



# LMI Solar Context for WAP

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# The State of LMI Solar

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# Why Does Solar for LMI Matter?

- Low-to-moderate income (LMI) households represent 43% of the U.S. population and spend disproportionately more of their income on energy.
- Solar has been disproportionately adopted by high-income households.
- Increasing interest in policy interventions to include LMI households and create more equitable solar access.

Household Classification	% of Area Median Income
Very Low Income	0-30%
Low Income	30-50%
Moderate Income	50-80%
Middle Income	80-120%
High Income	>120%

# LMI Rooftop Solar Potential

- Annual residential solar potential is ~1,000 TWh (roughly 75% of residential electricity consumption).
- LMI solar opportunity is 415.9 TWh, nearly half (42%) of total annual residential solar potential.

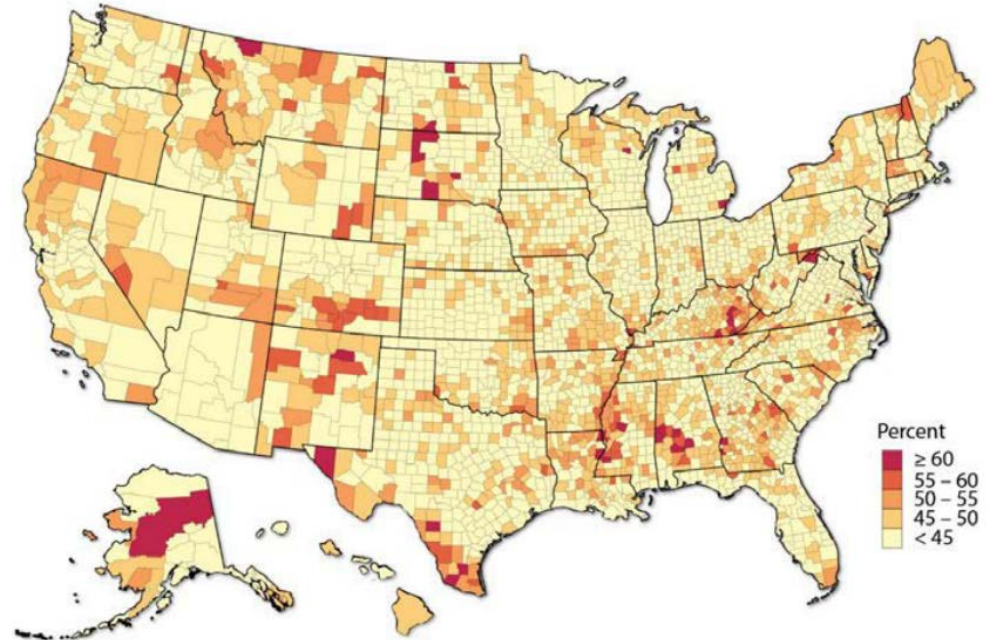
National residential PV rooftop technical potential by income group

Income Group	Households (millions)	Suitable Buildings (millions)	Suitable Module Area (millions of m <sup>2</sup> )	Capacity Potential (GWoc)	Annual Generation Potential (TWh/year)
Very Low (0-30% AMI)	19.5	9.4	794.4	127.1	160.8
Low (30-50% AMI)	11.5	5.7	472.8	75.6	95.3
Moderate (50-80% AMI)	18.8	10.4	792.0	126.7	159.8
Middle (80-120% AMI)	21.1	12.3	900.4	144.1	180.8
High (> 120% AMI)	46.0	29.4	2,003.3	320.5	403.1
<b>All LMI Buildings</b>	<b>49.8</b>	<b>25.5</b>	<b>2,059.2</b>	<b>329.4</b>	<b>415.9</b>
<b>All Residential Buildings</b>	<b>116.9</b>	<b>67.2</b>	<b>4,962.9</b>	<b>794.0</b>	<b>999.8</b>

Benjamin Sigrin; Meghan Mooney. 2018. "Rooftop Solar Technical Potential for Low-to-Moderate Income (LMI) Households." NREL/PR-6A20-71190. <https://www.nrel.gov/docs/fy18osti/71190.pdf>.

