CRN
Cooperative Research Network

TechSurveillance

The Changing Cost of Solar Power
Financing Options for Electric Cooperatives

OCTOBER 2013

Photo voltaic (PV) solar power is becoming increasingly competitive compared to traditional power generation in some markets. Because of this, more cooperatives—and a collaborative project by the CFC, Federated, and NRCO (see back page)—are investigating the costs of building their own solar installations and the different ways to finance solar projects. This article explores options for electric cooperatives to leverage their unique financial advantages to finance PV solar projects, and discusses approaches for electricity rates.

An ideal financial structure for PV solar projects utilizes a cooperative's financial strengths as well as its skilled employees.

FINANCING A PV SOLAR PROJECT

There are multiple financial structures electric cooperatives could use for a PV solar project. Any structure should aim to maximize federal and state tax incentives to be tax efficient. Solar projects enjoy two important incentives: the Investment Tax Credit (ITC), which is a tax credit of 30 percent of the cost to build the solar facility, and MACRS accelerated depreciation, which reduces income taxes. Due to the non-profit status of electric cooperatives, tax efficient investing is normally not a priority or even a consideration. Further, the solar ITC is not available to non-taxpayers, so a new financial structure must be created to allow electric cooperatives to take advantage of these tax incentives. In addition to tax efficiency, the ideal financial structure should try to utilize a cooperative's financial strengths (access to low cost debt capital and a strong balance sheet), and utilize a cooperative's skilled employees for construction, operation and maintenance.

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There are three basic financial structures that electric cooperatives could use to build solar facilities in their service territories: the third party developer, the cooperative for-profit subsidiary, and the tax equity flip.

THIRD PARTY DEVELOPER

The first is to allow a third party solar developer to build, operate and maintain solar facilities that would interconnect with a cooperative's distribution lines. Developers generally prefer to interconnect with cooperatives because it is typically easier and cheaper than connecting with an IOU. The developer would have a Power Purchase Agreement (PPA) with the cooperative that would require the co-op to purchase all the power generated by the solar facility at an agreed price for an agreed time period. The solar developer would take all financial risks and enjoy all tax benefits and profits.

This structure would increase the renewable portion of a cooperative's generation mix, but it would not leverage a cooperative's financial strengths or skilled workforce. This structure also involves a PPA, a power supply contract with a third party. Electric cooperatives may prefer the control afforded with owning the project rather than contracting the project's power output.

A simplified case study:

- Solar facility size: 5 megawatts
- Electricity production: 7,000,000 kWh in first year, which would be an average output for a project in North Carolina (declining 0.7 percent per year thereafter)
- Cost to build: ~$10,000,000, or $2.00 per watt (reasonable today and should continue to decline)
- Assume reasonable operating costs including lease of the land with 2.0 percent annual escalators
- Capital structure: 20 percent Equity from developer, 30 percent "Equity" from ITC tax credit, and 50 percent Debt from a commercial bank (15 years at 6 percent)
- Wholesale electricity price charged to co-op membership: ~$0.11/kWh in first year, with 2.5 percent escalator
- 20-year Internal Rate of Return (IRR) of ~11 percent to the developer

The 3rd party developer financial structure is summarized in **Figure 1** and **Table 1**.

