

Upcoming Schedule



- Module 4 Office Hours
 - Wednesday, April 25th, 1-2 Eastern
 - Register here:
<https://attendee.gotowebinar.com/register/3018433584458928641>



- U.S. EPA Webinar on its Local Government Solar Project Portal
 - Wed, Apr 25, 2018 1-2 Eastern
 - Register here:
<https://register.gotowebinar.com/register/5206149464354575105>

EPA's Local Government Solar Project Portal

<https://www.epa.gov/repowertoolbox/local-government-solar-project-portal>

- EPA invites local governments across the country to meet their environmental, energy, economic and domestic job creation goals through greater utilization of solar energy from on and off site solar projects that serve municipal operations.
- Local governments will find [project development resources](#) and opportunities to [learn from industry experts](#) and their peers.
- [Share Your Progress](#) and learn more about available resources and [technical support](#).

Local Government	State Cohort	Network Options	Pathway Progress	Project Development Pathway Steps								
				RE Public Commitment	RE Development Plan (Optional)	Collection of Utility Data & Site Assessment	Number of Projects Under Consideration	Issued Request for Proposals	Proposal Evaluations	Signed Contract	Capacity Installed	
City of Alexandria	VA			Link (PDF) (82 pp, 33MB)	-	-	-	-	-	-	-	-
City of Ashland	OR			Link	-	-	-	-	-	-	-	-
City of Chicago	IL			Link (PDF) (40 pp, 12MB)	-	-	-	-	-	-	-	-
City of Durango	CO			Link (PDF) (42 pp, 1.1MB)	-	-	-	-	-	-	-	-
City of Eau Claire	WI			Link (PDF) (37 pp, 1.8MB)	-	-	-	-	-	-	-	-
Town of Fraser	CO			Link	-	-	-	-	-	-	-	-
City of Milwaukie	OR			Link (PDF) (15 pp, 26KB)	-	-	-	-	-	-	-	-
New York City	NY			Link	-	-	-	-	-	-	-	-
City of Philadelphia	PA			Link (PDF) (28 pp, 3.8MB)	-	-	-	-	-	-	-	-
City of Roanoke	VA			Link (PDF) (77 pp, 1GB)	-	-	-	-	-	-	-	-
City of Sarasota	FL			Link	-	-	-	-	-	-	-	-
City of Urbana	IL			Link (PDF) (28 pp, 1.8MB)	-	-	-	-	-	-	-	-



System Advisor Model (SAM) Introduction Slides and Demo

Nate Blair and Janine Freeman

Tools That You Can Use

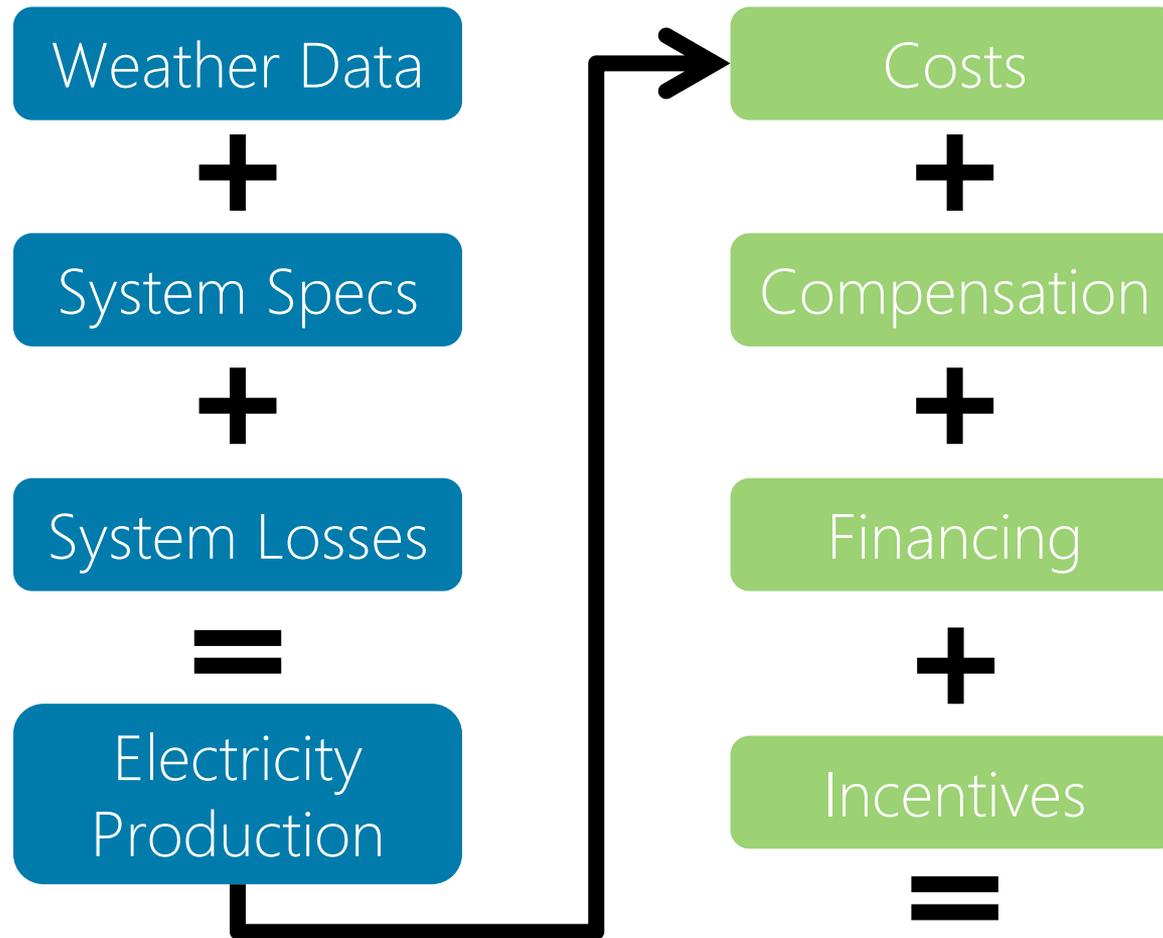
- PV modeling tools take into account the factors that impact project potential
- Publicly available tools can be used to gauge initial potential, optimize system sizing & refine project economics

