Modeling Financial Incentives in SAM

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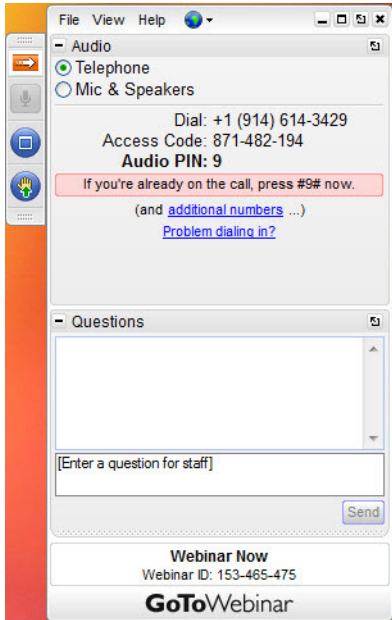Photo by Dennis Schroeder, NREL 46840

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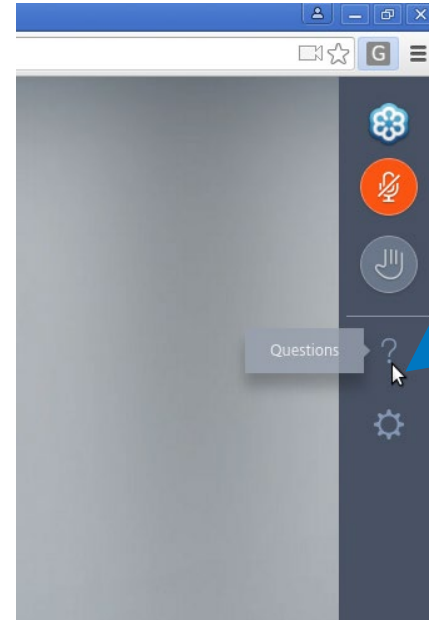
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Agenda

1. Introduction to SAM
2. Overview of financial incentives
3. Incentive inputs and outputs in SAM
4. Plans for future development
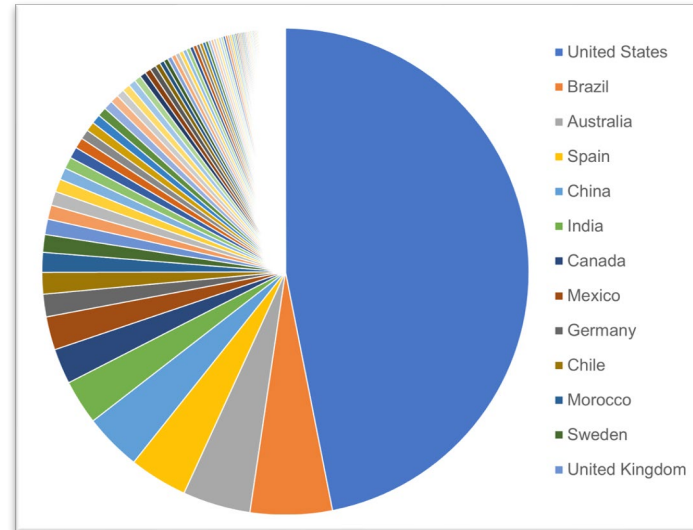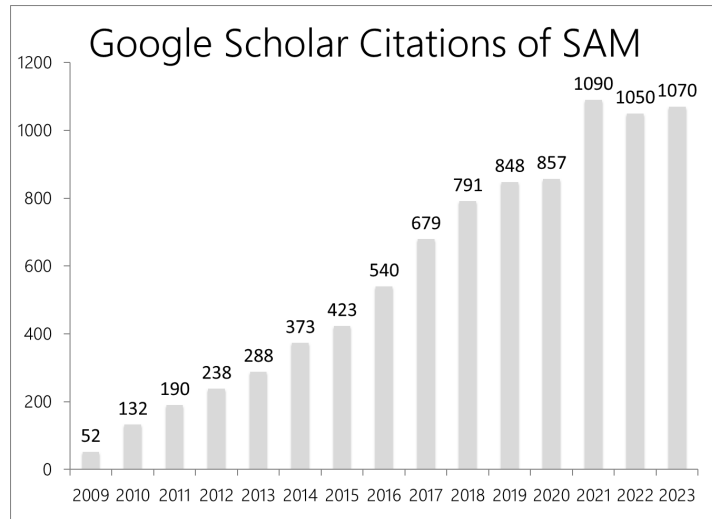5. Q&A

