



FLEXIBLE FINANCIAL CREDIT AGREEMENTS

Photo (left) from iStock 1222094389.

# NREL Low- and Moderate-Income Solar Flexible Financing Credit Agreement Rubric

**Low-income households spend a higher percentage of their gross household income on energy costs (electric, gas, water, etc.) than the average U.S. household. The national average energy burden for low-income households is over 8%—as much as four times higher than the average for higher-income households. On an individual or household basis, depending on location and income, energy burden can exceed 30% of household income.**

Over the last decade, distributed solar photovoltaic (PV) systems have been widely deployed, and associated system costs have declined rapidly, leading to lower-cost electricity in many homes and communities. Low- and moderate-income (LMI) households have been underrepresented in the growth of

the solar PV market. Households earning less than \$50,000 per year represent 37% of all U.S. households, yet solar PV adoption for these households was only 15% as of 2018. This adoption rate is not unusual for a new technology, as early adopters can often afford the higher initial cost, and the trend is toward LMI adoption growth. That said, progress is forecast to be slow, and initiatives vary widely.

The National Renewable Energy Laboratory (NREL), the New York State Energy Research and Development Authority (NYSERDA), and the Vermont Energy Investment Corporation (VEIC) have been working together on a U.S. Department of Energy project to empower LMI households to participate in the solar energy economy. We have engaged experts to generate ideas and implementation pathways for Flexible Financial Credit Agreements (FFCAs). An FFCA is an innovative financial or programmatic product that addresses underlying financial barriers for potential LMI solar customers, such as long-term contracting requirements, nontransferable solar subscriptions, credit score hurdles, seasonal income fluctuation,

product or vendor skepticism, and limited mechanisms for multiplying or leveraging benefits.

The NREL LMI Solar FFCA Rubric described in this document is designed to help evaluate innovative strategies for increasing the accessibility of solar and increasing adoption among LMI households. The rubric is modeled after a version developed to support plug-in electric vehicle policy adoption ([NASEO and Cadmus](#)).

The NREL LMI Solar FFCA Rubric is composed of four high-level metrics and fifteen sub-metrics. Descriptions of the individual metrics are provided to guide the evaluation, with specific criteria aligned with the weighted scoring system. Each FFCA concept assessment will include a description of the concept, identified barriers and strengths, and a completed FFCA rubric.

- **High-level metrics** represent broad categories of LMI solar market barriers.
- **Sub-metrics** are more specific characteristics of the high-level LMI solar market barriers.
- **Weighting:**
  - High-level metric weighting reflects the relative importance of each metric in achieving the overall objectives of increasing the accessibility and adoption

of solar in LMI households. The high-level weighting sums to 100.

- Sub-metric weighting reflects the relative importance of each sub-metric based on its perceived ability to achieve the high-level metric outcomes. The sub-level metric weighting sums to the individual high-level metric weighting.

- **Ratings** reflect how well or strongly a specific FFCA concept achieves the individual sub-metric objectives. The three levels of ratings are strong (100%), moderate (50%), and weak (10%); the percentages represent the perceived degree to which the FFCA concept meets the sub-metric criteria of the rubric.
- **Evaluation criteria** provide guidance to rubric users, helping them identify which rating to assign to a given FFCA concept.

A description of each metric (strong, moderate, or weak) and its weighting (reflecting its level of importance) are provided below. Although this rubric is intended to guide the initial phase of the NREL LMI FFCA project, it is understood and assumed that this rubric could be used to guide federal, state, and local community policies and actions to support LMI solar—and would likely reflect different scoring based on the respective contexts and local conditions.

## NREL FFCA Evaluation Rubric

Weight	FFCA Metric	100% Strong	50% Moderate	10% Weak
<b>25</b>	<b>Locational Flexibility</b>			
10	Portable	Enables retention of access to solar PV, similar to mobile phone subscriptions or insurance policies, regardless of where an LMI household lives or how frequently they may move.	Subscription is tied to location (e.g., utility billing); retention is limited but possible, and requires additional steps from the subscriber.	Limited transfer capability.
10	Universal (jurisdictions)	Appropriate for adoption in all jurisdictions, or federal policy enables adoption.	Appropriate for adoption in some jurisdictions, or state policy enables adoption.	Appropriate for adoption in few jurisdictions, or local policy enables adoption.
5	Applicable	Adoption does not depend on specific building types and/or land conditions.	Adoption may be specific to certain building types and/or land conditions.	Adoption is limited to specific building types and/or land conditions (e.g., multifamily affordable housing).