# LMI Solar Potential Relative to Total Potential, by County

- In 437 counties (14%), LMI solar potential accounts for at least half of the county's solar potential.
- Areas with relatively high LMI solar percentages include the Southeast (AL, AR, KY, LA, MS, and WV) and portions of the Midwest and Mountain West.



**County LMI rooftop technical potential as percent of total potential**

Benjamin Sigrin; Meghan Mooney. 2018. "Rooftop Solar Technical Potential for Low-to-Moderate Income (LMI) Households." NREL/PR-6A20-71190. <https://www.nrel.gov/docs/fy18osti/71190.pdf>.

# Most LMI Solar Potential is Not on Single-Family Owner-Occupied Roofs

- Deployment of rooftop solar has historically been concentrated on single-family owner-occupied buildings.
- NREL analysis indicates that nearly 60% of potential for LMI buildings exists on other types of building:
  - Single-family renter-occupied
  - Multifamily owner-occupied
  - Multifamily renter-occupied.
- Improving LMI solar access will likely require nontraditional rooftop solar models.

## Tenure-type combinations

SFOO	Single-family owner-occupied
SFRO	Single-family renter-occupied
MFOO	Multi-family owner-occupied
MFRO	Multi-family renter-occupied

# LMI Solar Planning Resources

- SolarForAll web application of Rooftop Energy Potential of Low-Income Communities in America (REPLICA) data set:
  - Census tract-level solar technical potential by income, tenure, and building type, joined with 10 additional data sets to provide socio-demographic and market context (e.g., energy burden, housing types, health indicators, etc.).
  - Explore, download, and intersect data in interactive web application <https://maps.nrel.gov/solar-for-all/>.



# Solar and WAP and LIHEAP

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# Solar in WAP

- The Energy Policy Act of 2005 allowed the use of Weatherization Assistance Program (WAP) funds for renewable energy technologies, such as solar photovoltaics.
  - Expenditures are capped at an average of \$3,000 per dwelling unit. (For FY21 the cap is \$3,815, based on annual incremental adjustments).
- Since solar is not included in Appendix A of 10 CFR 440, the approved measures list, Grantees must apply to DOE for approval.
- The major steps of the approval process are outlined in the next slides. Additional details are available in WAP Memorandum 024:  
<https://www.energy.gov/sites/default/files/2017/01/f34/WAPMEMO%20024%201.17.17.pdf>.

# Requesting Approval for Solar in WAP

1. Grantee requests approval from DOE to add solar to list of approved measures.
  - Grantee must demonstrate that a prototypical solar project in that jurisdiction meets or exceeds SIR of 1.0.
  - Leveraged funds may be used to improve the SIR for solar projects, as provided by WAP Memorandum 035, which allows “agencies to secure funding to apply to the cost of the measure, bringing down the cost of the measure to meet the SIR requirement.”

# Requesting Approval for Solar in WAP

2. Grantee proposes a pilot.
  - Typically, a small number of single-family homes or multifamily installations
  - Grantee must provide detailed technical, environmental, and financial analysis of project, including:
    - Energy Audits of proposed units (including SIR)
    - National Environmental Policy Act (NEPA) review.
3. Following pilot, Grantee may request full-scale DOE approval of inclusion of solar measures.

# Solar and LIHEAP

- LIHEAP Grantees can direct 15% of their annual LIHEAP allocations toward weatherization measures in their annual plan. LIHEAP Grantees must identify:
  - Weatherization measures to be include
  - Which agency will administer the weatherization work
  - Which regulations that agency will follow.

# Next Steps

- NREL is conducting analysis on how solar has been implemented via WAP and LIHEAP.
- Data collection regarding:
  - Implementation models
  - Installation metrics
  - Sources of funding
  - Housing characteristics.
- Stakeholder engagement to identify barriers, challenges, and opportunities for deploying solar within each program.

Please email [weatherization.support@nrel.gov](mailto:weatherization.support@nrel.gov) if you are interested in participating.

# Thank you!

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