Pros and Cons

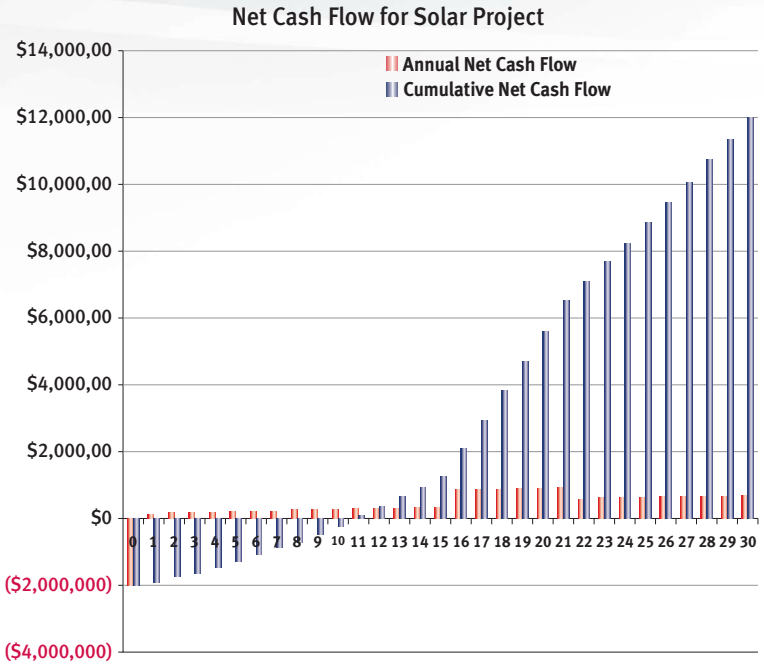
Pros:

- Cooperative has no cash commitment, making project low risk/low return for co-op.
- Would increase the renewable portion of a cooperative's generation mix.

Cons:

- Would not leverage a cooperative's financial strengths or skilled workforce.
- Involves a long-term PPA, a power supply contract with a third party.
- The developer would have most of the control that comes with ownership.

Cash Flow In		
Equity from Developer	"Equity" from ITC tax credit	Debt from Bank
20% of cost	30% of cost	50% of cost
Cash Flow Out		
Project Revenues		
100% to Developer		
Equity		
Project Ownership		
100% to Developer		
Electricity Price:	PPA as agreed between Co-op and Developer	
Labor to Build Project:	Provided by Developer	
Labor for Operations:	Provided by Developer	



Source: Helian Energy Simple Solar Investment Model

FIGURE 1: Cash Flows for Solar Projects Financed by 3rd Party Developer

TABLE 1: Participants of Solar Projects Financed by 3rd Party Developer

Financial Components	Direction of Cash Flows	Major Participants
Debt	Developer borrows money and guarantees payments	Commercial banks or pension funds
Equity	Flows from Developer	Developer or Tax Equity Investors
ITC and Accelerated Depreciation	Flows to Developer	U.S. Treasury
Margin (or Profit)	Flows to Developer	3rd Party Developer

Visit Cooperative.com for the Helian Energy Simple Solar Investment Model

The Helian Energy Simple Solar Investment Model, which was used to generate the numbers in the simple case study, is available with this article at **Cooperative.com**. The spreadsheet can be adjusted to reflect some of the financial, physical and organizational factors specific to the prospective solar investment at your organization.

A third party solar developer may be appropriate for an electric cooperative that wants to build solar generation but doesn't want to take development or financial risk.

Action Plan for Electric Cooperatives

Using a third party solar developer may be appropriate for an electric cooperative that wants to build solar generation but doesn't want to take development or financial risk. Such a co-op should contact local solar project developers to begin planning new solar projects together. Solar developers can be found most easily by contacting solar "engineering, procurement and construction" (EPC) companies located in their state, who can make introductions to reputable solar developers. All states have renewable energy and energy efficiency programs, and most states list local EPC companies on their websites.

A useful first place to look is the comprehensive database for state programs, the Database of State Incentives for Renewables & Efficiency (DSIRE), created by North Carolina State University: **www.dsireusa.org**.

COOPERATIVE FOR-PROFIT SUBSIDIARY

Cooperatives using a for-profit subsidiary for their PV project achieve maximum tax incentives, use of employee pool, and flexibility in pricing.

Many electric cooperatives have for-profit subsidiaries, and the second financial structure would use one of those subsidiaries to build the solar facility. In this scenario, the co-op subsidiary would develop, build, operate, and maintain the solar facility. All financial risks, tax benefits and profits would belong to the for-profit subsidiary. The non-profit co-op would have a PPA with the subsidiary.