System Advisor Model (SAM) & PVWatts

Free software that enable detailed performance and financial analysis for renewable energy systems

https://sam.nrel.gov/
https://pvwatts.nrel.gov/
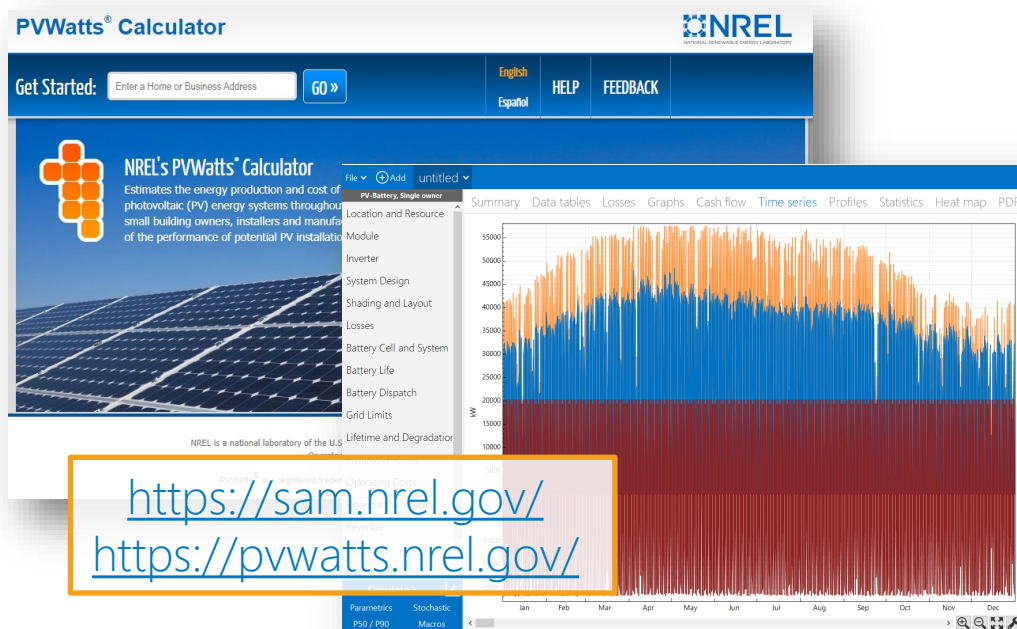
- ✓ Desktop application
- ✓ PVWatts web tool & API
- ✓ Software development kit
- ✓ PySAM Python package
- ✓ Open source code
- ✓ Extensive documentation
- ✓ User support

SAM Users

SAM is started **once every 1.4 minutes**

PVWatts receives over **17.5 million hits per month**

Over **200,000** users in 190+ countries

120+ webinars with **over 280,000 views**

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

Google Scholar Citations of SAM

52, 132, 190, 238, 288, 373, 423, 540, 679, 791, 848, 857, 1090, 1050, 1070 (2009–2023)

Pie chart legend: United States, Brazil, Australia, Spain, China, India, Canada, Mexico, Germany, Chile, Morocco, Sweden, United Kingdom

Incentives Overview

SAM can model three types of incentives
- Tax credits
- Depreciation (tax deduction)
- Cash payments

Incentives may be provided by different institutions
- Federal government
- State and local government
- Utilities
- Other

Rules for incentives depend on who provides them. SAM is general enough to model most types of incentives. *It does not automatically choose options based on the provider of the incentive.*

Some features are U.S.-specific but can be turned off.