	Expertise and Effort needed	Required Inputs	Key Outputs
FEMP DG Screening Tool	Low	<ul style="list-style-type: none"> • Location 	<ul style="list-style-type: none"> • Map interface with geospatial layers • High-level economics
PVWatts Calculator	Low	<ul style="list-style-type: none"> • Location • System configuration 	<ul style="list-style-type: none"> • PV energy generation (no economics)
REopt Lite Web Tool	Medium	<ul style="list-style-type: none"> • Location • Energy Consumption • Rate tariff 	<ul style="list-style-type: none"> • Optimized system size and dispatch • High-level economics
System Advisor Model (SAM)	High	<ul style="list-style-type: none"> • Energy Consumption • Rate tariff • Detailed system configuration • Financing inputs 	<ul style="list-style-type: none"> • Detailed technology performance • Detailed economic modeling

Poll Questions

- Have you previously used REOpt?
- Have you previously used SAM?

Steps to Modeling Renewable Energy



Results

Annual, Monthly, and Hourly Output, Capacity Factor, LCOE, NPV, Payback, Revenue



Technologies

Photovoltaics

- Detailed & PVWatts

- Battery Storage

Wind

- Concentrating solar power

- Geothermal

- Biomass

- Solar water heating

Financial Models

Behind-the-meter

- residential

- commercial

- third-party ownership

Power purchase agreements

- single owner

- equity flips

- sale-leaseback

Simple LCOE calculator



- Model a variety of technologies in a consistent platform
- Access high-quality performance and economic models developed by NREL, Sandia, and other partners
- Calculate financial metrics such as LCOE, NPV, payback for projects in different markets
- Perform parametric and uncertainty analyses
- View and export modeling results in a variety of ways
- Access extensive help documentation, view tutorials and webinars



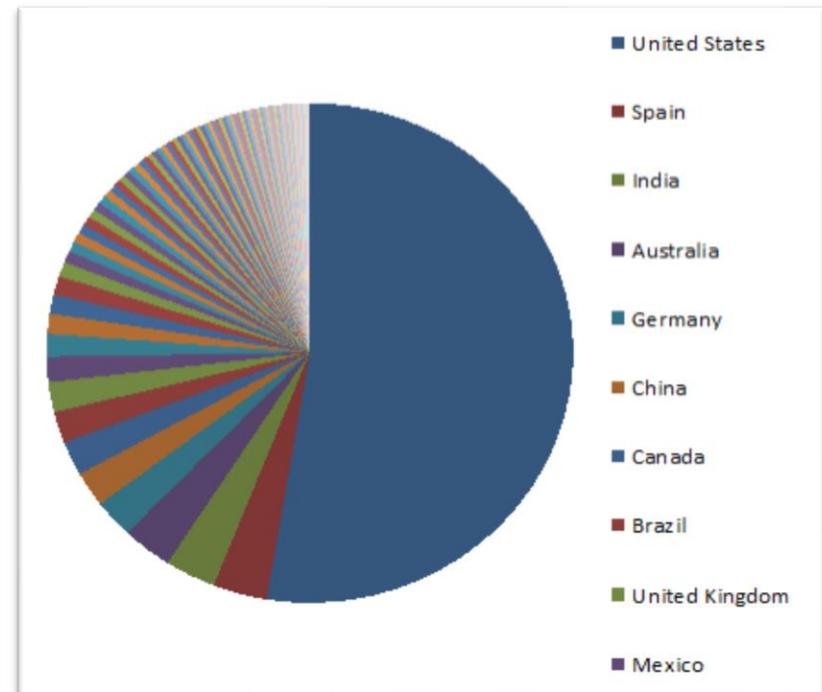
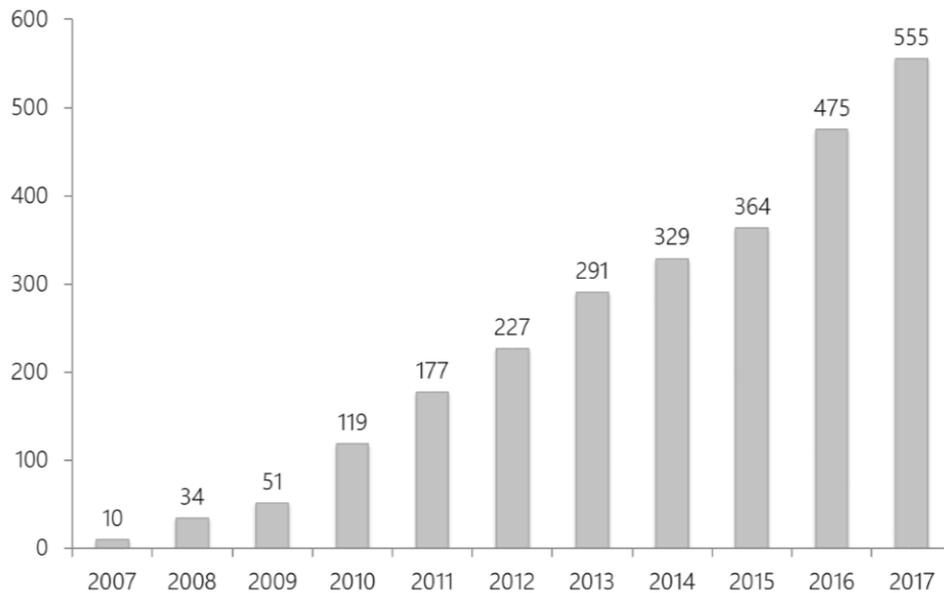
SAM is started **once every 2 ½ minutes**

Over **65,000** active users in 130+ countries

90+ webinars with **113,346 views**

Users include Sunrun, Enphase, AEP, Southern Company, EPRI, & more

Google Scholar Citations of SAM



Poll Questions

- Do you anticipate buying PV directly or through third-party owners at this point?