This structure is the highest risk, highest reward for cooperatives. It would maximize tax incentives and utilize a cooperative's balance sheet and employee pool. Also, full ownership of the project would allow the cooperative much greater flexibility in setting prices and managing operations.

A simplified case study:

- Solar facility size: 5 megawatts
- Electricity production: 7,000,000 kWh in first year, which would be an average output for a project in North Carolina (declining 0.7 percent per year thereafter)
- Cost to build: ~$10,000,000, or $2.00 per watt (reasonable today and should continue to decline)
- Assume reasonable operating costs including lease of the land with 2.0 percent annual escalators
- Capital structure: 5 percent Equity from co-op subsidiary, 30 percent "Equity" from ITC tax credit, and 65 percent low-cost Debt from Cooperative Finance Corporation (CFC), CoBank or Rural Utilities Service (RUS) (30 years at 3 percent)
- Wholesale electricity price charged to co-op membership: ~$0.07/kWh in first year, with 2.5 percent escalator
- 20-year IRR of ~12 percent to co-op's for-profit subsidiary

In this example, the co-op's for-profit subsidiary would enjoy an attractive IRR of ~12 percent on its equity investment with a wholesale power price to the co-op membership of only 7¢/kWh. This is obviously adjustable where one could increase the subsidiary IRR, if one increased the power price, but the power price must be at least 7¢/kWh, in order to maintain reasonable debt payment coverage ratios. Of course, as the cost of installing solar generation declines, the power price could also decline.

The cooperative for-profit subsidiary financial structure is summarized in **Figure 2** and **Table 2**.

Cash Flow In		
Equity from Co-op's For-Profit Subsidiary	"Equity" from ITC tax credit	Debt from CFC, CoBank or RUS
5% of cost	30% of cost	65% of cost
Cash Flow Out		
Project Revenues		
100% to Co-op's For-Profit Subsidiary		
Equity		
Project Ownership		
100% to Co-op's For-Profit Subsidiary		
Electricity Price: PPA as agreed between Co-op and Co-op's For-Profit Subsidiary		
Labor to Build Project: Provided by Co-op or Co-op's For-Profit Subsidiary		
Labor for Operations: Provided by Co-op or Co-op's For-Profit Subsidiary		

Source: Helian Energy Simple Solar Investment Model

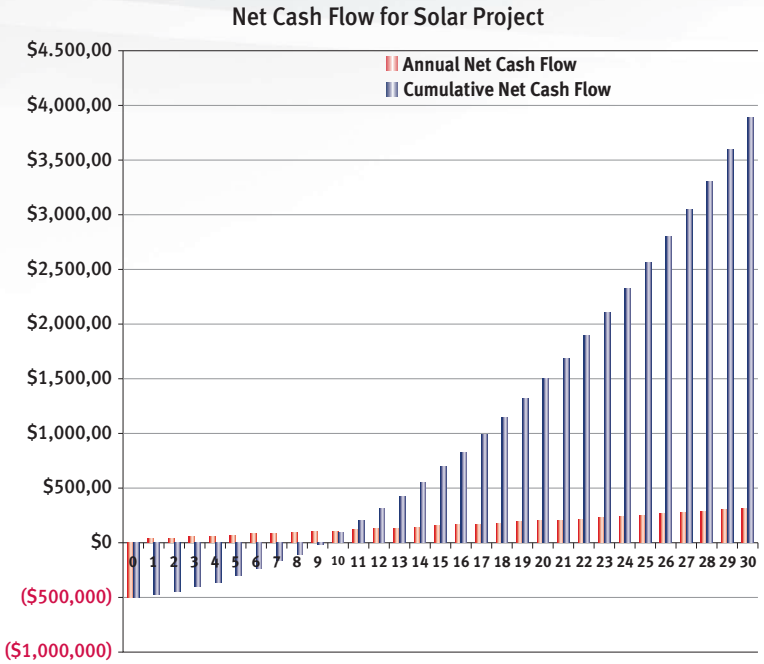


FIGURE 2: Cash Flows for Solar Projects Financed by a Co-op's For-Profit Subsidiary