Weight	FFCA Metric	100% Strong	50% Moderate	10% Weak
<b>25</b>	<b>Financial Flexibility/Stability</b>			
10	Transferable	Provides the ability to easily transfer ownership of the tangible system or the intangible asset (electricity production, benefits) to a new owner. Asset ownership is not contingent upon property ownership.	Provides the ability to transfer ownership of the tangible system or the intangible asset to a new owner, but process may be cumbersome OR asset ownership is difficult to separate from property ownership.	Does not provide the ability to transfer ownership of the tangible system of the intangible asset to a new owner OR asset ownership is contingent upon property ownership.
5	Investable	Provides the ability for an LMI household to invest directly or indirectly in a system and achieve a return on the investment through bill credits, dividends, tax credits, or other means.	Limited ability for an LMI household to achieve a return on investment of a system due to third-party ownership and limited benefits through bill credits.	Limited indirect benefits from system through separate ownership (e.g., landlord, property owner) and reduced electric costs.
5	Accessible (communities)	Provides access to solar PV to variety of LMI populations (urban/rural, homeowner/renter, low/moderate income, etc.).	Provides access to solar PV to some LMI populations.	Provides access to solar PV to limited LMI populations.
5	Secure/Transparent	Use of technology provides significant security and transparency for both the system and users. There is inherent trustworthiness and accountability in the system design.	Use of technology provides security for transactions, but limited transparency for users.	Use of technology has limited security or transparency benefits.
<b>25</b>	<b>Attractiveness</b>			
10	Equitable/Desirable	Possesses sufficient consumer protections and straightforward program design to be appealing to LMI households.	Possesses sufficient consumer protections but cumbersome program design OR possesses straightforward program design but lacks sufficient consumer protections.	Does not possess sufficient consumer protections or straightforward program design.
5	Strengthens Community	Engages community and achieves local needs/goals (e.g., solar asset located in community, solar asset developed by community organization, program design focused on community enrollment, asset scoped to meet local needs/goals).	Some attempt at engaging community or addressing local needs/goals.	Does not engage community and does not address local needs or goals.
5	Leverages Partners	Leverages and aligns with organizations relevant to and trusted by LMI households.	Leverages and aligns with organizations that are familiar to LMI households but may not be effective messengers.	Does not build appropriate partnerships with organizations relevant to or trusted by LMI households.
5	Mitigates Risk	Eliminates risk of financial investment for LMI households and financial partners.	Reduces risk of financial investment for LMI households and financial partners.	Does not reduce risk of financial investment for LMI households and financial partners.

Weight	FFCA Metric	100% Strong	50% Moderate	10% Weak
<b>25</b>	<b>Impact</b>			
10	Provides Financial Benefits to LMI	Value of benefits is primarily distributed to LMI communities.	Value of benefits is distributed relatively equally to LMI communities and non-LMI entities.	Values of benefits is primarily distributed to non-LMI entities.
5	Provides Non-Energy Benefits	Provides substantial non-energy benefits, such as local job creation, improved local health/air quality, household/community resilience, and property value.	Provides moderate non-energy benefits, such as local job creation, improved local health/air quality, household/community resilience, and property value.	Provides limited non-energy benefits, such as local job creation, improved local health/air quality, household/community resilience, and property value.
5	Impacts Grid Flexibility/Stability	Enables energy storage and provides associated benefits, including grid service valuation and household/community resilience.	Enables energy storage or provides associated benefits, including grid service valuation and household/community resilience.	Does not enable energy storage or provide associated benefits, including grid service valuation and household/community resilience.
5	Scalable	Low level of policy or regulatory change required to scale from pilot to broader adoption.	Moderate level of policy or regulatory change required to scale from pilot to broader adoption.	High level of policy or regulatory change required to scale from pilot to broader adoption.

Through this project, we have identified several FFCA models that may increase the adoption of LMI solar, which are summarized below. Five of these (asterisked) are summarized in accompanying briefs and evaluated using the above rubric. The FFCA concepts generally fall into two categories: (1) models that channel new sources of capital or financial leverage toward LMI solar, and (2) models that repurpose or create new financial arrangements that deliver solar benefits to LMI households or entities providing solar to LMI households.