Third Party Ownership

Terms of Agreement

Lease agreement

First year monthly lease price \$/month

Lease price escalation rate %/year

Power purchase agreement (PPA)

First year PPA price \$/kWh

PPA price escalation rate %/year

- From perspective of building owner (discount rate, etc.)
- Enter the offered PPA/lease offer
- Enter load data and rate data
- Model evaluates if the third-party owned project is profitable (= positive net present value)

Sub-system Components Working Together

Example: Battery Model

- Designed primarily for behind-the-meter analysis (residential and commercial scale systems)
- Lithium ion and lead acid chemistries including submodels for cell voltage, capacity, thermal, degradation, and replacements
- Highly configurable manual dispatch controller
- Validated with laboratory measured test data for two systems.



Detailed photovoltaic model

Module

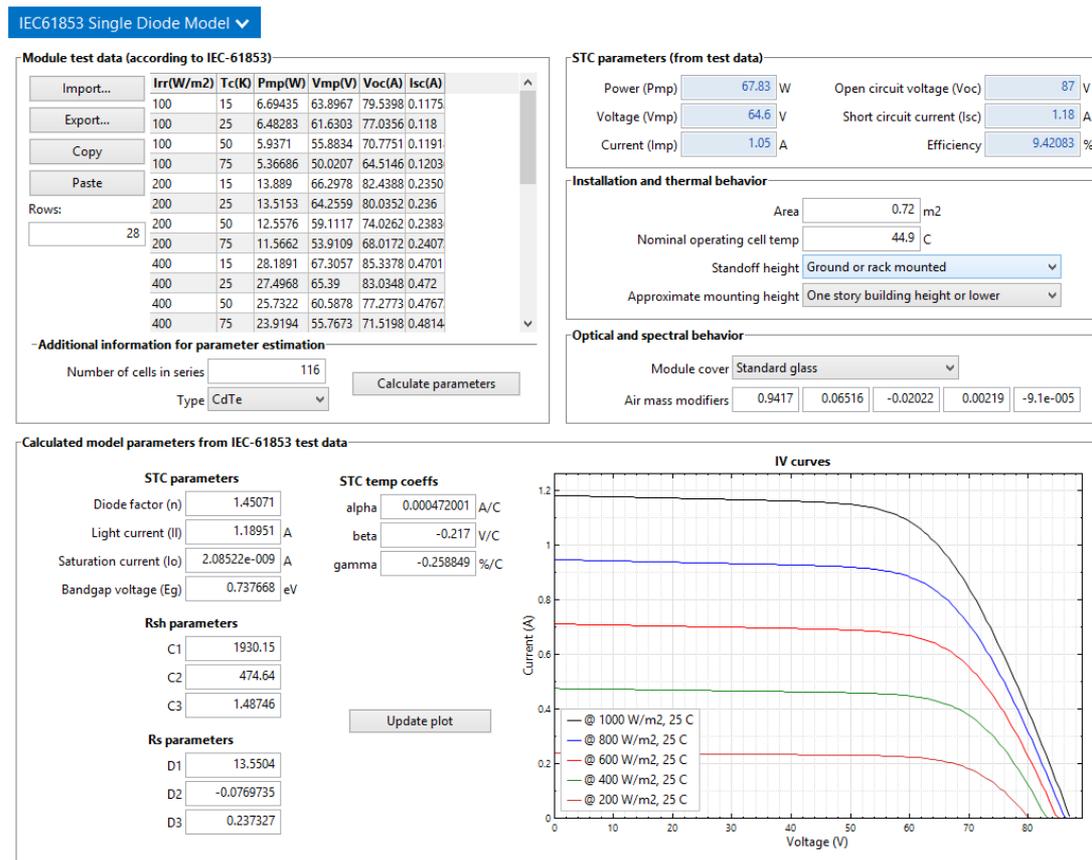
- Simple efficiency model
- Single diode model
 - CEC database or datasheet
- IEC-61853 data based model
- Sandia PV Array Perf. Model

