

# Show them the numbers:

## Using SAM to demonstrate the value of solar PV

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# Outline

- About NC CETC and SolarOps
- Three examples of using SAM:
  - Delaware Residential Customer Guide
  - ECIA Financial Analysis
- Key takeaways and questions

# NC Clean Energy Technology Center

*Formerly the NC Solar Center*

- Housed within NC State University.
- Programs in industrial efficiency, clean transportation, renewable energy technology, training, and policy.
- The team that brings you DSIRE (The Database of State Incentives for Renewables and Efficiency – [www.dsireusa.org](http://www.dsireusa.org))



# About the SunShot Solar Outreach Partnership



Leaders at the Core of Better Communities



American Planning Association  
Making Great Communities Happen



NARC  
Building Regional Communities  
National Association of Regional Councils



The **SunShot Solar Outreach Partnership (SolarOPs)** is a U.S. Department of Energy (DOE) program designed to increase the use and integration of solar energy in communities across the US.



## About the SunShot Solar Outreach Partnership

- Increase installed capacity of solar electricity in U.S. communities
- Streamline and standardize **permitting and interconnection processes**
- Improve **planning and zoning codes/regulations** for solar electric technologies
- Increase access to and information on **solar financing options**
- Reduce **customer acquisition** costs



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# Complimentary Services



Technical Resources



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One to One Assistance



Strategy Session



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# Delaware Goes Solar

## A Guide for Residential Customers

- Technical assistance to the Delaware Department of Natural Resources and Environmental Control
- Comprehensive manual for residential customers interested in solar
  - PV technology basics, system costs and savings, ownership and financing options, and policies and incentives available in Delaware
- Demonstrated likely savings under various options
  - 4 utility service areas (Delmarva, 2 municipal utilities, one cooperative)
  - With and without state rebate programs
  - Different options for monetizing SRECs
  - Financed or cash purchase

# Delaware Goes Solar

## A Guide for Residential Customers

Utility and Rate Schedule	Net Savings Over 25-Year System Lifetime			
	SEU SREC Purchase	SREC Procurement Program	SEU SREC Purchase + Green Energy Program Rebate	SREC Procurement Program + Green Energy Program Rebate
<b>Delmarva - Flat Rate</b>	\$19,028	\$22,452	\$22,138	\$25,562
<b>Delmarva - TOU</b>	\$23,294	\$26,718	\$26,404	\$29,829
<b>Newark</b>	\$24,930	\$28,354	\$30,315	\$33,740
<b>Dover</b>	\$13,695	\$16,940	\$18,655	\$21,900
<b>DEC</b>	\$1,789	\$5,034	\$4,899	\$8,144

Side-by-side comparison of incentive programs as state rethinks Green Energy Program structure

\* Does not apply any discounting to net savings in future years.



# Solar Financing Options for the East Central Intergovernmental Association

- Technical assistance to help ECIA evaluate options for financing a PV system
- Association of county governments – non-taxed public entity
  - Funded mostly through fees from member counties, some fees for programs and services – no pool of available capital



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# Solar Financing Options for the East Central Intergovernmental Association

- Used SAM to demonstrate potential savings under available options:
  - Cash Purchase
  - Loan
  - PPA
  - Lease (not evaluated in SAM)

# ECIA – PPA Analysis

- Required additional steps outside SAM
  - No PPA Financing model for third-party owned, customer sited systems
- Exported cash flow from cash purchase to Excel
  - Subtracted initial investment costs
  - Added annual PPA Costs – PPA kWh rate \* SAM's Annual Energy (kWh)
  - Accounted for upfront buy down and terminal buyout



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# ECIA – PPA Analysis

8					
9	<b>ANNUAL VALUES</b>				
10	Year	0	1	2	3
11	Annual energy (kWh)	0	71,836	71,476	71,119
12	Value of electricity savings (\$)	0	7,966	8,128	8,295
13	Difference for NEG Credits	0	221	220	219
14	Total PPA Electricity Savings (\$)	0	7,744	7,908	8,075
15	State depreciation percentages (fraction)	0.00	0.00	0.00	0.00
16	Federal depreciation percentages (fraction)	0.00	0.00	0.00	0.00
17	PPA/System Costs (undiscounted)	5,000.00	6,465.20	6,658.03	6,856.60
18	Annual Savings (undiscounted)	-5,000.00	1,278.99733851	1,250.10301682	1,218.77090868
19	Cumulative Cash Flows	-5,000.00	-3,721.00	-2,470.90	-1,252.13
20	Payback Period				
21	Average Annual Savings (undiscounted)	2,736.50			
22	<b>Total Lifetime Savings (undiscounted)</b>	<b>\$ 63,413</b>			
23	Discounted Cash Flow	-5,000.00	1,224.50	1,145.84	1,069.52
24	<b>NPV - Total Lifetime Savings</b>	<b>\$ 25,771</b>			
25					

Navigation: 20YrPPA | 10YrPPA | Chart 1 - PPA | Monthly | Chart 2 - PPA | Cash Flow | Sensitivity | Ave ... (+)

Browser: EADY Internet Explorer



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# Takeaways

- SAM allows us to run basic financial analyses quickly and efficiently
  - Can modify input parameters to evaluate different options for customers
  - Ability to quickly replicate analyses for different cities and service areas
  - Exporting results allows for flexibility in adapting analysis
    - TPO leases and PPAs, unconventional loan structures
- Demonstration of impacts of various policies
  - Valuation of net excess generation under net metering
  - Presence and magnitude of rebates
  - Incentive design matters too (e.g. SRECs in Delaware)

# Questions?