TABLE 2: Participants of Solar Projects Financed by a Co-op's For-Profit Subsidiary

Financial Components	Direction of Cash Flows	Major Participants
Debt	For-Profit Subsidiary borrows money; Co-op guarantees payments	CFC, CoBank, or RUS
Equity	Flows from Co-op's For-Profit Subsidiary	Co-op's For-Profit Subsidiary
ITC and Accelerated Depreciation	Flows to Co-op's For-Profit Subsidiary	U.S. Treasury
Margin (or Profit)	Flows to Co-op's For-Profit Subsidiary	Co-op's For-Profit Subsidiary

Pros and Cons

Pros:

- Because cooperatives would be responsible for all aspects of the project, this structure is the highest risk, highest reward for cooperatives.
- All financial tax benefits and profits would belong to the co-op's for-profit subsidiary.
- Would leverage a cooperative's financial strengths of a strong balance sheet and ability to borrow for a long-term at a low interest rate.
- Would leverage a cooperative's skilled workforce for construction, operations and maintenance.
- Would allow the cooperative flexibility in setting prices and managing operations.
- Lower electricity price to membership than the 3rd party structure.
- Would increase the renewable portion of a cooperative's generation mix.

Cons:

- Because cooperatives would be responsible for all aspects of the project, this structure is the highest risk, highest reward for cooperatives.
- Some cooperatives may not have the project development experience required to "go it alone."

Action Plan for Electric Cooperatives

A good energy, procurement and construction (EPC) company can provide PV services turn-key or in collaboration with a co-op.

Clearly, not all electric cooperatives have for-profit subsidiaries with large income tax exposure. However, there are many electric cooperatives that do have income tax exposure through their subsidiaries, and they could benefit from this financial structure. An electric cooperative that has tax exposure and wants to take development risk in the hope of enjoying the benefits of ownership would be attracted to one of two financial structures: financing the solar project by a co-op's for-profit subsidiary discussed in this section, or the tax equity flip discussed in the next section.

The first step for those co-ops is to contact local solar EPC companies who can help design and build solar projects. EPC companies are often listed on the websites for state government renewable energy and energy efficiency programs. A good EPC can take a solar project from beginning to end on a turn-key basis, or collaborate with the cooperative to design and build the project together, depending on a co-op's skill set.

The first step to find financing is to contact lenders at CFC, CoBank or RUS. Most co-ops already have good working relationships with these organizations, and solar project lending is becoming routine for them.

TAX EQUITY FLIP

A tax equity flip engages an outside investor for the initial years of the project for tax benefits, and then full ownership is assumed by the cooperative.

The third financial structure is the tax equity flip, which is commonly used for renewable energy projects as a way of attracting equity investment and maximizing the value of the ITC and accelerated depreciation. Electric cooperatives don't normally seek equity capital from outside sources, but it may be necessary due to the way solar incentives are built into the tax code.

In this scenario, the co-op and an outside investor (the tax equity investor) would create a taxable special purpose entity (SPE) to develop, build, operate and maintain the solar facility. For example, the equity ownership could initially be 95 percent for the tax equity investor and 5 percent for the cooperative (or for-profit subsidiary). For the first six years, the tax benefits and profits would flow according to this 95 percent/5 percent split. After six years, when the tax benefits have been exhausted, the structure would "flip" to 95 percent for the co-op and 5 percent for the tax equity investor. The tax equity investor would then sell his residual 5 percent share to the co-op and exit completely.

The cooperative would have a PPA with the special purpose entity, and the power price would be set to provide adequate coverage for project debt.

This structure is lower risk for the cooperatives partially due to the co-op's minimal upfront investment. Using the same assumptions as above, the cooperative would enjoy similar returns and would charge a similar rate to the membership. This structure provides the co-op with 100 percent ownership of the solar facility after six years, and it would maximize tax incentives, and utilize a cooperative's balance sheet and skilled employee pool.