Inverter

- Sandia/CEC grid-tied inverter model
- Datasheet part-load efficiency curve

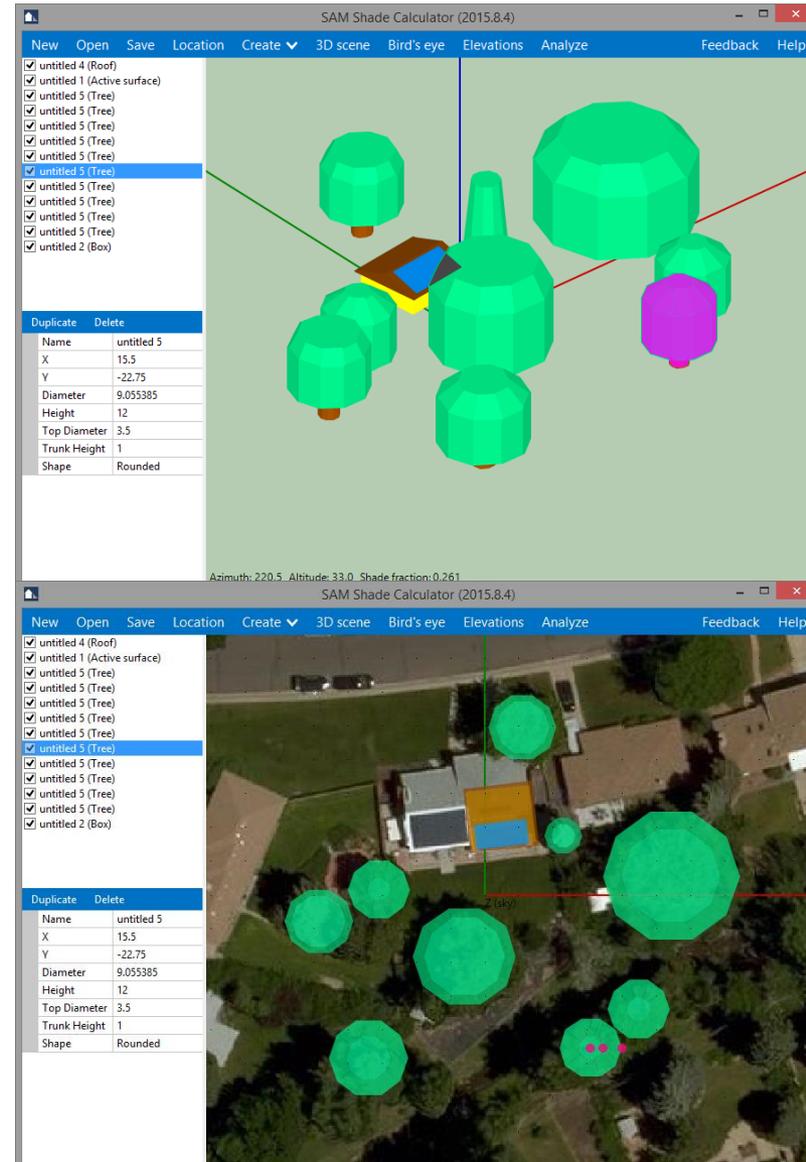
Degradation

- Extrapolated single year
- Lifetime simulation of all years



Complex System Feature: 3D shading calculator

- Fully integrated into SAM
- Calculates linear beam shading losses and sky diffuse view factor loss
- Imports 2D mapping underlays from Bing maps
- Diurnal or hourly/subhourly time series shade simulation
- Estimation of nonlinear losses for shaded parallel strings
- Scripting to automate panel layout and import/export geometry data



Complex utility rate model options

SAM models complex utility rates in conjunction with the NREL Utility Rate Database

Recent additions:

Additional net metering options have been added and implemented to help users understand the impact of different scenarios currently implemented in several states.

Metering options

Net metering rollover monthly excess energy (kWh)
 Net metering rollover monthly excess dollars (\$)
 Non-net metering monthly reconciliation
 Non-net metering hourly reconciliation

Year end sell rate \$/kWh

Non-net metering sell rate option

Sell excess at energy charge sell rates
 Sell excess at specified sell rate

Single TOU sell rate \$/kWh

New data browser categorizes and consolidates results.

The screenshot shows a search bar and a list of utility rate data categories. The selected category is 'Energy charge with system (TOU) Jul (\$)'. The interface displays four tables:

	Tier 1	Total
Period 1	62.84	62.84
Period 2	50.53	50.53
Total	113.37	113.37

	Tier 1	Total
Period 1	235.47	235.47
Period 2	606.77	606.77
Total	842.23	842.23

	Tier 1	Total
Period 1	-9.24	-9.24
Period 2	18.03	18.03
Total	8.80	8.80

	Tier 1	Total
Period 1	-34.61	-34.61
Period 2	216.56	216.56
Total	181.95	181.95

Linkage with OpenEI rate database improved and expanded for some international rates.

Several ways to enter building load data

Calculate Load Data ▾

Building Energy Load Profile Estimator

- Building Characteristics

Floor area sq ft
Year built
Number of stories
Number of occupants
Energy retrofitted
Occupancy schedule fraction/hr

- Temperature Settings

Heating setpoint °F
Cooling setpoint °F
Heating setback point °F
Cooling setup point °F
Temperature schedule on/off

- Electric Appliances

Cooling system Dishwasher
 Heating system Washing machine
 Range (stove) Dryer
 Refrigerator Misc. electric loads

- Monthly Load Data

Jan	<input type="text" value="725.00"/> kWh	Jul	<input type="text" value="1,925.00"/> kWh
Feb	<input type="text" value="630.00"/> kWh	Aug	<input type="text" value="1,730.00"/> kWh
Mar	<input type="text" value="665.00"/> kWh	Sep	<input type="text" value="1,380.00"/> kWh
Apr	<input type="text" value="795.00"/> kWh	Oct	<input type="text" value="1,080.00"/> kWh
May	<input type="text" value="1,040.00"/> kWh	Nov	<input type="text" value="635.00"/> kWh
Jun	<input type="text" value="1,590.00"/> kWh	Dec	<input type="text" value="715.00"/> kWh

Annual Adjustment

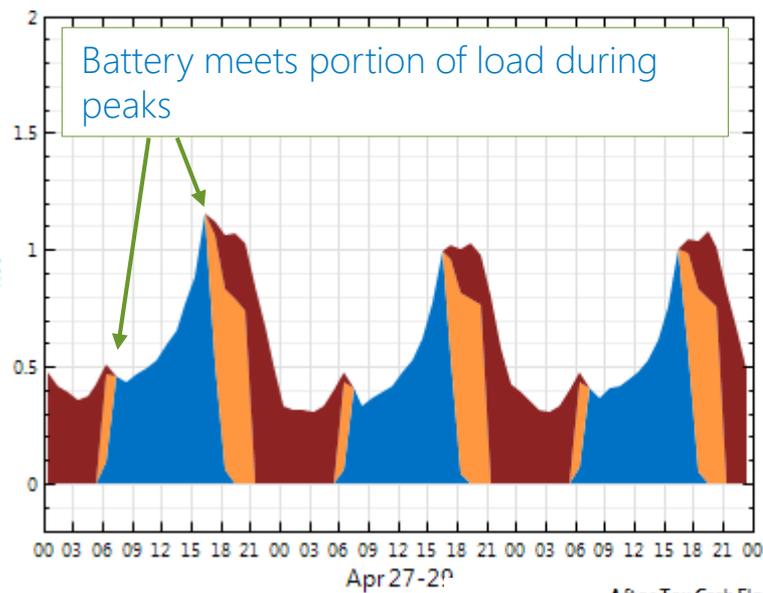
Load growth rate %/yr

In Value mode, the growth rate applies to the previous year's annual kWh load starting in Year 2. In Schedule mode, each year's rate applies to the Year 1 kWh value. See Help for details.

