

"Addressing Barriers to Low-Income Access to Residential Solar in Bennington County"

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BCRC ENERGY INTERN

Vermont Energy Policy

Vermont Goals

- 90% renewable by 2050
- Lower emissions 80% below 1990 levels by 2050

Bennington Goals

- Increase the usage of electricity 50% by 2050
- Add 85 MW of new solar Capacity

Energy Burden

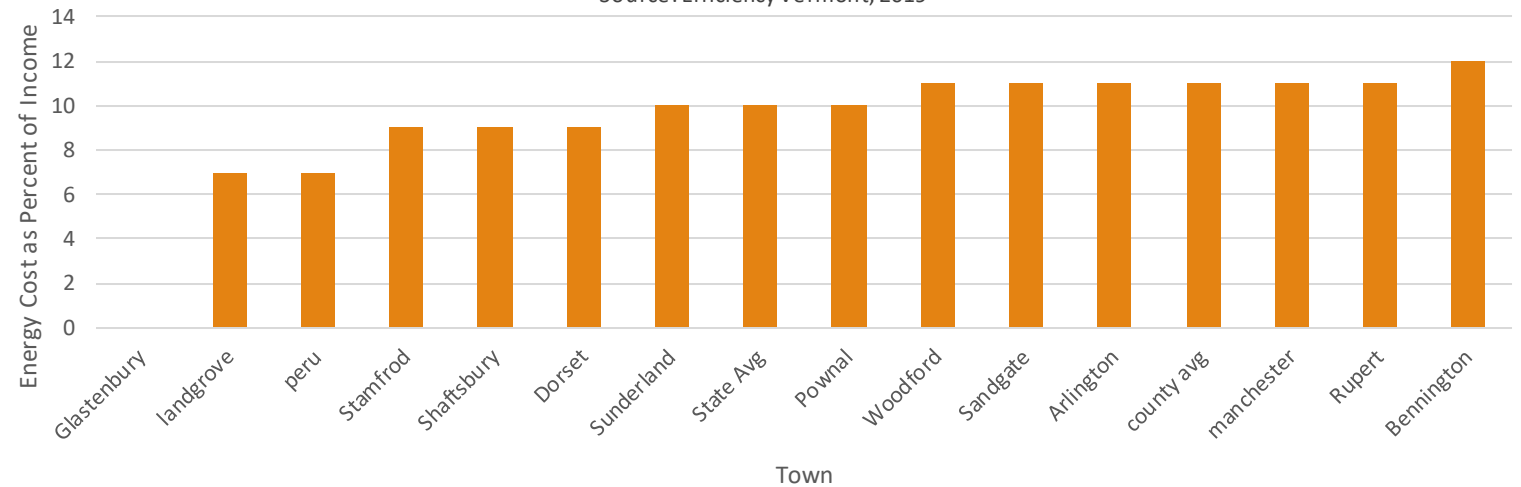
Energy Burden is a metric of total energy cost as a percentage of total income. It indicates how great of a financial strain energy costs are on households.

According to the Vermont Low Income Trust for Electricity, a burden more than 10% is considered "fuel poor". Statewide, the average is 10% and in Bennington County, 12%. This suggests that a large portion of residents fall into this category

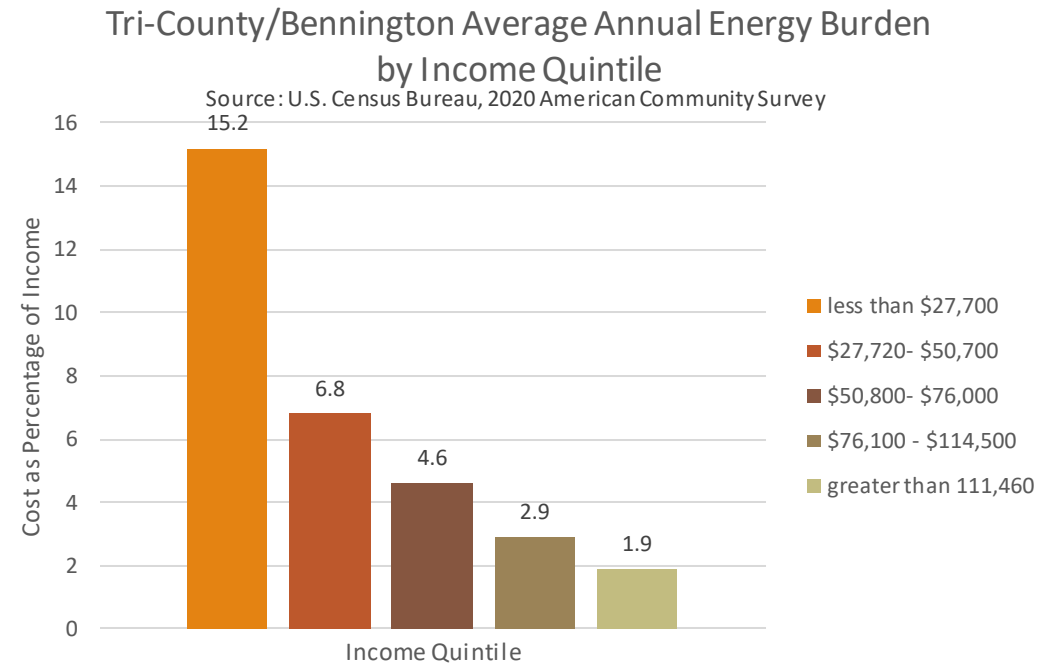
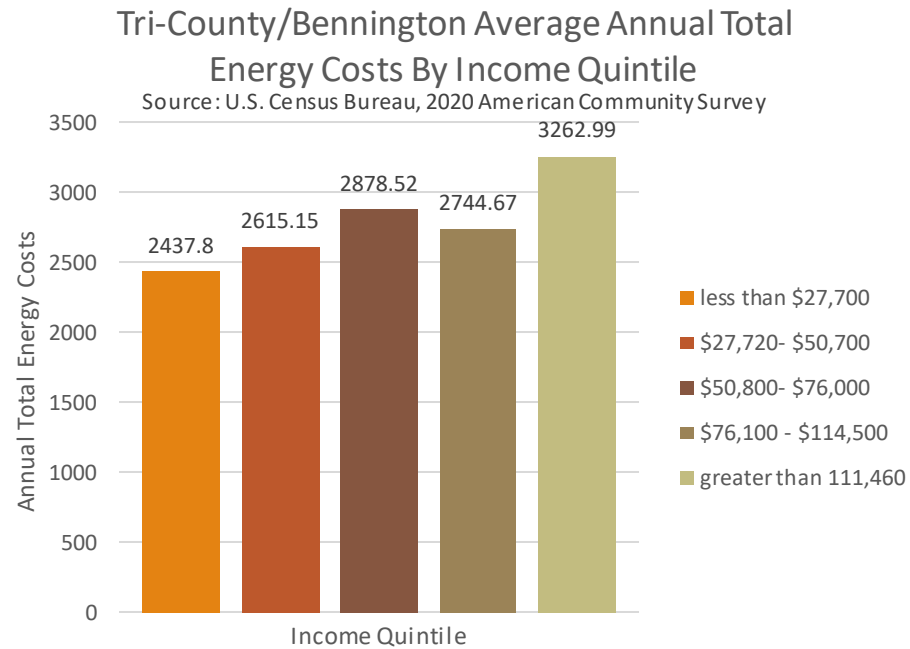