Finding tax equity investors can be a significant challenge for solar project developers, partially because these investors are very demanding about a project's expected revenues. Investors prefer revenues that are guaranteed or contracted. An electric cooperative could borrow most of the project's cost from CFC, CoBank or RUS for long-term at a very low rate, and the cooperative could guarantee interest payments to the lender. The co-op's guarantee of interest payments plus the co-op's PPA would be viewed as very attractive to potential tax equity investors.

The tax equity flip could be a powerful structure for electric cooperatives as they create financing for their solar projects.

A simplified case study:

- Solar facility size: 5 megawatts
- Electricity production: 7,000,000 kWh in first year, which would be an average output for a project in North Carolina (declining 0.7 percent per year thereafter)
- Cost to build: ~$10,000,000, or $2.00 per watt (reasonable today and should continue to decline)
- Assume reasonable operating costs including lease of the land with 2.0 percent annual escalators
- Create Special Purpose Entity (SPE) to develop, build, operate and maintain the solar facility. For example, the equity ownership of the SPE could initially be 95 percent for the tax equity investor and 5 percent for the cooperative (or for-profit subsidiary).
- For the first six years, the tax benefits and profits would flow according to this 95 percent/5 percent split.
- After six years, when the tax benefits have been exhausted, the structure would "flip" to 95 percent for the co-op and 5 percent for the tax equity investor. The tax equity investor would then sell his residual 5 percent share to the co-op and exit completely.
- Capital structure: 5 percent Equity from Special Purpose Entity, 30 percent "Equity" from ITC tax credit, and 65 percent low cost Debt from CFC, CoBank or RUS (30 years at 3 percent)
- Wholesale electricity price charged to co-op membership: ~$0.07/kWh in first year, with 2.5 percent escalator
- 20-year IRR of ~12 percent

The tax equity flip financial structure is summarized in **Figure 3** and **Table 3**.

Pros and Cons

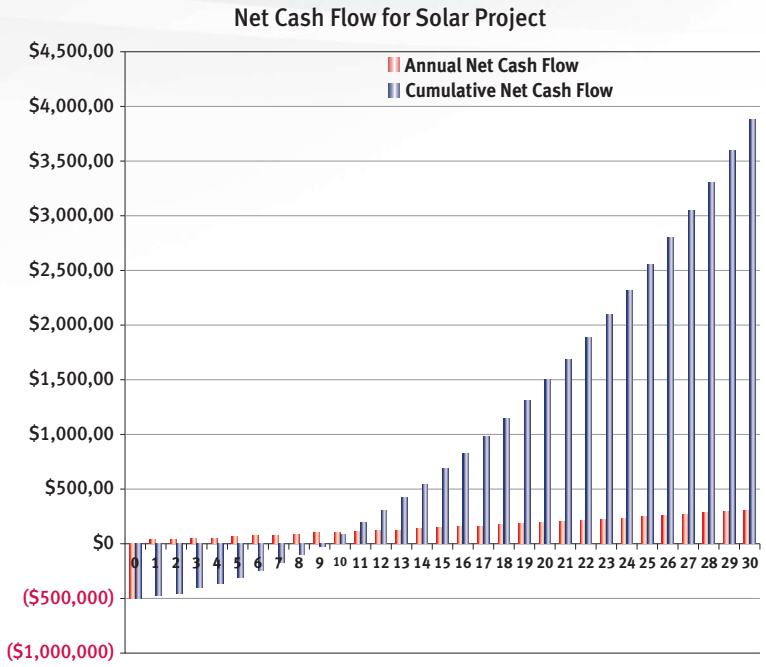
Pros:

- This structure is lower risk than the for-profit subsidiary structure, but higher risk than the 3rd party developer structure.
- Would enjoy similar returns as the for-profit subsidiary structure.
- Would charge a similar electricity rate to the membership, which would be lower than the 3rd party structure.
- Provides the co-op with 100 percent ownership of the solar facility after six years.
- Would leverage a cooperative's financial strengths of a strong balance sheet and ability to borrow for a long term at a low interest rate.
- Would leverage a cooperative's skilled workforce for construction, operations and maintenance.
- Would increase the renewable portion of a cooperative's generation mix.