- Load profile in a file that can be scaled for monthly values.
- Residential loads: Use data about the building to create load data with consistent weather data
- Macro to download load data from OpenEI

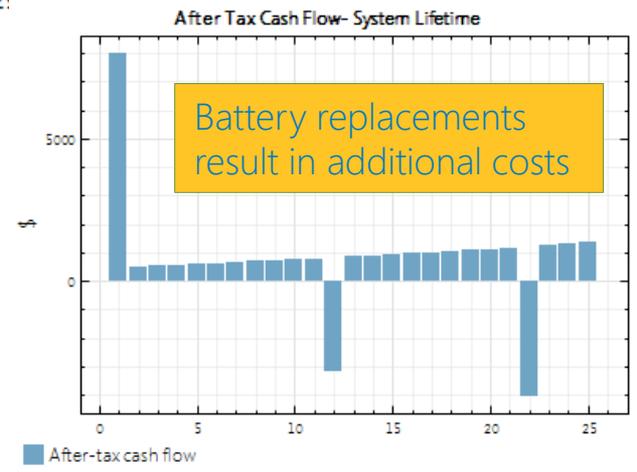
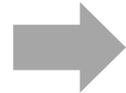
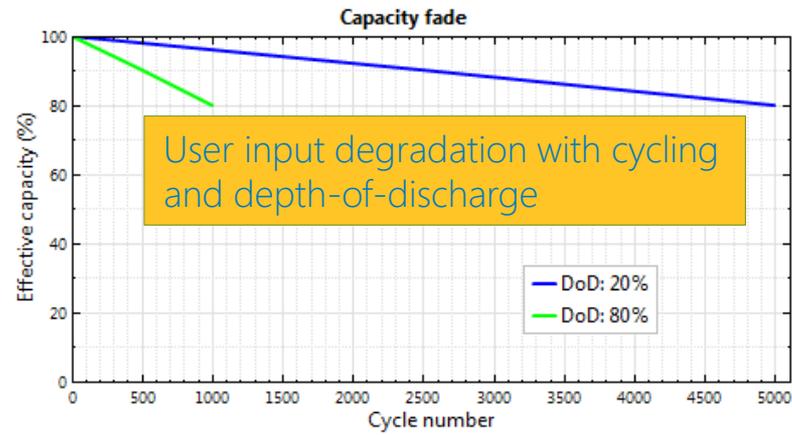
Putting it all together: Dispatch and degradation

	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Jan	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Feb	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Mar	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Apr	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
May	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Jun	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Jul	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Aug	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Sep	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Oct	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Nov	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
Dec	2	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1



- Power to load from PV (kW)
- Power to load from battery (kW)
- Power to load from grid (kW)

4 kW PV system
2 kW peak load



Extending SAM

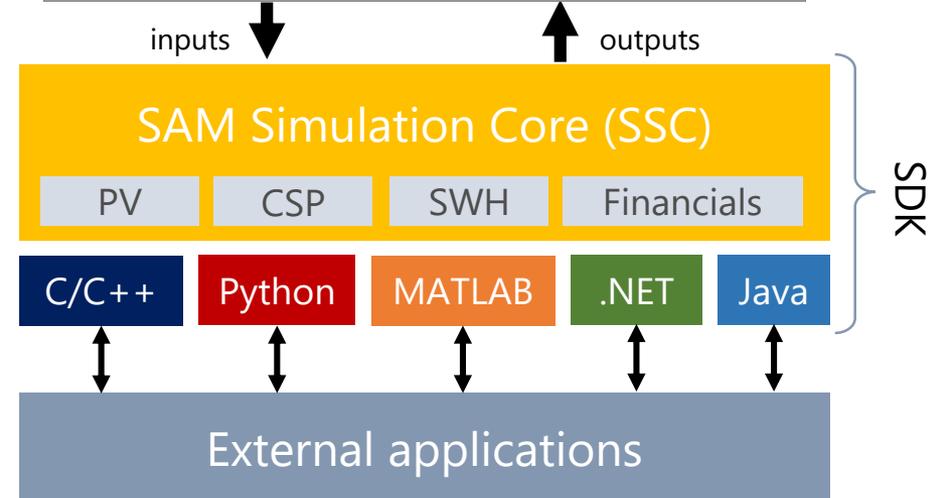
Desktop Application

- Advanced Analysis Features
 - Parametric
 - Stochastic (and for O&M)
 - P50/P90
- Built-in Scripting Language
- Macros
 - Written with SAM scripting language

Requires programming skills

- Software Development Kit (SDK)
 - C/C++, Python, C#, Java
 - Matlab, VBA
 - PHP
 - iOS And Android (NEW!!!)
- Web Services API (PVWatts Only)
- Open-sourced SAM code (NEW!!!)

SAM project file → Code

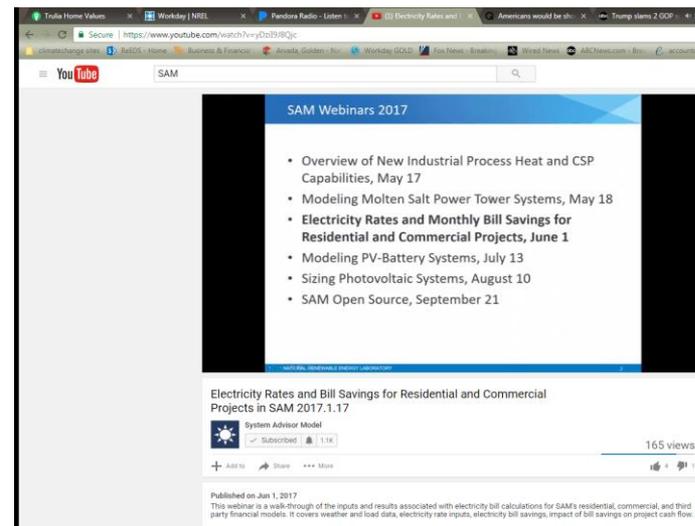


Poll Questions

- Do you anticipate using SAM in a way other than via the desktop tool?

