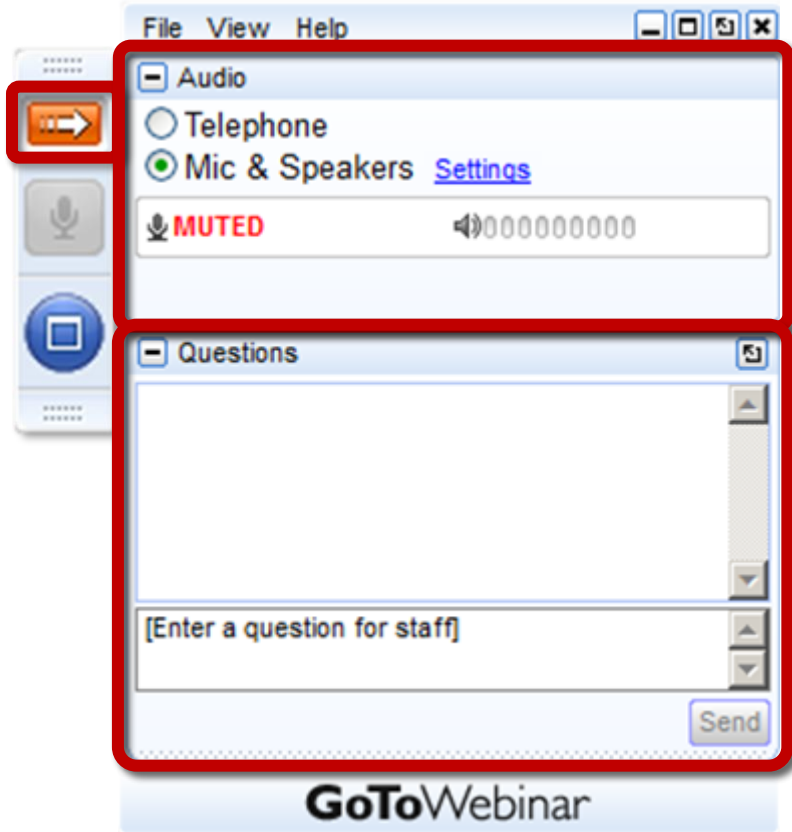




Solar for Manufactured Homes

May 13, 2021

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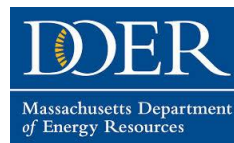
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Innovation is in our nature.



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Scaling Up Solar for Under-Resourced Communities

CESA is leading a wide-ranging initiative to accelerate the development of solar projects that benefit low-and-moderate-income (LMI) households and communities.

The project focuses on three distinct subsets of the LMI solar market:

- Single-family homes
- Manufactured homes
- Multifamily affordable housing

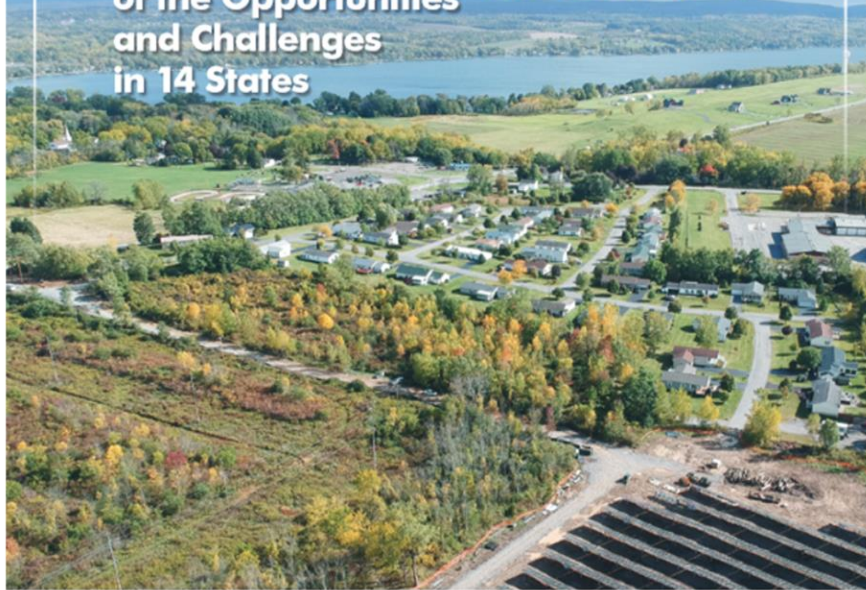
The project is made possible through a funding award from the US Department of Energy Solar Energy Technologies Office.