Average Energy Burden in Bennington County

Source: Efficiency Vermont, 2019



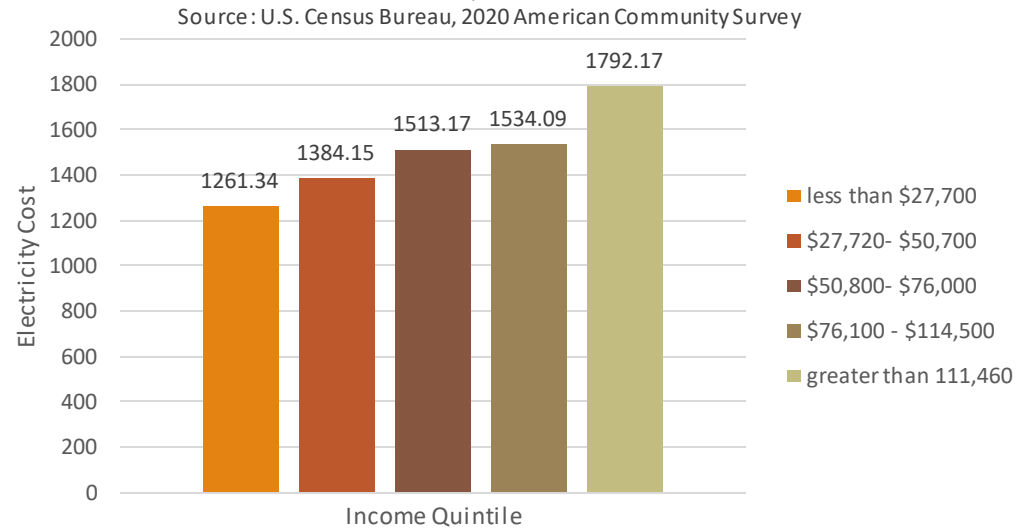
Energy Burden Across Income Quintiles



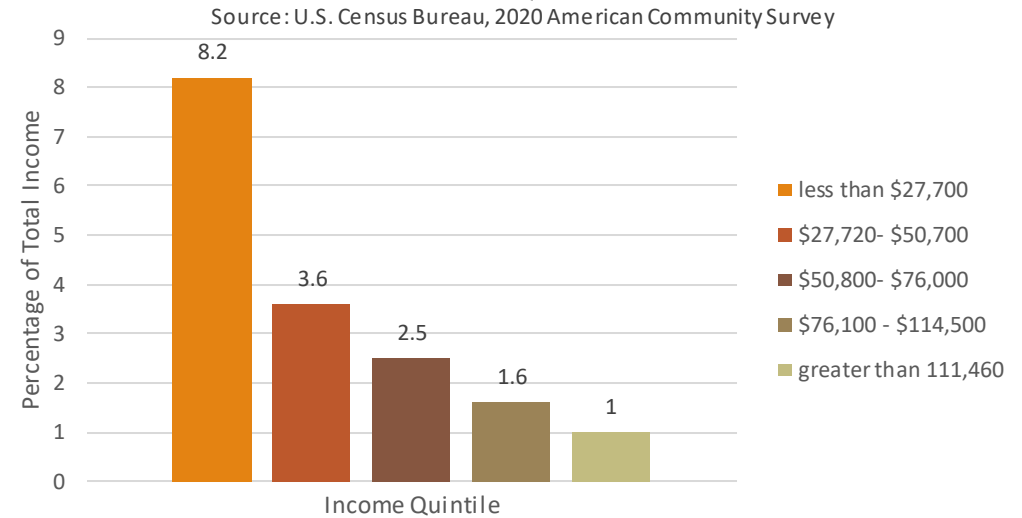
Although households in the lowest income bracket spend 25% less on energy, it takes up 8x as much of income