How to Interact with the SAM team and get help?

- Website – <http://sam.nrel.gov>
 - Support Forum – Ask your question!
 - General info/ online help file / contact info
- YouTube Channel
 - <https://www.youtube.com/user/SAMDemoVideos>
 - All prior webinars and seminars
- Bi-Monthly Round Table sessions
 - SAM team asks questions live and interactively
- Email Support
 - SAM support can provide email support if question/bug is involved



Other Resources Online

The following information resources about SAM are available.

- [News](#)
- [Webinars](#) (mostly on the SAM YouTube channel)
- [Weather Data](#) (Description of various weather data sources)
- [Sample Files](#) (particularly scripting language examples)
- [Financial Model Documentation](#)
- [Performance Model Documentation](#) (detailed descriptions)
- [System Cost Data](#) (sources and latest cost data discussion)
- [Case Studies and Validation](#) (all data/files from our validations)
- [Libraries and Databases](#) (i.e. module and inverter specs)
- [Source Code](#) (linkages to Open Source code on GitHub)

1. Before you've issued a request for proposals:
 - PVWatts + Financing Options
 - Buying the system yourself (Commercial model)
 - Third party ownership
2. After you've received bids:
 - Detailed PV + Third Party Ownership
 - Parametric analysis with multiple PPA price offers

Thank you! Questions?

Janine Freeman - project lead, photovoltaic and wind models

Nick DiOrio - code architecture, battery storage models

Nate Blair - emeritus lead, financials, costs, systems

Steve Janzou - programming, utility rate structures (subcontractor)

Paul Gilman - user support and documentation (subcontractor)

Ty Neises - concentrating solar power models

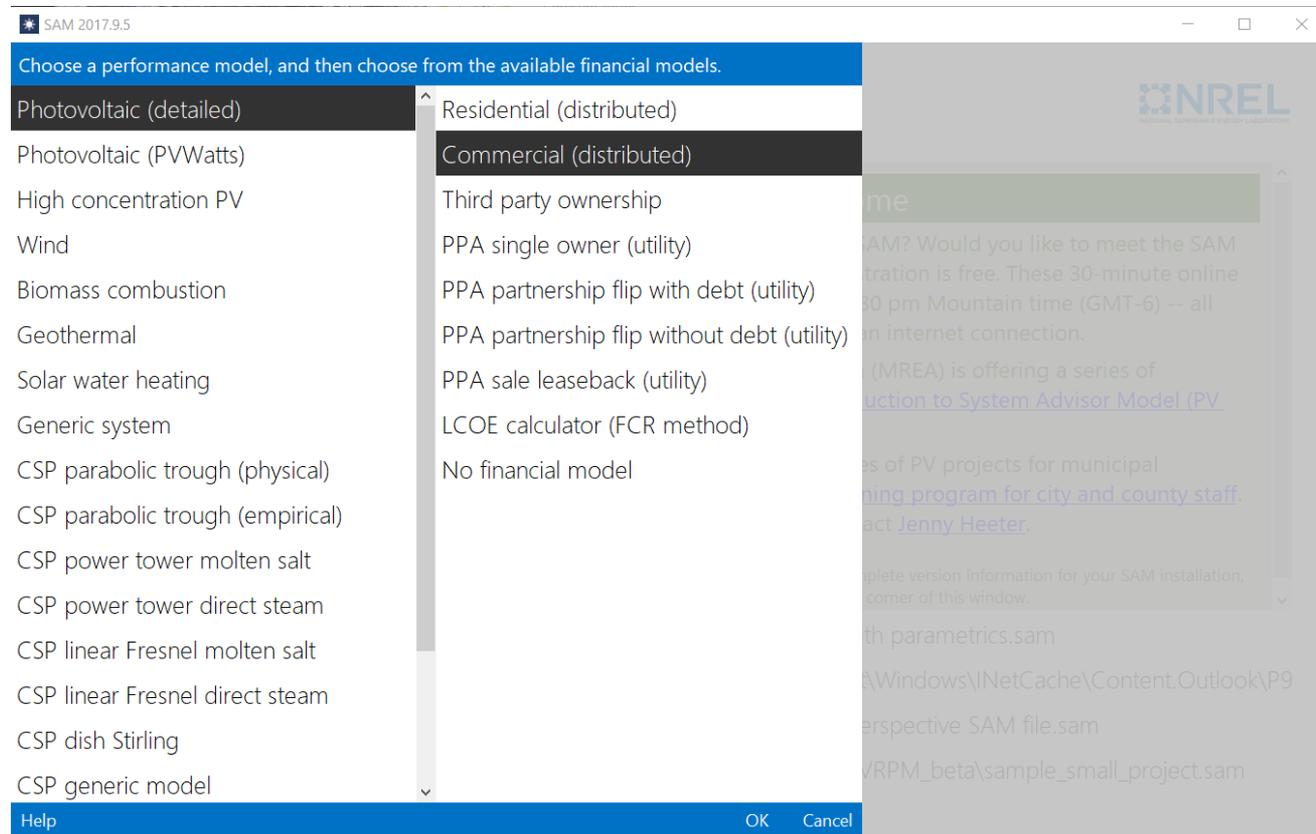
Mike Wagner - concentrating solar power models

www.nrel.gov

<http://sam.nrel.gov>



Selecting a Technology and Financial Model



Select a Weather File

NREL National Solar Radiation Database (NSRDB)

Download the latest weather files from the NSRDB to add to your solar resource library: Download a typical-year (TMY) file for most long-term cash flow analyses, or choose files to download for single-year or P50/P90 analyses. See Help for details.