www.cesa.org/projects/scaling-up-solar-for-under-resourced-communities/



VOLUME 1 **SOLAR FOR
MANUFACTURED
HOMES**

An Assessment
of the Opportunities
and Challenges
in 14 States

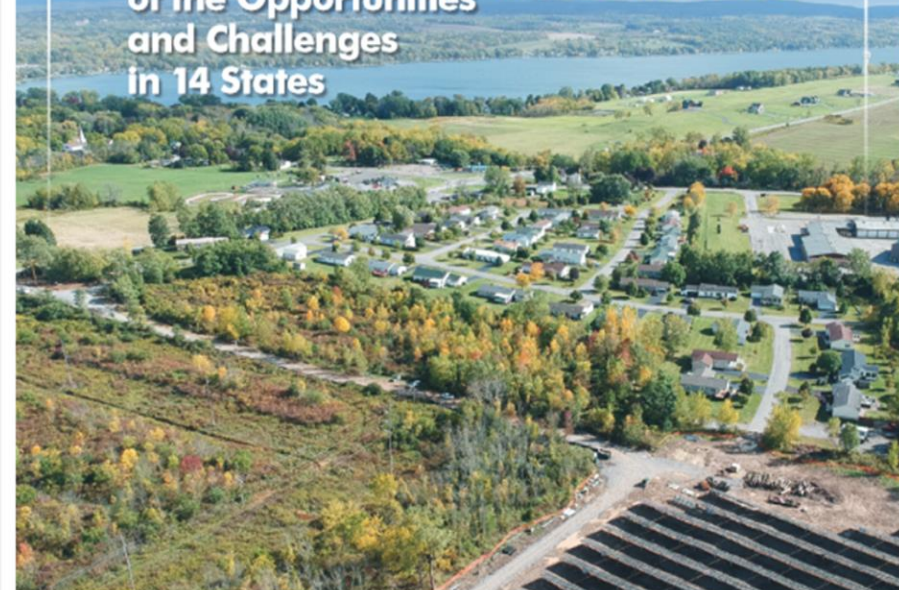


WARREN LEON, KAT BURNHAM,
NATE HAUSMAN, AND LAURA SCHIEB

APRIL 2021

VOLUME 2 **SOLAR FOR
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APRIL 2021

www.cesa.org/resource-library/resource/solar-for-manufactured-homes

Solar for Manufactured Homes

Webinar Speakers



Wafa May Elamin

Project Manager
Clean Energy States Alliance



Warren Leon

Executive Director
Clean Energy States Alliance

A Presentation Based on

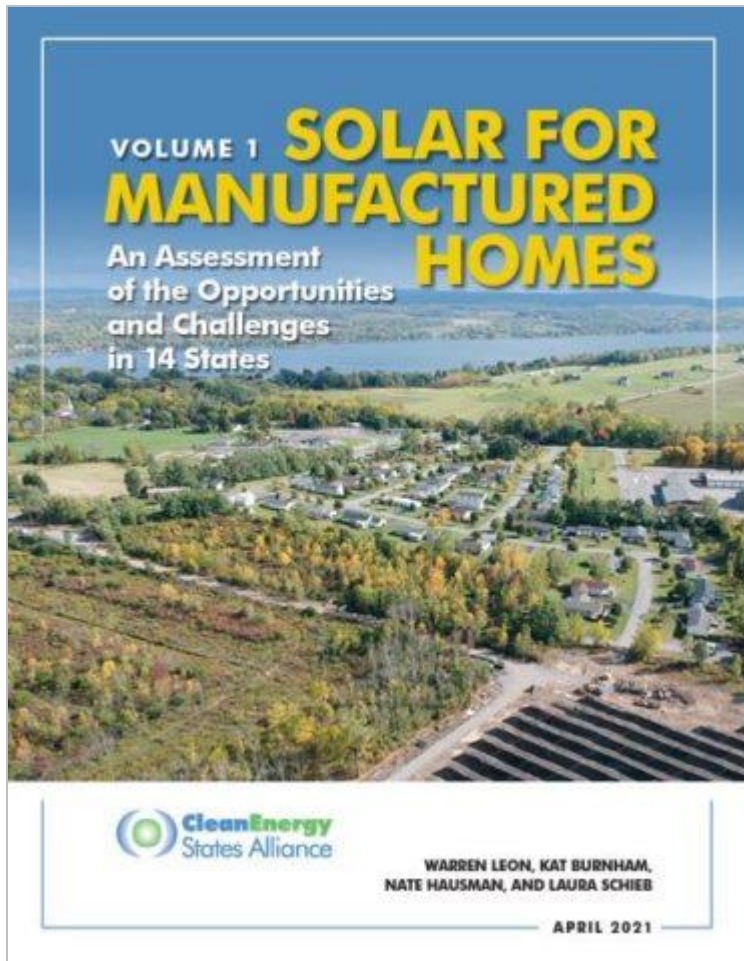
Solar for Manufactured Homes:

An Assessment of the Opportunities and Challenges in 14 States

Warren Leon
CESA Executive Director
May 13, 2021



Purposes of the Report



- Understand how best to use solar to power manufactured homes
 - A potential solar market that has received little attention
 - A housing market sector that is often ignored
- Report on 14 states
 - Leading to a learning network and a working group
- Accelerate the development of low- and moderate-income (LMI) solar projects for manufactured homes

Supported by the US Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under Solar Energy Technologies Office Award Number DE-EE0008758

What Is a Manufactured Home?

- Formerly called mobile homes
- Built in a factory
- Transported on a permanent chassis, so it can be moved again
 - One of more sections
- Since 1976, must meet standards set by US HUD
 - Conform to the federal code rather than to state and local building codes
 - Standards upgraded in 1994



Modular Home

- Also built in a factory and transported to the homesite
- Required to meet state and local building codes
- Placed on a permanent foundation

Why Solar for Manufactured Homes?

- LMI solar is essential for equity and to ensure solar retains public support
- Relieve high energy burden
- Greatest progress
 - When LMI solar market is not seen as an undifferentiated sector, but rather as a collection of sub-markets
- Manufactured homes
 - Significant share of housing stock
 - 8.5 million homes
 - 6.1% of homes nationally
 - Higher percentage of LMI housing stock
 - Large share of unsubsidized affordable housing
 - Most residents own their home



Barriers

LMI Solar Barriers

- Initial cost of a PV system
- Must be risk-free
- Inability to use federal tax credits
- Ignored by solar marketers
- Unfamiliarity of audience

Manufactured Homes Barriers

- Many roofs cannot support a PV system
 - Limited space for ground-mounted
- Residents in manufactured homes communities usually do not own the land