Electricity Burden By Income Quintile

Tr-County Average Annual Electricity Cost by Income Quintile



Tri-County Average Annual Electricity Burden by Income Quintile



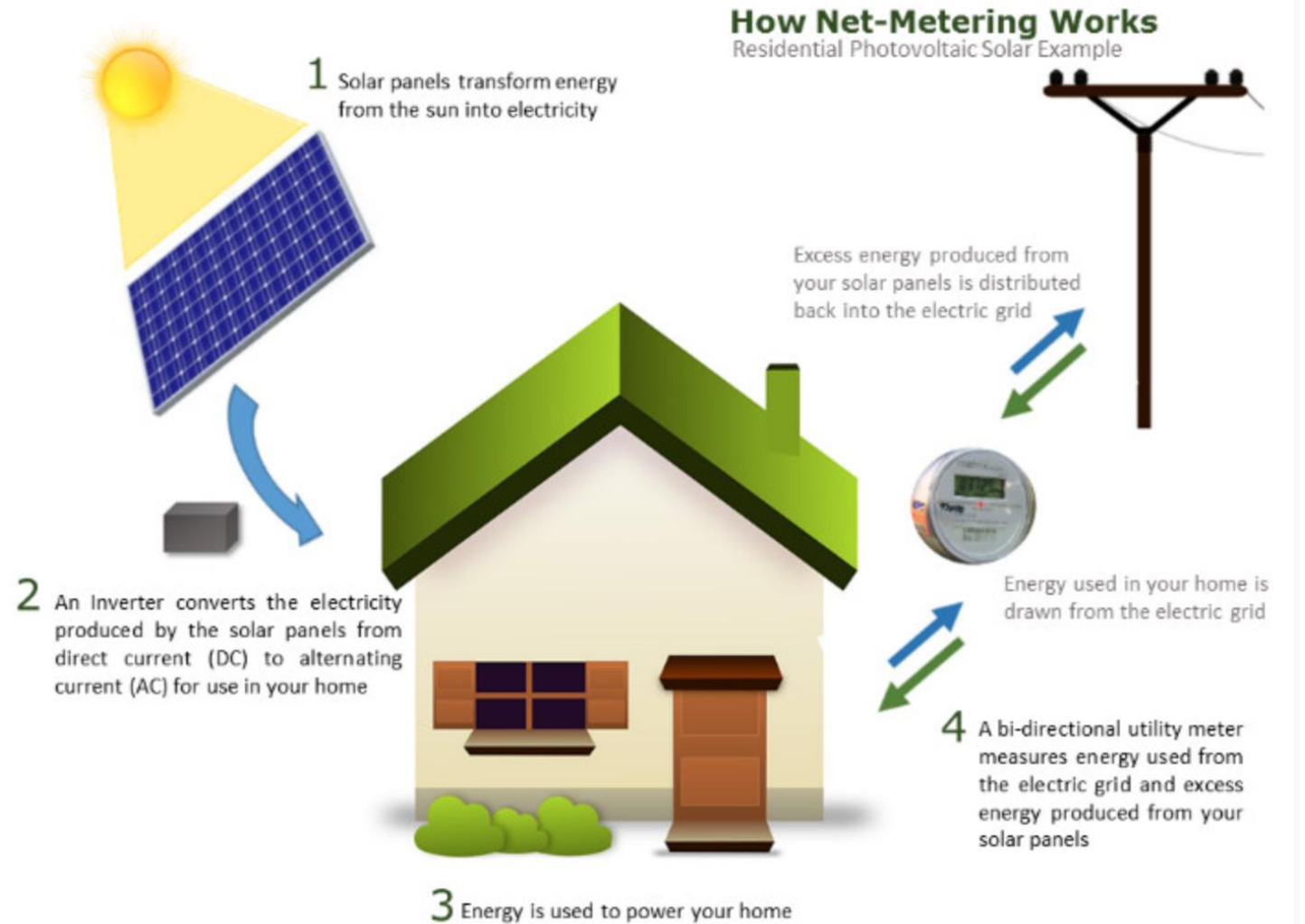
While the bottom 20% spends almost 30% less on electricity, they 8x more as a percentage of their income

Solar Energy

- State Energy Transition
 - As Vermont transitions away from fossil fuels, solar Photovoltaic (PV) systems are expected to take on the bulk of the energy load
 - 450 MW of in-state installed capacity in 2021; expected to increase to 600 MW by 2030
 - Context: Vermont Yankee produced 620 MW and was 71% of in-state generation
 - Bennington
 - 10 MW in 2017
 - 20-30 MW today
 - 85 by 2050 (68-107 MW)
- PV systems can offset electricity costs and lower burden
 - The average annual electricity cost in BC is \$1274.77

Net-Metering

"Net-metering is the process of measuring the difference between the electricity supplied to a customer by their utility and the electricity fed back to the utility by a customer's electric generation system (such as solar panels) during the customer's billing period." - Vermont Public Utilities Commission



Current Net-Metering Rates

Rate category	Category I (< 15 kW)	Category II (15 kW -150 kW on a preferred site)	Category III (150 kW-500 kW on a preferred site)	Category IV (150 kW-500 kW on a non-preferred site)
Residential blend (basic rate)	\$0.17141/kWh	\$0.17141/kWh	\$0.17141/kWh	\$0.17141/kWh
REC Adjustor (sell)	\$0.00/kWh	\$0.00/kWh	\$0.00/kWh	\$0.00/kWh
REC Adjustor (keep)	-\$0.04/kWh	-\$0.04/kWh	-\$0.04/kWh	-\$0.04/kWh
Siting Adjustor	-\$0.02/kWh	-\$0.02/kWh	-\$0.05/kWh	-\$0.06/kWh

KEY:

Residential Blend: the basic rate homeowners receive for giving power to the grid

Renewable Energy Credit (REC) Adjustor: RECs are credits associated with producing clean energy. The adjustor accounts for whether a homeowner claims those credits or sell them to the utility

Siting Adjustor: a rate meant to encourage small scale projects on preferred sites

Other Incentives

Federal Tax Credit:

- Panel owners can deduce 26% of the cost of the PV system from their federal income tax the first year of operation
- *Credit set to fall to 22% in 2023

State Tax Credits:

- Panels under 50kW except from state property tax
- Panels exempt from state sales tax