Tax credits reduce project owner's tax liability

Investment tax credit (ITC) applies in Year 1
- Usually calculated as a percentage of qualifying costs
- In the U.S., the federal ITC reduces the tax depreciation basis by 50% of the ITC amount

Production tax credit (PTC) applies in Years 1 up to a specified number of years with optional annual escalation
- Calculated in $ per kWh of electricity

SAM offers options for flexibility:
  o ITC and PTC can be specified by year
  o ITC effect on depreciation basis can be turned off or on
  o ITC can be specified as a dollar amount

Depreciation

Depreciation is a tax deduction of some number of years for the cost of an asset

Different types of property qualify for different classes of depreciation

In the U.S., renewable energy equipment qualifies for depreciation under Modified Accelerated Cost Recovery System (MACRS), see IRS Publication 946 for details

Depreciable basis is the cost of qualifying property less credits and deductions

SAM assumes project owner earns sufficient income to fully use tax credits and depreciation benefits.
  o Use SAM's Partnership Flip and Sale Leaseback models for tax equity financing

A cash incentives is a grant, rebate, renewable energy credit, or other payment to the project

Investment-based incentive (IBI) applies in Year 0
- May be a fixed dollar amount or a percentage of total installed cost with an optional maximum

Capacity-based incentive (CBI) applies in Year 0
- Specified in dollars per Watt of installed capacity with an optional maximum

Production-based incentive (PBI) applies in Year 1 up to specified number of years
- Specified in dollars per kWh of electricity with an optional escalation rate

> Options available for cash payments:
> - IBI, CBI, and PBI may be taxable (federal and state)
> - IBI and CBI may reduce ITC and depreciation basis
> - PBI may be available for debt service
>
> *SAM does not automatically choose options.* For example, a utility rebate may not be taxable but reduce the ITC basis.

Incentives Input Page

Tax credits

Cash incentives

ITC qualification is on the Depreciation page.

Depreciation Input Page

Depreciation

| Classes	Allocations	Bonus Depreciation		ITC Qualification	
		Federal	State	Federal	State
5-yr MACRS	90 %	☑	☑	☑	☑
15-yr MACRS	1.5 %	☑	☑	☐	☐
5-yr Straight Line	0 %	☐	☐	☐	☐
15-yr Straight Line	2.5 %	☐	☐	☐	☐
20-yr Straight Line	3 %	☐	☐	☐	☐
39-yr Straight Line	0 %	☐	☐	☐	☐
Custom Edit...	0 %	☐	☐	☐	☐
Non-depreciable assets	3 %	Bonus: 0 %	0 %		

The allocation for each depreciation class is a percentage of the total capital cost. Allocations apply to both state depreciation and federal depreciation.

Total capital cost includes the total installed cost from the Installation Costs page and other financial costs and fees from the Financial Parameters page. SAM displays the value in the Metrics table on the Results page.

Check the box for each asset class that qualifies for federal or state bonus depreciation, and enter the bonus amount as a percentage of the total qualifying allocations.

Check the box for each asset class that qualifies for the investment tax credit (ITC). This determines the basis used to calculate the ITC amount.