Models that channel new sources of capital or financial leverage toward LMI solar include:

- 1. Tariff On-Bill Financing\***—In this type of program, the utility or third-party capital provider pays for the energy efficiency or renewable energy asset, and the subscriber pays for assets through their existing utility bill over time. Charges are tied to the meter, not the individual. The size of the regular payments is typically scaled so that the customer sees immediate bill savings.
- 2. Solar Revenues To Retire Arrears\***—Utility customers who are unable to pay their bills on time may have the unpaid bills (arrears) sent to an external debt collection entity. The debt collection process adds expenses to utility operations, may not result in full payment of

unpaid bills, and creates hassle and potential credit issues for the customers. Utilities could develop solar assets and dedicate all or some of the solar revenue to retiring customer arrears, thereby assisting predominantly low-income customers.

- 3. Expand Use of Energy Assistance Funds To Develop Solar Assets for LMI Communities**—Various federal, state, and utility energy assistance programs have the capability to use funds to develop solar assets for LMI households. Further development of this approach could provide an ongoing source of revenue for assistance programs or households, rather than using annual public or ratepayer funding to cover household utility bills.
- 4. Voluntary Green Power Purchases To Fund LMI Solar**—In this type of program, voluntary green power purchases are undertaken by individuals, corporations, and/or utilities for purposes other than meeting state renewable portfolio standards. Solar asset developers or owners, in coordination with renewable energy credit (REC) tracking entities, could create a class of RECs generated by solar assets that provide specific and verifiable benefits to LMI communities, such as project location in LMI communities, LMI community ownership, or workforce development.

**5. Corporate Benefit Investments**—This type of model involves financing driven by corporate commitments to environmental or social outcomes. Investments to implement corporate social responsibility commitments could be directed toward LMI solar programs.

Models that repurpose or create new financial arrangements that deliver solar benefits to LMI households or entities providing solar to LMI households include:

- 6. Employer-Sponsored Solar Benefits\***—Corporations may provide employee benefits that include health and life insurance, paid vacations and sick leave, childcare, and gym memberships. A solar PV benefit from an employer could be directly provided to employees for installing their own systems, or indirectly provided to employees through a larger corporate subscription to solar energy.
- 7. Portable Community Solar Subscriptions/Community Solar Micro-Subscriptions**—Although some community solar subscriptions have limited portability within a utility service territory, fully portable subscriptions could allow individuals to carry them across utility territories or potentially even across states.
- 8. Rent To Own**—Small-scale solar PV may be adaptable to the model currently used to finance appliances and furniture for LMI households. A basic structure exists in the current third-party-owned markets for solar via power purchase agreement or equipment lease agreement structures.
- 9. Section 8-Style Solar Voucher**—The Section 8 housing choice voucher program implemented by the United States Department of Housing and Urban Development is designed to allow families to move residences without

the loss of housing assistance. A housing subsidy is paid to the landlord directly on behalf of the participating family. A similar program could provide a solar voucher subsidy that is paid to a solar asset owner to reduce the cost of participating in community solar for low-income customers. Funds for the subsidy could come from a variety of public or private sources. A key element distinguishing this model from other low-income solar subscription subsidies would be portability within or across jurisdictions.

- 10. Low-Interest Secured Flex Loans\***—This loan product offers a no- or low-cost capital source to bridge the gap between the initial installation cost and the ultimate receipt of tax credits and energy savings. This program also provides low interest rates, for affordability, as well as a pre-funded debt service reserve account, and is secured by the solar PV asset.
- 11. Blockchain\***—This emerging technology application may have applicability for LMI households. A key component of blockchain technology is the ability to reduce or remove middle-man involvement and related service charges. Projects that involve blockchain may allow for peer-to-peer lending or revenue sharing outside of standard utility or financing channels.
- 12. Digitalization**—Digitalization refers to the shift in the delivery of traditional financial services and instruments to electronic devices, including computers and smartphones. Digitalization can increase access for LMI households that historically have been underserved due to either an absence of banking institutions located in their communities or being underbanked, whether because of lower credit worthiness or limited financial capital.

