Mackenzie Power & Renewables U.S. Solar Market Insight 2023 Year in Review



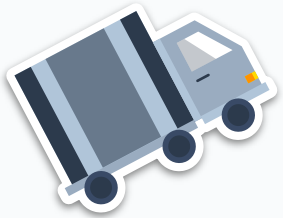
See Our Event Page

Press Release | September 2023

U.S. Climate Alliance Announces New Commitments to Decarbonize Buildings Across America, Quadruple Heat Pump Installations by 2030

September 21, 2023

NEW YORK, NY – The U.S. Climate Alliance, a bipartisan coalition of 25 governors representing approximately 60 percent of the U.S. economy and 55 percent of the U.S. population, today announced a series of new commitments from its members to eliminate emissions from buildings, including collectively quadrupling heat pump installations by the end of the decade.

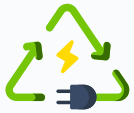








Solar and Energy Storage



Energy Efficiency







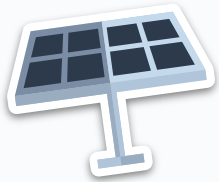




THANKS!

Do you have any questions?





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Partnerships for International Buildings Decarbonization: U.S.-sponsored programs and opportunities for industry collaboration

Mar 19, 2024, 1:00 PM ET

Register here

Net Zero World is the Department of Energy (DOE)-led whole-of-government project focused on advancing the decarbonization of global energy systems with our country partners. Speakers from across DOE and the national labs will introduce cooperative building efficiency and decarbonization projects organized by Net Zero World, the Partnership for Transatlantic Energy and Climate Cooperation, and the joint cooling initiative with India. The conversation will highlight current projects and upcoming opportunities for U.S. industry to partner with key international stakeholders to accelerate the transition to net zero, resilient, and inclusive built environment. Speakers will also solicit feedback about priorities and challenges in international markets.

Residential Buildings Integration (RBI) team sessions

NHPC 2024 | MINNEAPOLIS

Key Elements of Successful Retrofit Programs	Monday, April 8 3:30-5:00 PM
Strategies for Using Home Energy Score with other Audit Software	Tuesday, April 9 10:30-11:30 AM
Tackling the Toughest Technical Challenges to Residential Retrofits: A Multidisciplinary Team Approach	Tuesday, April 9 10:30-11:30 AM
U.S. DOE Residential Team Update	Tuesday, April 9 1:00-2:00 PM
Home Energy Score: Providing Transparency and Empowering Homeowners, Renters, and Buyers with Actionable Energy Information	Tuesday, April 9 2:30-3:30 PM
More, Multi, Manufactured - Home Energy Score tool enhancements expand opportunities for efficiency upgrades	Wednesday, April 10 1:00-2:00 PM
Getting the Workforce Heat Pump Ready	Wednesday, April 10 2:30-3:30 PM
Red Calc Lives On!	Thursday, April 11 11:00 AM-12:00 PM

Smart Tools for Efficient HVAC Performance (STEP) Campaign

Pacific Northwest NATIONAL LABORATORY

STEP CAMPAIGN

Scan this QR code to visit our website

Contact: christian.valoria@pnnl.gov

The STEP Campaign aims to increase adoption of smart diagnostic tools to streamline HVAC system performance testing and troubleshooting, reducing energy-wasting faults and improving occupant comfort.

To join the STEP Campaign, visit: bit.ly/3DFmEaE



HVAC Contractors and Technicians

- Reduce callbacks, improve consistency and quality, streamline processes
- Find out where to get training on smart diagnostic tools
- Be recognized for successful adoption of smart diagnostic tools!



Utilities and Program Implementers

- Streamline quality installation and quality maintenance programs
- Improve engagement with your contractors
- Be recognized for programs that utilize smart diagnostic tools!



HVAC Training Organizations

- Offer qualified training on System Performance with smart diagnostic tools
- Promote your training events
- Be recognized for providing training!



Weatherization Organizations

- Ensure your ASHP/CAC installations are operating at optimized efficiency
- Develop pilot with PNNL team
- Be recognized!

ORGANIZING PARTNERS

ACCA · BUILDING PERFORMANCE ASSOCIATION · CEE Working Together, Advancing Efficiency · HVAC Excellence · NATE · neea · U.S. DEPARTMENT OF ENERGY

Explore the Residential Program Guide

Resources to help improve your program and reach energy efficiency targets:

- Handbooks - explain *why* and *how* to implement specific stages of a program.
- Quick Answers - provide answers and resources for common questions.
- Proven Practices posts - include lessons learned, examples, and helpful tips from successful programs.
- Technology Solutions NEW! - present resources on advanced technologies, **HVAC** & **Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.
- Health + Home Performance Infographic – spark homeowner conversations.



https://rpsc.energy.gov

Health + Home Performance Infographic



DOE's Health + Home Performance Infographic reveals the link between efficiency and health – something everyone cares about. Efficiency programs and contractors can use the question-and-answer format to discover a homeowner's needs.

The infographic is ideal for the "kitchen table" conversations where people decide what to do – and who they want to do it. It also has links for homeowners to find a qualified contractor if they do not already have one.

Download this infographic from DOE's Better Buildings Residential Network.

Looking for photos to help tell your energy efficiency story? Visit our image libraries: https://www.energy.gov/eere/better-buildings-residential-network/articles/image-libraries

Thank You!

Follow us to plug into the latest Better Buildings news and updates!

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