Incentives in SAM
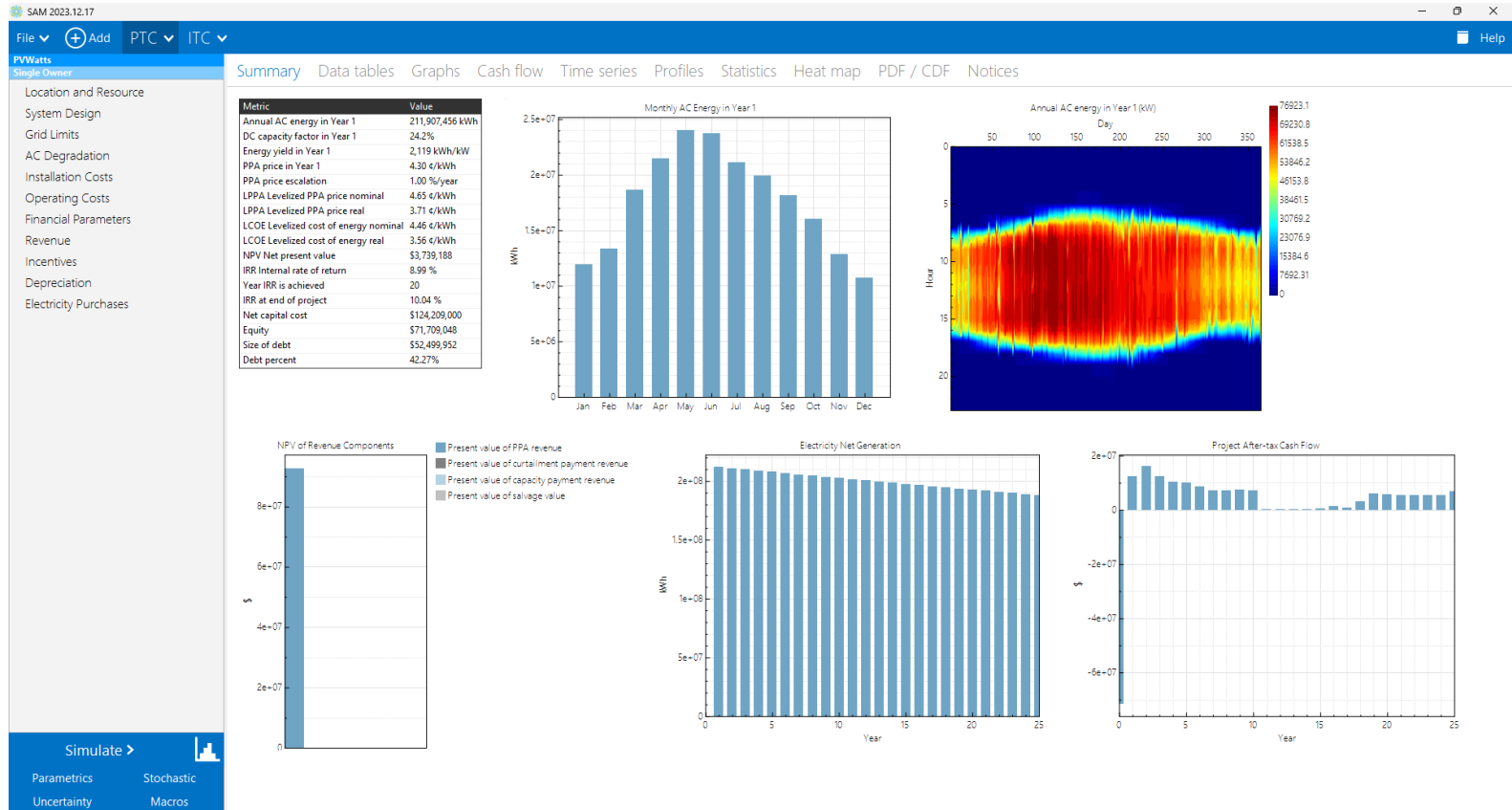
Update for SAM 2023.12.17 Revision 2

New output variable shows ITC basis and depreciation basis.

In SAM for Windows, from Results page Cash Flow tab, click **Send-to-Excel with Equations** to see basis calculation.

Plans for Fall 2024 version

When ITC and IBI are combined, subtract 100% of IBI from the ITC basis instead of according to depreciation class allocations.

Improve modeling of tax implications of debt upfront fees.

Improve default depreciation allocations for hybrid power systems.

Remove reserve account funding and financing fees from depreciation and ITC basis.

Thank you! Questions?

Contact: Paul Gilman
sam.support@nrel.gov

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