Cons:

- This structure is lower risk than the for-profit subsidiary structure, but higher risk than the 3rd party developer structure.
- The tax equity flip structure can be complicated.
- Cooperative may not have the project development experience required.

Cash Flow In		
Equity from Special Purpose Entity	"Equity" from ITC tax credit	Debt
5% of cost	30% of cost	65% of cost
Pre-Flip Cash Flow Out	**Pre-Flip Equity**	
Project Revenues	**Project Ownership**	
95% to Tax Equity Investor 5% to Co-op	95% to Tax Equity Investor 5% to Co-op	
Post-Flip Cash Flow Out	**Post-Flip Equity**	
Project Revenues	**Project Ownership**	
5% to Tax Equity Investor 95% to Co-op	5% to Tax Equity Investor 95% to Co-op	
Terminal Cash Flow Out	**Terminal Equity**	
Project Revenues	**Project Ownership**	
100% to Co-op	100% to Co-op	
Electricity Price: PPA as agreed between Co-op and SPE		
Labor to Build Project: Provided by Co-op		
Labor for Operations: Provided by Co-op		



Source: Helian Energy Simple Solar Investment Model

FIGURE 3: Cash Flows for Solar Projects Financed by Special Purpose Entity (Tax Equity Flip)

TABLE 3: Participants of Solar Projects Financed with Special Purpose Entity (Tax Equity Flip)

Financial Components	Direction of Cash Flows	Major Participants
Debt	New SPE borrows money and Co-op guarantees payments	CFC, CoBank, or RUS
Equity	Flows from Tax Equity Investor	Tax Equity Investors
ITC and Accelerated Depreciation	Flows to new SPE	U.S. Treasury
Margin (or Profit)	Flows to new SPE	SPE between Tax Equity Investor and Co-op

Action Plan for Electric Cooperatives

The action plan for cooperatives wanting to build solar projects and finance them with a tax equity flip is similar to using the for-profit subsidiary structure. Both structures require that the cooperative develop relationships with EPCs and lenders. The difference becomes evident after the project has reached the late stage of development when one must secure the equity capital from tax equity investors.

There are multiple sources of tax equity capital: large commercial banks, private equity firms, and large corporations to name a few. A good first step is for an electric cooperative to talk to its outside counsel and local commercial bank.

The tax equity flip is a complicated legal process, so the co-ops using this structure should proceed slowly in order to fully understand exactly how it works. There are lawyers who specialize in creating these structures and

the required special purpose entities. Electric cooperatives serious about using this structure should consult them.

CONCLUSION

When a cooperative considers a new PV solar project, three basic financial structures could be used depending on the cooperative's situation and objectives. Table 4 provides a summary of the options to consider, as discussed within this article.

Beyond the installed cost, there are several additional considerations which could affect a cooperative's decision, including:

- Many cooperatives have exclusive all-requirements agreements with their G&Ts, which may prohibit a distribution co-op owning a solar project.
- There are engineering issues that are beyond the scope of this article, such as dealing with intermittent distributed generation.
- Co-ops may want to install solar, not due to a cost-competitive argument, but rather because it may be a proactive defense against a solar developer taking advantage of net metering statutes transferring fixed costs to members who don't have solar.
- Solar is a fixed cost over 30-40 years, partially mitigating long-term uncertainty related to fuel cost and regulations inherent with fossil fuel and nuclear generation.
- Solar projects are eligible for generous tax credits, and there are ways for electric cooperatives to take advantage of these credits.
- The cost curve of solar projects is expected to continue to decline, but the solar tax credits expire at the end of 2016, creating some urgency to build solar now.
- The U.S. military expects to build 3 GW in renewable generation, making it imperative that electric cooperatives develop an expertise on the installation, operations, and maintenance of renewable projects (see sidebar for related information).
- Solar projects would diversify the generation mix.
- Electric cooperatives can approach solar projects as potential opportunities to be taken in small steps. ■