How We Researched the Subject

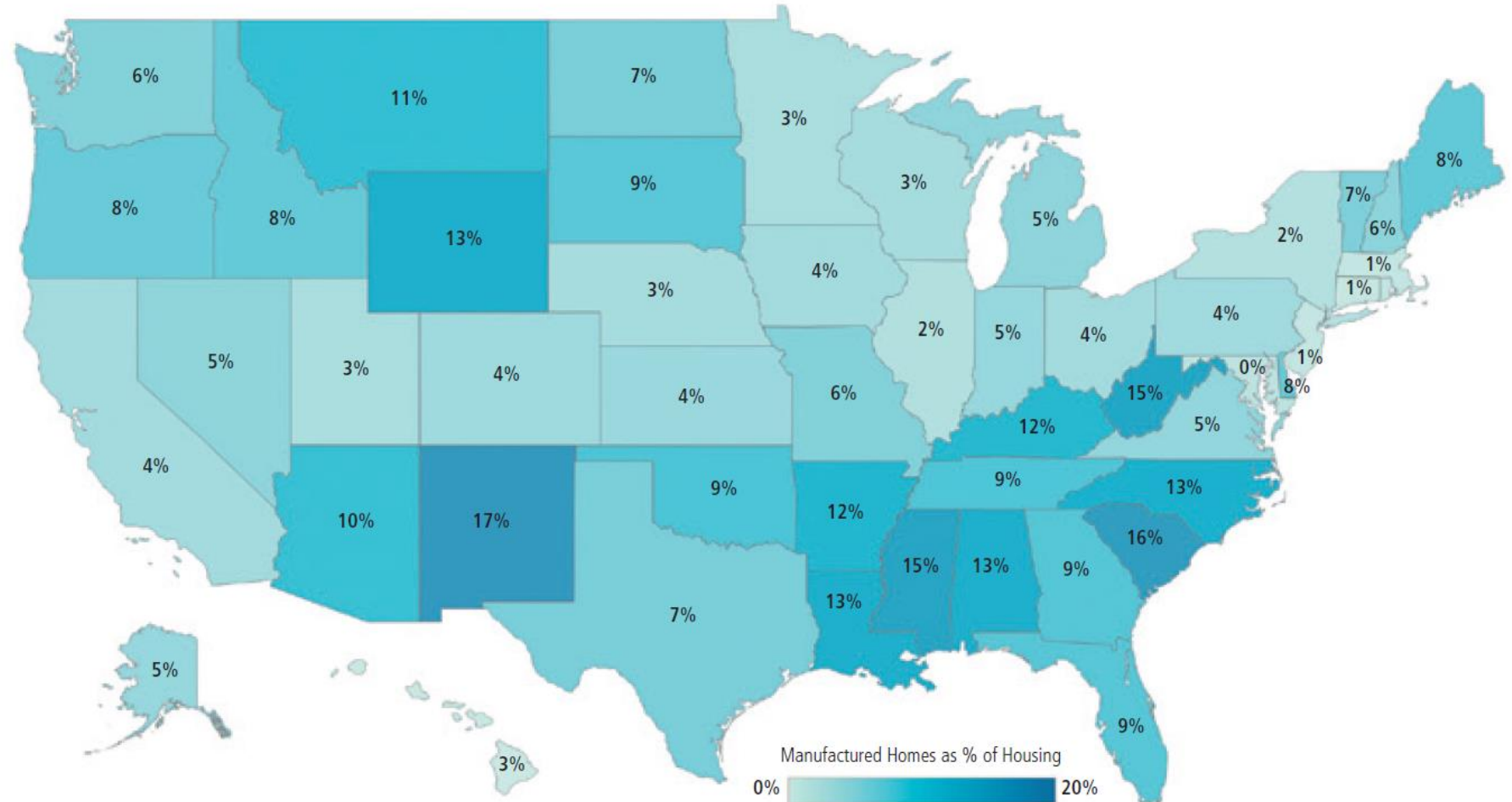
Focused on 14 states

- Selected from among 26 with significant manufactured homes sectors
 - Several criteria used
- Arizona, California, Florida, Georgia, Kentucky, Maine, Michigan, Missouri, New Mexico, North Carolina, Ohio, South Carolina, Texas, Virginia

- Desktop research
- US Census Bureau Data
 - American Community Survey and American Housing Survey
 - Rely on sampling (~2 million households in ACS)
- For manufactured home communities (i.e., mobile home parks), used Datacomp proprietary database
 - Largest provider of manufactured home value reports and appraisal reports
 - Data on the location, size, rental prices, housing costs, and other characteristics of dedicated communities of manufactured homes
 - 24,391 communities in 14 target states
 - Information collected over time, so not all current
- Linked Datacomp data to census household income data and to utility service territories
- Surveys and interviews of solar installers
- Survey responses from 170 manufactured home households
- A significant margin of error in statistics, but still a more complete picture than previously

Understanding Manufactured Homes

- Dramatic differences among states
 - Share of total housing stock: 1-17%



Community Differences

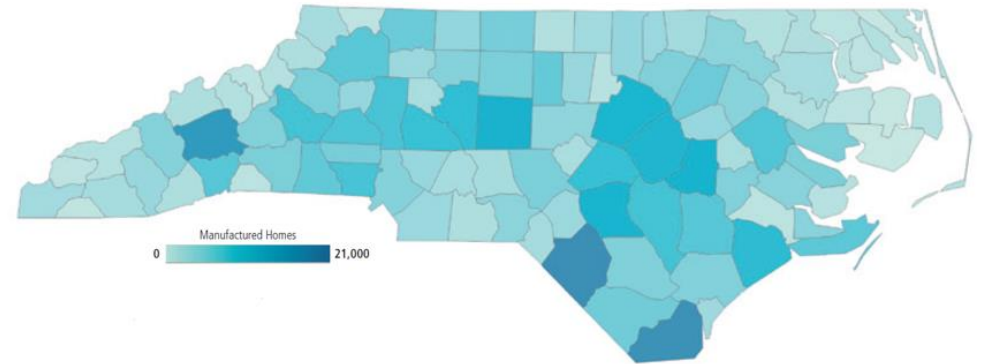
- Not all MH homes are in MH communities
 - Share in MH communities: 10% - 69% among 14 states
- Communities different in different states
 - 17% - 64% large (100+ homesites)
 - But most homesites in large communities
 - 2% - 36% age-restricted (55+)
 - Share of residents that are LMI
 - Resident-owned communities (ROCs) & other nonprofits: 0 - 202