SOLAR BENEFITS

ENVIRONMENTAL

- PV SYSTEMS OFFSET THE NEED FOR FOSSIL-FUEL BASED ENERGY AND EMIT NO GREENHOUSE GASES
- REDUCTIONS IN VT EMISSIONS HAVE LARGELY BEEN FROM CLEAN ELECTRICITY

FINANCIAL

- AVERAGE TOTAL SAVINGS **OVER 20-YEAR LIFE OF SYSTEM: \$30,277** (\$1,513/YEAR)
- LOWERS BURDEN BY OVER 50%
- LESS VOLATILE ENERGY COSTS

HEALTH

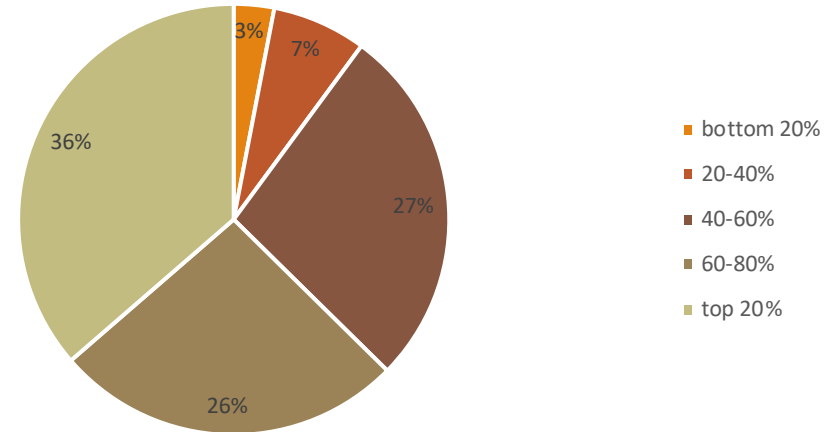
- CLEAN ENERGY SOURCES WILL LEAD TO LESS AIR POLLUTION
- FEWER INSTANCES OF RESPIRATORY RELATED ILLNESS, HOSPITALIZATIONS, AND DEATHS

Disparities in Uptake

The benefits of solar are distributed inequitably among income quintiles.

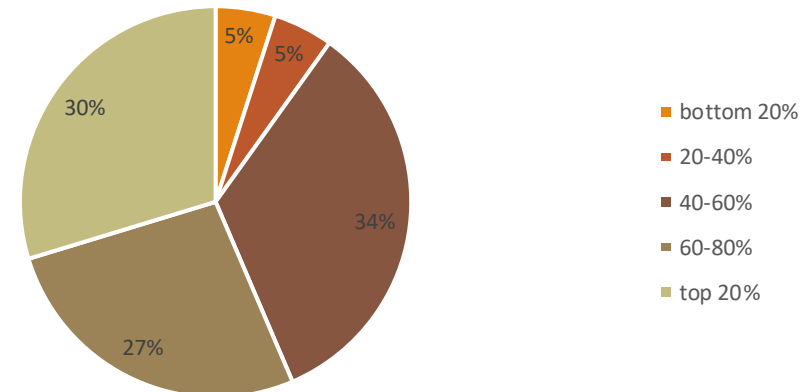
Statewide Share of Solar Capacity by Income Quintile

Source: Lawrence Berkeley National Laboratory



Bennington County Share of Solar Capacity by Income Quintile

Source: Lawrence Berkeley National Laboratory



Barrier: Cost and Limited Financial Options

HIGH UPFRONT COSTS:

- Average Panel Cost: \$2.98/watt
 - A 5 kW system costs an average \$14,900
 - *inaccessible for the 11.6% of BC households that make less than \$14,999
 - Material and operational costs are on the rise
- Average Payout Period: 9.5 years

FINANCIAL BARRIERS:

- LMI households may not have adequate credit history
 - 30% of low-income consumers nationwide are credit invisible and 15% are unscored
 - "low to moderate income is one of those things we really think about carefully" -- Laurie Fielder, Vgreen Program Director, VSECU
 - "the people that are less than positioned to utilize the credit are people with credit challenges...they've defaulted in the past or they've defaulted with us in the past"-- Laurie Fielder, Vgreen Program Director, VSECU
- Risk of over-leverage

Barrier: Regressive Incentive Structure

THE FEDERAL TAX CREDIT:

- “Congress has decided to give that subsidy only to people that have a taxable income. That creates a lot of inequities” -- Kevin Jones, UVM Law School
 - The National Renewable Energy Laboratory reports that the credit is 62% effective for those with incomes above \$75,000
- Tax credit cannot be claimed by non-profits
 - “the entities who are participating in the low-income community still don’t have that tax appetite, so it’s immediately 26% more expensive for low-income communities and nonprofits to do solar” -

NET METERING:

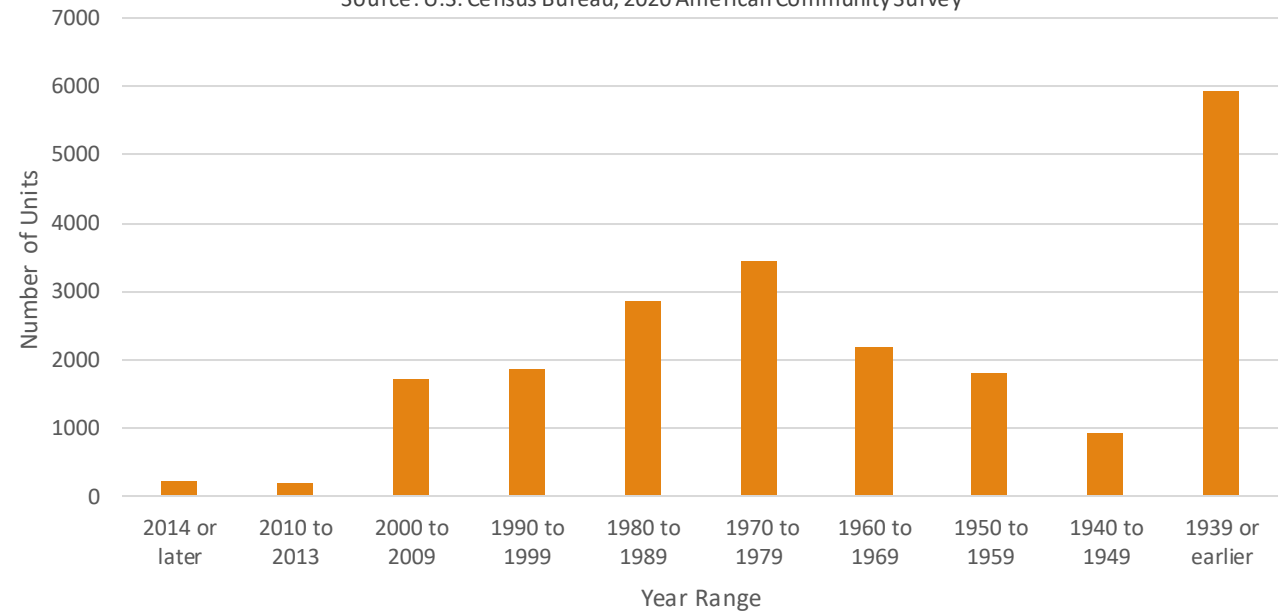
- **Changes in rates and addition of REC and Siting adjustors has lowered the compensation**
 - **Lowers savings and increases payout period**
- “Reductions in net-metering rates without any direct intervention to support LMI participation only makes participation less feasible.”
 - Norwich Solar Technology in a Letter to PUC

Barrier: Land Conditions

Generally, LMI households live in older, poorly-maintained homes. This means that renovations are likely required before a PV system can be installed. This is a particularly prevalent issue given that 41% of housing units in BC were built before 1960, and only 10% since 2000

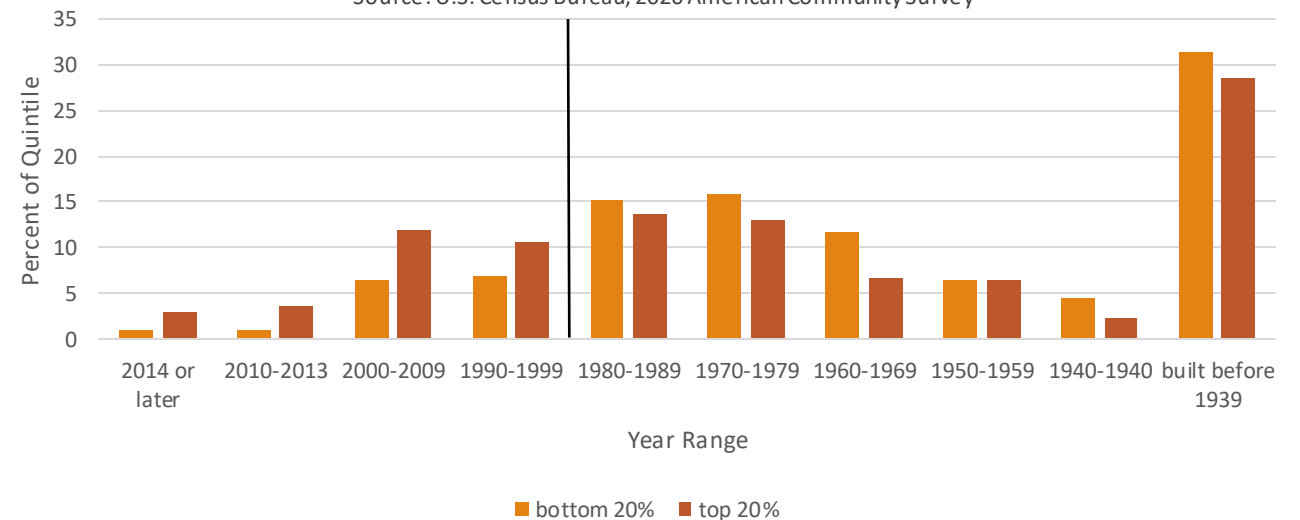
Year Bennington County Housing Units Were Built

Source: U.S. Census Bureau, 2020 American Community Survey



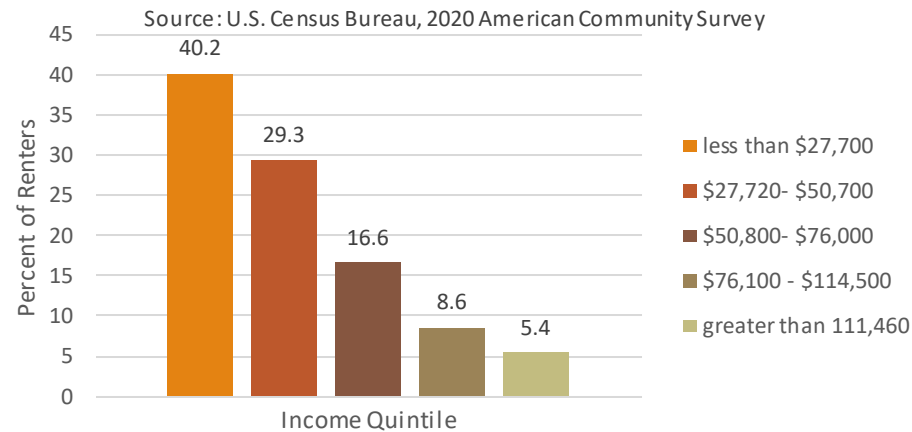
Tri-County/Bennington Percentage of Bottom and Top 20% living in housing built in a given range