Download a TMY file for Americas... TMY or Single-year for Americas and Asia... [Map on NSRDB website](#) [International Data Sources](#)

Solar Resource Library

Use the buttons above to download the latest NSRDB files and add them to your solar resource library. Click Folder Settings to add your own weather files to the library. The default library contains legacy weather files. See Help for details.

Weather file: C:\SAM\2017.9.5\solar_resource\USA AZ Phoenix (TMY2).csv

- Header Data from Weather File -

City: Phoenix Time zone: GMT -7 Latitude: 33.4333 °N
State: AZ Elevation: 339 m Longitude: -112.017 °E
Country: USA Data Source: TMY2 Station ID: 23183

- Annual Averages Calculated from Weather File Data -

Global horizontal: 5.80 kWh/m²/day Average temperature: 22.5 °C
Direct normal (beam): 6.90 kWh/m²/day Average wind speed: 3.0 m/s
Diffuse horizontal: 1.55 kWh/m²/day Maximum snow depth: 0 cm

- Files in Library -

Search for: Name

Name	Station ID	Latitude	Longitude	Time zone	Elevation
USA AZ Kingman (amos) (TMY3)	723700	35.267	-113.95	-7	1033
USA AZ Luke Afb (TMY3)	722785	33.55	-112.367	-7	331
USA AZ Page Muni (amos) (TMY3)	723710	36.933	-111.45	-7	1304

Choose a Module and an Inverter

SAM 2017.9.5

File Add untitled Help

Photovoltaic, Commercial CEC Performance Model with Module Database

Location and Resource Search for: Name

Name	I _{mp_ref}	V _{mp_ref}	A _c	N _s	I _{sc_ref}
SunPower SPR-76RE-BLK-U	5.65	13.45	0.541	24	6.02
SunPower SPR-E18-295-COM	5.45	54.2	1.631	96	5.83
SunPower SPR-E18-300-COM	5.49	54.7	1.631	96	5.87
SunPower SPR-E18-305-COM	5.58	54.7	1.631	96	5.96
SunPower SPR-E19-235	5.8	40.5	1.244	72	6.18
SunPower SPR-E19-240	5.93	40.5	1.244	72	6.3
SunPower SPR-E19-245	6.05	40.5	1.244	72	6.43
SunPower SPR-E19-310-COM	5.67	54.7	1.631	96	6.05

Module Characteristics at Reference Conditions

Reference conditions: Total Irradiance = 1000 W/m2, Cell temp = 25 C

SunPower SPR-E19-310-COM

Parameter	Value	Unit	Temperature Coefficient
Nominal efficiency	19.0159	%	
Maximum power (Pmp)	310.149	Wdc	-0.386 %/°C
Max power voltage (Vmp)	54.7	Vdc	
Max power current (Imp)	5.7	Adc	
Open circuit voltage (Voc)	64.4	Vdc	-0.273 %/°C
Short circuit current (Isc)	6.1	Adc	0.062 %/°C

Temperature Correction

Nominal operating cell temperature (NOCT) method

NOCT method parameters: Mounting standoff Ground or rock mounted

Set Up Your System

The screenshot displays the SAM 2017.9.5 software interface for a photovoltaic system. The left sidebar contains navigation options: Location and Resource, Module, Inverter, System Design, Shading and Snow, Losses, Lifetime, Battery Storage, System Costs, Financial Parameters, Incentives, Electricity Rates, and Electric Load. The main window is titled 'untitled' and shows the 'System Sizing' section, which is highlighted with a red box. This section includes two radio buttons: 'Specify desired array size' (selected) and 'Specify modules and inverters'. Below these are input fields for 'Desired array size' (220 kWdc), 'DC to AC ratio' (1.20), 'Modules per string' (12), 'Strings in parallel' (58), and 'Number of inverters' (3). The 'Configuration at Reference Conditions' section is divided into 'Modules' and 'Inverters' columns, with a 'Sizing messages' box on the right. The 'Modules' column lists: Nameplate capacity (219.586 kWdc), Number of modules (708), Modules per string (12), Strings in parallel (59), Total module area (1,154.7 m²), String Voc (772.8 V), and String Vmp (656.4 V). The 'Inverters' column lists: Total capacity (179.577 kWac), Total capacity (183.300 kWdc), Number of inverters (3), Maximum DC voltage (1,000.0 Vdc), Minimum MPPT voltage (570.0 Vdc), Maximum MPPT voltage (800.0 Vdc), and Battery maximum power (0.000 kWdc). The 'Sizing messages' box contains the text: 'Actual DC/AC ratio is 1.22.' Below this, a note states: 'Voltage and capacity ratings are at module reference conditions shown on the Module page.' The 'DC Subarrays' section provides instructions and a table for configuring subarrays. The table has columns for Subarray 1, Subarray 2, Subarray 3, and Subarray 4. Subarray 1 is pre-configured with 'Strings in array' (59) and 'Strings allocated to subarray' (59). The 'Tracking & Orientation' section for Subarray 1 is highlighted with a red box, showing radio buttons for 'Fixed' (selected), '1 Axis', and '2 Axis'. The 'Azimuth' is set to 0 and 'Tilt' is set to 50 Vert. The 'Simulate' button is visible at the bottom left of the main window.

System Sizing

Specify desired array size Specify modules and inverters

Desired array size: 220 kWdc Modules per string: 12

DC to AC ratio: 1.20 Strings in parallel: 58

Number of inverters: 3

Configuration at Reference Conditions

Modules		Inverters		Sizing messages (see Help for details):
Nameplate capacity	219.586 kWdc	Total capacity	179.577 kWac	
Number of modules	708	Total capacity	183.300 kWdc	
Modules per string	12	Number of inverters	3	
Strings in parallel	59	Maximum DC voltage	1,000.0 Vdc	
Total module area	1,154.7 m ²	Minimum MPPT voltage	570.0 Vdc	
String Voc	772.8 V	Maximum MPPT voltage	800.0 Vdc	
String Vmp	656.4 V	Battery maximum power	0.000 kWdc	

DC Subarrays

To model a system with one array, specify properties for Subarray 1 and disable Subarrays 2, 3, and 4. To model a system with up to four subarrays connected in parallel to a single bank of inverters, for each subarray, check Enable and specify a number of strings and other properties.