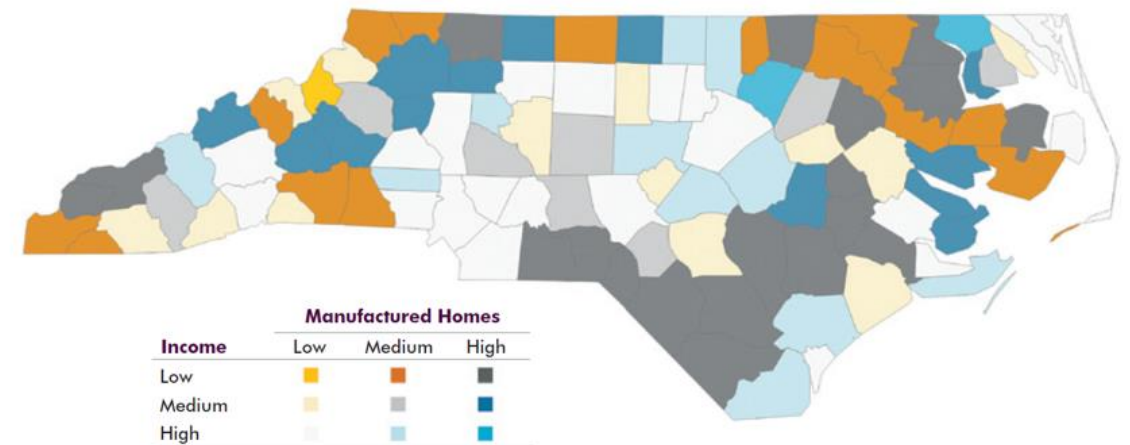
Check Out the Data in the Report

- Data for each state
 - # of MH communities and homesites in LMI census tracts
 - Communities and homesites by utility
 - # of MH communities by size
 - Income by community size
 - # of communities with age restrictions
 - Age-restricted communities in LMI census tracts
- Discussion of the solar market and policy landscape in each state
- Economics of a typical solar installation
- Recommendations for each state

Total Manufactured Homes



Manufactured Homes vs. Household Income



Technology Options

1. Rooftop installations
 - For existing homes
 - For new manufactured homes
2. Ground-mounted solar
3. Pole-mounted solar
4. Community solar (shared solar)
5. Zero-energy modular homes



Case Studies of Nine Promising Projects.



Strategies for Advancing Solar for Manufactured Homes

1. Assess the manufactured housing stock in the state or utility service territory
2. Start with modest targeted efforts
 - Produce a track record of success by focusing on the low-hanging fruit
3. Recognize that special funding or incentives will be necessary
 - Ensure financial benefits are flowing to the residents
4. Find the best venues for pursuing a “solarize” strategy (community-based education/marketing campaign with group discount pricing)
 - Can address residents’ limited familiarity with solar
 - Well matched to large manufactured home communities and informal subdivisions

More Strategies for Advancing Solar for Manufactured Homes

5. Target resident-owned communities (ROCs) and other nonprofit communities (e.g., community land trusts, housing agencies)
 - With ROCs, the land is owned by the residents
 - Easier to ensure savings flow to residents



6. Promote certain types of large community-scale solar arrays
 - For community facilities and common loads
 - Dedicated project for a MH community
 - Look to MH residents when seeking to fill state mandates
 - Ensure consumers are not being placed at financial risk
7. Support efforts to incorporate solar into new manufactured homes
 - Recognize the limitations (94,000 new manufactured homes annually)
8. Consider third-party ownership, on-bill payments, and other special financing options

To join solar for manufactured homes
learning network, send contact
information to:

wafamay@cleanegroup.org

Questions?

Warren Leon



Thank you for attending our webinar

Warren Leon

Executive Director, CESA

wleon@cleanegroup.org

Wafa May Elamin

Project Manager, CESA

wafamay@cleanegroup.org

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Upcoming Webinars

NREL Solar Permitting Tools: An Introduction to SolarAPP+ and TRACE Tool

Wednesday, May 19, 1-2pm ET

How Low- and Moderate-Income Solar Programs are Evaluated: Trends and Best Practices

Thursday, May 20, 1-2pm ET

Evaluating the Financial Performance of Connecticut's Low- and Moderate-Income Solar Lease Program

Wednesday, May 26, 1-2pm ET

Read more and register at: www.cesa.org/webinars