Source: U.S. Census Bureau, 2020 American Community Survey

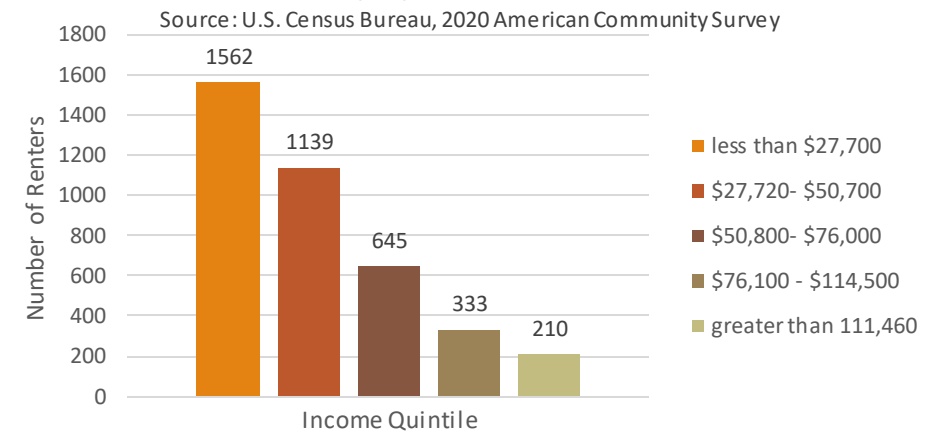


Barrier: Tenure Status

Tri-County/Bennington Percent of Renters from Each Income Quintile



Estimated Number of Renters in Bennington County by Income Quintile



TENURE:

- In BC: 3,886 households (26.6%) are renters
 - Split Incentive disincentives on-site panel construction
 - Electricity costs may be part of utilities (27.7% of renters)
 - Master meter system may prevent them from accessing net-meter credits

Barrier: Time and Bureaucratic Complexity

"For low- and moderate-income households, attention may be on a number of other pressing concerns, such as job security or medical care...Given limits of time, mental energy, or income, people may settle for heating sources that satisfy their needs, even if an upgrade may save them money."

- Tara Santi, "Increasing Energy Efficiency and Beneficial Electrification in Low-Income Households in the Northeast Kingdom"

Barrier: Future Uncertainty

INCOME INSTABILITY

- LMI HOUSEHOLDS FACE LESS JOB AND INCOME SECURITY. THUS MAKING A LARGE HOME INVESTMENT SEEMS UNREALISTIC

HOUSING INSTABILITY

- LMI HOUSEHOLDS FACE GREATER HOUSING INSECURITY AND MAY BE TWICE AS LIKELY TO HAVE MOVED IN THE LAST YEAR.

UNFORESEEN COSTS

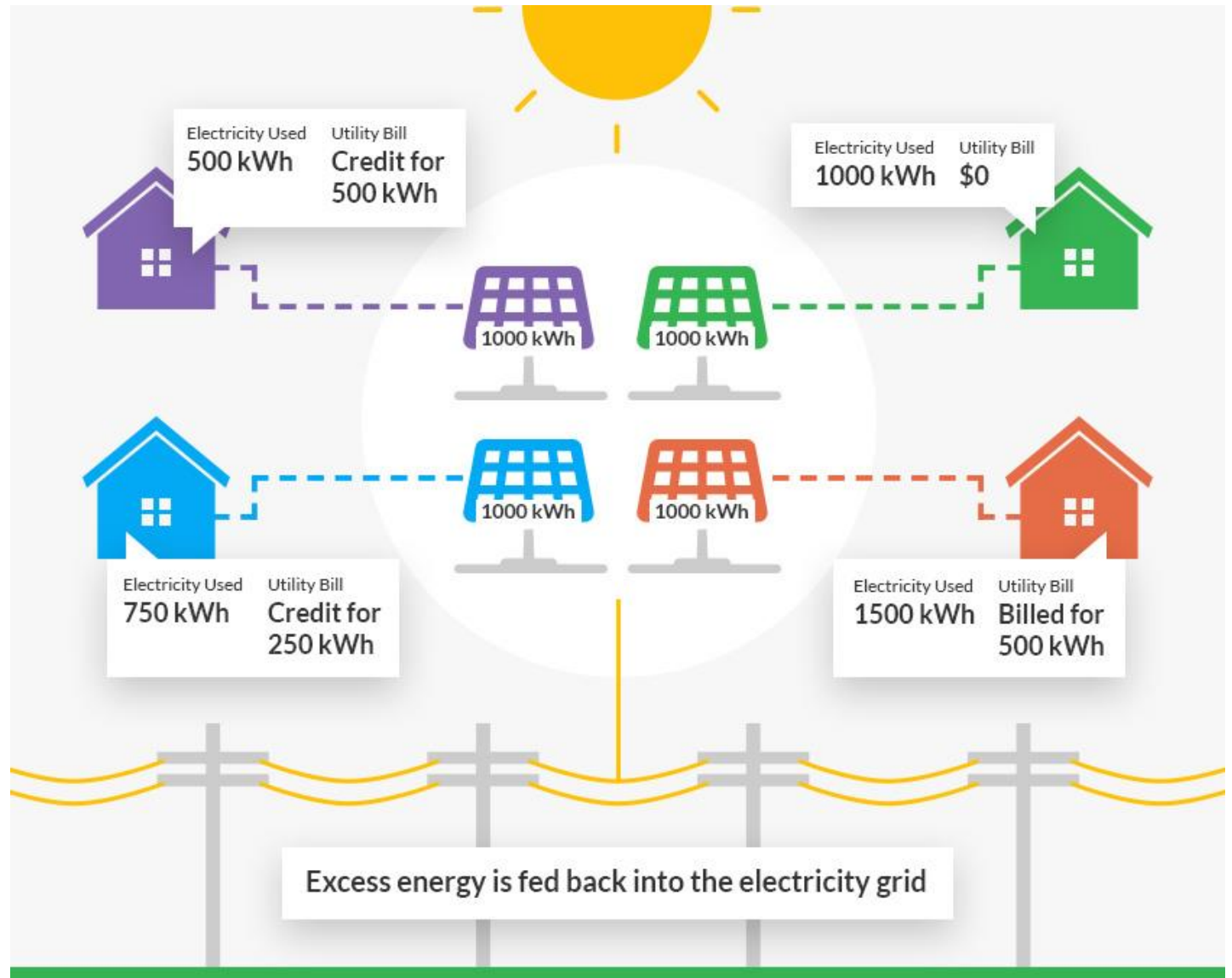
- HOUSEHOLDS MAY BE CONCERNED ABOUT BEING OVERLEVERAGED AND FINANCIALLY STRAINED IN THE EVENT OF UNFORSEEN COST (HEALTHCARE, CAR, ETC)