TABLE 4: Summary of Solar Financing Options

Project Type	Cash Flow In	Cash Flow Out—Project Revenues	Equity-Project Ownership
Developer	Equity from Developer: 20% of cost	100% to Developer	100% to Developer
	Equity from ITC tax credit: 30% of cost		
	Debt from bank: 50% of cost		
For-Profit Subsidiary	Equity from For-Profit Subsidiary: 5% of cost	100% to Co-op's For-Profit Subsidiary	100% to Co-op's For-Profit Subsidiary
	Equity from ITC tax credit: 30% of cost		
	Debt from CFC CoBank or RUS: 65% of cost		
Special Purpose Entity	Equity from SPE: 5% of cost	Pre-flip: 95% to Tax Equity Investor, 5% to Co-op. Post-flip: 5% to Tax Equity Investor, 95% to Co-op. Terminal: 100% to Co-op.	Pre-flip: 95% to Tax Equity Investor, 5% to Co-op. Post-flip: 5% to Tax Equity Investor, 95% to Co-op. Terminal: 100% to Co-op.
	Equity from ITC tax credit: 30% of cost		
	Debt from CFC CoBank or RUS: 65% of cost		

U.S. DEPARTMENT OF DEFENSE SOLAR INITIATIVE

Legislation now mandates that 25% of Department of Defense's (DoD's) energy use is to come from renewable sources by 2025. While DoD wants to improve energy independence for its own operations and more broadly for the nation, it does not want to own or operate energy services. The U.S. Army's Energy Innovation Task Force (EITF), a lead agency in these efforts, has made it clear that they want the local utilities involved to provide as much as 3 GW of renewable energy to DOD facilities nation-wide.

NRECA is working to stay informed of opportunities for cooperatives offered by DoD for solar initiatives. If you wish to be included in notifications about upcoming events, webinars, and possible NRECA sponsored meetings for federally funded renewable projects, please contact NRECA at: **DODRenewables@nreca.coop**.

PILOT PROGRAM AIMS TO MAKE PV MORE ECONOMICAL

The National Rural Utilities Cooperative Finance Corporation (CFC) announced a pilot program with Federated Rural Electric Insurance Exchange (Federated) and the National Renewables Cooperative Organization (NRCO) that seeks to make solar photovoltaic generation more economical for electric cooperatives and their members.

Through the initiative, NRCO will oversee program management and supporting marketing and legal documents. CFC will provide debt capital as needed for solar projects. Federated has committed up to $6 million as tax equity investment for initial solar projects.

The program was developed in the context of decreasing technology costs combined with tax incentives, which have contributed to the popularity and affordability of solar power among consumers. Taxable third-party solar vendors are able to harness the benefits of investment tax credits and accelerated depreciation to deploy solar projects—incentives that nonprofit electric cooperatives cannot traditionally access.

Electric cooperatives interested in pursuing solar power options may find out more information from CFC, Federated and NRCO:

CFC:
Krishna Murthy | Krishna.Murthy@nrucfc.coop | Office: 703-467-2743 | Cell: 703-623-9803

Federated: 1-800-356-8360
- Bill West | WCW@federatedrural.com
- Susan Olander | SMO@federatedrural.com

NRCO:
- Todd Bartling | todd.bartling@nrco.coop | 317-344-790

Disclaimer:

Any information relating to the tax status of financial instruments and other entities discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Electric cooperatives and project developers are urged to seek tax advice based on their particular circumstances from an independent tax professional before entering any transaction.

Questions or Comments

CRN Contact: Andrew Cotter, CRN Program Manager, **andrew.cotter@nreca.coop**

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