	Subarray 1	Subarray 2	Subarray 3	Subarray 4
-String Configuration	(always enabled)	<input type="checkbox"/> Enable	<input type="checkbox"/> Enable	<input type="checkbox"/> Enable
Strings in array	59	0	0	0
Strings allocated to subarray	59			
-Tracking & Orientation	<input checked="" type="radio"/> Fixed <input type="radio"/> 1 Axis <input type="radio"/> 2 Axis	<input checked="" type="radio"/> Fixed <input type="radio"/> 1 Axis <input type="radio"/> 2 Axis	<input checked="" type="radio"/> Fixed <input type="radio"/> 1 Axis <input type="radio"/> 2 Axis	<input checked="" type="radio"/> Fixed <input type="radio"/> 1 Axis <input type="radio"/> 2 Axis

Optionally, Enable a Battery

The screenshot displays the SAM 2017.9.5 software interface. The 'Photovoltaic, Commercial' menu is open, and the 'Enable Battery' option is highlighted with a red box. The main window shows the 'Battery Storage' configuration panel. The 'Battery type' is set to 'Lithium Ion: Nickel Manganese Cobalt Oxide (NMC)'. Under 'Battery Bank Sizing', the 'Set desired bank size' radio button is selected. The 'Desired bank capacity' is 100 kWh, 'Desired bank power' is 50 kW, 'Number of cells in series' is 3, and 'Number of strings in parallel' is 1. The 'Voltage Properties' section shows 'Desired bank voltage' as 500 V (DC), 'Cell nominal voltage' as 3.6 V (DC), and 'Cell internal resistance' as 0.001 Ohm. The 'Voltage curve specification' section has the 'Use voltage model' radio button selected. The 'Voltage model' section notes that there is no voltage model in SAM for iron-flow batteries. The 'Voltage table' section provides instructions for entering a table of voltage vs. depth-of-discharge for iron flow batteries.

Define Costs, Financial Parameters

The screenshot displays the SAM 2017.9.5 software interface for defining financial parameters. The left sidebar shows a navigation menu with 'Financial Parameters' selected. The main window is divided into several sections:

- Project Term Debt:** Includes input fields for Debt percent (100%), Loan term (25 years), and Loan rate (7.5%/year). It also shows calculated values for Net capital cost (\$518,912.91), Debt (\$518,912.91), and WACC (4.88%). A note explains that WACC is for reference and not used for calculations.
- Analysis Parameters:** Includes Analysis period (25 years), Inflation rate (2.5%/year), Real discount rate (5.5%/year), and Nominal discount rate (8.14%/year).
- Tax and Insurance Rates:** Includes Federal income tax rate (30%/year), State income tax rate (7%/year), Sales tax (5% of total direct cost), Insurance rate (annual) (0.5% of installed cost), Assessed percentage (100% of installed cost), Assessed value (\$518,912.91), Annual decline (0%/year), and Property tax rate (2%/year).
- Salvage Value:** Includes Net salvage value (0% of installed cost) and End of analysis period value (\$0).
- Depreciation:** Includes options for Federal and State depreciation methods (No depreciation, 5-yr MACRS, Straight line) and a 7-year input field for both.

At the bottom of the sidebar, there are buttons for 'Simulate >', 'Parametrics', 'Stochastic', 'P50 / P90', and 'Macros'.

Examine Outputs in a Variety of Ways

The image displays the SAM 2017.9.5 software interface, showing the 'Summary' tab for a 'Photovoltaic, Commercial' project. The interface is divided into several sections:

- Summary Table:** A table listing key metrics and their values.

Metric	Value
Annual energy (year 1)	411,280 kWh
Capacity factor (year 1)	21.4%
Energy yield (year 1)	1,873 kWh/kW
Performance ratio (year 1)	0.78
Battery efficiency (incl. converter + ancillary)	91.14%
Levelized COE (nominal)	5.75 ¢/kWh
Levelized COE (real)	4.55 ¢/kWh
Electricity bill without system (year 1)	\$826,030
Electricity bill with system (year 1)	\$783,282
Net savings with system (year 1)	\$42,747
Net present value	\$109,917
Payback period	11.0 years
Discounted payback period	23.3 years
Net capital cost	\$518,913
Equity	\$0
Debt	\$518,913
- Energy Loss Chart:** A bar chart showing energy loss components. The 'Simulate >' button is highlighted in a red box.
- Monthly Energy Production Graphs:** Two time-series plots showing 'System power generated (kW)' (top, orange) and 'Electricity load (year 1) (kW)' (bottom, blue) over a 12-month period from January to December. The y-axis ranges from -200 to 4000 kW.
- Navigation and Settings:** The top menu bar includes 'File', 'Add', 'untitled', and 'Help'. The left sidebar lists various system components like 'Location and Resource', 'Module', 'Inverter', etc. The right sidebar contains a search bar and a list of simulation parameters with checkboxes, such as 'Subarray 1 Open circuit voltage (V)', 'Inverter efficiency (%)', and 'Electricity load (year 1) (kW)'. The bottom status bar shows 'Simulate >', 'Parameters', 'Stochastic', and 'P50 / P90'.

How to Learn More and Get Help

- Website – <http://sam.nrel.gov>
 - Support Forum – Ask your question!
 - Documentation / case studies / general info
- Webinars/YouTube Channel
 - <https://sam.nrel.gov/webinars>
- Bi-Monthly Round Table sessions
 - Ask the SAM team questions live
- Email Support for complex questions