Alternative Model: Community Solar

"A group of accounts in the same service territory that are benefitting from one array" -Martha Staskus, Norwich Solar Technologies

Overview:

Otherwise known as "group net metering", community solar projects when several ratepayers reap the benefits of a single solar array. Households, businesses, and investors reap the proportional electrical and financial benefit



CO-OP/Community Owned

	Structure	Benefits	Challenges
OWNERSHIP	Owned by community shareholders: Households, businesses, municipalities, non-profits, housing authorities, etc.	Accessible for those with land or tenure restrictions; Democratic energy governance (siting+ RECs).	Bureaucratic complexity; administrative burden
FINANCING	Financed through community shareholder support and a larger investor with adequate tax appetite. Financing and funding may be available	Resource pooling; lower risk; maximizing tax credit	Tax appetite required; outreach and uptake
UPFRONT COSTS	Split among the shareholders. Economies of scale lowers cost/watt	discounted costs make projects more accessible.	Costs remain high (especially with logistical fees)
CREDIT DISTRIBUTION	Net-metering credits distributed among enrolled community members proportional to shares. Credits can be directed towards low-income households	those otherwise restricted get net metering credits (smaller shares); special focus on LMI possible	Disproportionate distribution; LMI support not guaranteed/plausible.
SAVINGS	Similar to traditional ownership: long term, high return	Large, long-term savings	Not immediate

Case Study: ACORN

- Community operated Co-Op in Addison County, VT
 - Mission: *"To develop an attractive and successful model for community – and patron-ownership in renewable energy and appropriate technology production, education, sales and local economic development."*
- Membership
 - Individuals can become a member of the Co-Op for \$350 or \$250 for LMI Households
- Community Solar Project
 - ACORN identifies a site and forms an LLC to own and manage the array
 - Project partially funded by corporate investor that gets tax credit
 - Rest of project supported by ACORN members who buy shares of the project (\$1.7/Watt)
 - *3 Projects in Bristol, Middlebury, and Shoreham VT
- Benefits
 - Off-site solar generation and net metering
 - 2:1 return on investment over lifetime of project
 - Discounted upfront cost
 - Permitting, construction and maintenance covered by ACORN
 - Democratic governance
- Challenges
 - Shareholders partially responsible for upfront costs and long payoff
 - Limited capacity
 - ACORN organized by volunteers
 - Multiple shareholders and members add legal and logistical complexities



Case Study: Hartford Public Safety Project

- Project Details
 - The Town of Hartford placed an 87 kW solar array on the roof of its Police and Fire Building
 - Hartford organized the project
 - Funding came from an independent, impact investor associated with Norwich
 - Net Meter credits diverted to two LMI housing communities owned by Twin Pines Housing and Stewart Property Management
 - Helped to lower costs for residents
- Benefits
 - Net-metering credits diverted to LMI residents
 - Use of open municipal space (cost effective and simple)
- Challenges
 - Investor required
 - Hartford willing to shoulder much of the risk and burden



Subscription/Leasing Agreements

	Subscription/Leasing Agreements	Benefits	Challenges
OWNERSHIP	Panels owned by a solar developer, investor, a group, etc. The panels are leased out to subscribers at a discounted rate.	Fewer administrative hurdles; less risk + easier access for LMI/restricted households	Energy governance and environmental justice "third-party ownership models do strip the RECs...they're not actually getting the carbon reduction benefit" -- Jeannie Oliver, UVM
FINANCING STRUCTURE	Financed and constructed by the primary owners of the array. Subscribers pay fee to owners (owners gets return on investment)	Easier financing; maximizing tax credit	Dependent on "angel investor" ; owners may be unwilling to take on LMI risk
UPFRONT COSTS	Covered by the owner.	Greater LMI/restricted access	
CREDIT DISTRIBUTION	NM credits distributed proportionally to the size of the subscription.	Greater LMI/restricted access	Disproportionate distribution; LMI support not guaranteed
SAVINGS	Subscriber savings is total net metering credits minus subscription fee. 5%-10% off utility bill (under Norwich program).	Savings are immediate to subscriber (no payout period)	"As soon as you move away from direct ownership... you're leaking money away from the low-income residents who you're trying to bring these benefits to." -- Jeannie Oliver, UVM

Case Study: StarLake Community Solar

- StarLake Lane
 - Low-income single-family housing community in Norwich, VT
- Project details
 - Three 15-kW arrays financed and owned by a single investor
 - Built and managed by Norwich Solar Technologies
 - 14 households from StarLake subscribe to the array
 - purchase NM credits at a discounted rate: saves an average \$251/year
 - Panel ownership to be transferred to community once investment is paid (5 years)
- Benefits
 - Off-site solar generation and net-metering
 - No upfront costs
 - Eventual community ownership
 - Logistical elements managed by experts at Norwich
- Challenges
 - Need an investor that is willing to take on risk
 - Community ownership not typically a component of TPL
 - Lower payback than full ownership



Other Interesting Examples:

- Co-Op/Community

- Peacham Community Solar
 - Organized by the Peacham town Energy Committee
- SouthShire Community Solar
- Power Guru
 - Vermont Mill Properties Community Solar
 - Shadowbrook Farm Community Solar

- Subscription

- Norwich subscription service
- Manchester Elementary Middle School (in Collaboration with Hand and Son Solar in Manchester)

Recommendations

Increase Coordination Among Stakeholders to Share Financial and Administrative Burden:

- Encourage towns, businesses, installers, non-profits, and RPCs to collaborate, leveraging unique social positions and expertise
 - Ex: towns -- identify preferred sites; inquire about using municipal land to host a project
 - Ex: RPCs -- identify preferred sites; facilitate interactions between actors with forums and incubators; offer administrative support
 - Ex: installers – offer administrative and technical expertise
- Ensure that LMI interests are represented during project development and in energy governance more largely
 - *“Oftentimes... the goals that community members have may be a little bit different than how some of the programs” - Kevin Jones*
 - Work with non-profits, housing authorities, and other LMI resources to develop new models of participation
 - Focus on education and outreach to encourage participation

Develop Shared Resources to Streamline and Simplify Process

- Sample RFPs
- Sample Project Plan
 - Material/videos on regulatory process
- Up-to-date, accessible data
 - regional capacity
 - Rates and pricing
 - preferred siting
- Consolidate information about interested actors

Recommendations

Increase LMI outreach

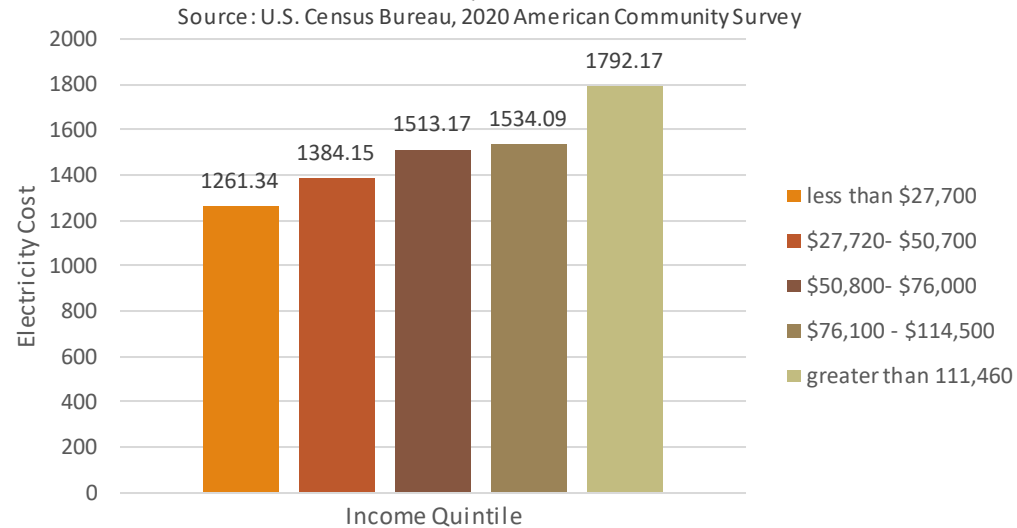
- Work with towns and organization that support LMI households to **distribute materials and offer information** about energy and financing options
 - Provide **comprehensive data** on costs and savings
 - Offer coaching
 - *connect with Green Saving Smart about larger energy projects and weatherization as an alternative
- Utilize **grassroots, community-based outreach** methods
 - Ex: tabling, presentations at gatherings, neighborhood demonstrations
 - Encourage community members to be part of outreach

Regulatory Reform*

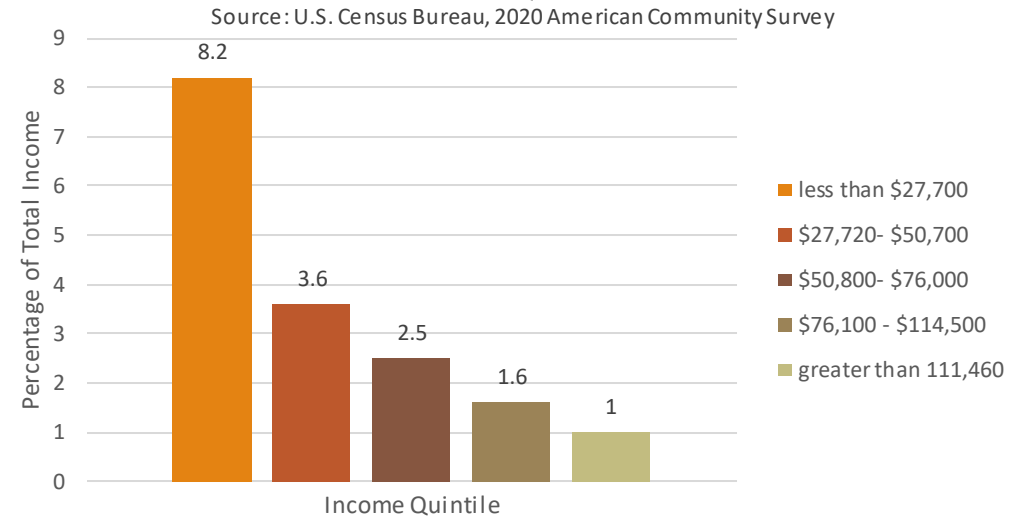
- Change PUC Net Metering Policy
 - Return base rate to previous levels
 - Lower/remove siting adjustors to encourage community arrays
 - *Alternative: offer progressive rates for LMI
- Reform Incentive Structure
 - Offer direct grants and rebates
 - Create secured and flexible loan options at low rates
- Streamline Permitting Process
- State Funding?

Electricity Burden By Income Quintile

Tr-County Average Annual Electricity Cost by Income Quintile



Tri-County Average Annual Electricity Burden by Income Quintile



While the bottom 20% spends almost 30% less on electricity, they 8x more as a percentage of their income

Questions?
