

Participant questions with NREL answers for SAM Webinar Modeling a Photovoltaic Battery System in SAM 2016.3.14

Anywhere in SAM to determine the PSH for December?

Sorry, I'm not sure what the PSH acronym stands for.

Peak Sun Hours

The hourly data in SAM is available including the irradiance components, as well as the plane of array irradiance so you should be able to pick out the PSH from there.

what does this error mean?exec fail(utilityrate5): Period 3 is in Month 5 but is not defined in the demand rate table. Rates for each period in the Weekday and Weekend schedules must be defined in the demand rate table.

Simulation utilityrate5 failed.

It appears that there is an error with the way the complex utility rate structure is entered into SAM. Make sure that each time period in the schedule entry is associated with a rate entry in the table.

I found the error: When I downloaded the SCE rate it did not create a 3rd period. When I created a 3rd period manually the simulation ran. Question why the rate download did not create that 3rd period?

It may be an error in data provided by the online database. Thank you for indicating this and we can try to investigate that particular issue.

Can I save my location as the default weather for using SAM in the future?

Unfortunately you cannot overwrite defaults at this time. However, you could save a SAM file that you always use as the starting point for an analysis that has your location specified.

Can you modify PV size along with the battery bank in the parametrics to determine optimal size of both PV and battery bank?

Yes, multiple parameters may be varied simultaneously using the parametric interface. There are more demonstrations of the parametric capabilities in previous webinars on the SAM videos page: sam.nrel.gov/videos.

Is there a full off-grid model in the works (i.e. PV + battery + backup generator)? If not, can the grid load output be used to estimate the generator demand?

SAM models grid-connected systems at this time. There is no facility for pure off-grid operation, but there is a grid-target operation mode for the battery that tries to limit power to/from the grid to the specified value.

does weather data account for altitude at locations between actual weather stations, in particular higher cloudiness?

Yes, the weather data includes the effects of clouds reducing available irradiance at the ground level.

Will SAM be including specific battery models as it does with PV, rather than generic types (FLA, Li-ion)?

We are working to provide additional sets of default parameter values for the various battery submodels to better represent different battery technologies. However, we do not anticipate, at this time, to curate a full library of specific components.

Can you print the results?

Yes. The easiest way is to use the 'Create Report' feature from the case menu that will generate a PDF report that you can print. The report does not include every input and output, but provides a summary of key system parameters and output metrics.

Can you size a system so that the grid never supplies energy to the load (somehow simulating a stand-alone system)?

Currently, SAM does not simulate an off-grid system. If a load is not met by the PV system, grid electricity is used to meet the remainder.

Demand costs increasing are based upon kVA, will this function be added?

Can you decrease the future battery cost at replacement?

Does the model assume that the old battery has 0 value? Can this be modified?

Can the parasitic loads such as the AC be adjusted?

Will you be adding flywheel storage devices into the SAM for future modeling

Thank you for the question. At this time we do not have plans for adding flywheel storage to SAM's suite of models.

how i can do if i want to download the weather data of subsaharian africa for example if i want to use the Cameroon weather data because i think that it is no in database

There many resources for international weather data that can be used in SAM at <https://sam.nrel.gov/weather>

How often is the rate structure updated in the SAM system?

SAM provides many options for inputting different kinds of rate structures, but information on rates for your area can be downloaded from the OpenEI Utility Rate Database (URDB), which is what happens when you click "Download" on the electric rates page. The URDB is updated by another organization, but you should always double check that the rate you've downloaded matches your actual utility rate.

Is the SAM team currently working on the analysis capability for salt water batteries such as Aquion?

Not currently, but we are exploring all types of batteries and talking with manufacturers.

I am jumping ahead. Is the battery model accessible through the SDK?

Yes, the battery model is accessible through the SDK.

Where do we specify 25 years as analysis period?

The analysis period is specified on the "Financial Parameters" page.

I may have missed this earlier, but are there plans to add battery storage to PPA-type simulations?

Yes. The next version of SAM will include the battery model for utility-scale systems.

Is 15-min interval weather data available?

15 minute weather data is somewhat difficult to find. However if you do get it, SAM will run at subhourly time steps down to 1 minute. The new NREL National Solar Radiation Database (NSRDB) dataset has 30 minute data.

Is there a timeline for incorporating battery charging directly from the DC bus?

We are working on alternative battery system topologies and should have a DC connected option in the next version of SAM. Although we do not have a firm release date, we expect the new version to be ready roughly by the end of the year or early 2017.

Is there any kind of confirmation I can get to use this course for engineer professional education refresher requirements?

We can offer an emailed confirmation of your attendance.

Does SAM assume a perfect forecast of the PV and load over the next day?

Yes. SAM uses the information in the weather file for the forecast of the next day.

Ah, so it doesnt apply a fx at all.. It either assumes perfect knowledge of the future OR persists yesterdays knowledge

Yes that is the approach.

How easy would it be to accomodate a load forecast as an input? Are future versions expected to model a peak shaving strategy based on this and perhaps provide confidence intervals?

Thank you for the suggestion. We will note it and investigate the possibility.

Power electronics you mean charger, cables and so forth?

Power electronics would generally represent the AC/DC and DC/AC converters in this system. Recall that in the current version of SAM, batteries are connect on the AC bus.

what is the definition of each load, e.g. small buidling

Please see the definitions on the OpenEI database.

Using the parametrics, can we minimize the utility charges by playing with battery usage hours, not necessarily designed to maximize the solar fraction

Yes, on the parametrics page (accessible on bottom left of SAM), you may change several battery parameters and see what effect the inputs have on various output metrics.

What are reasons for and implications from various "time step" inputs?

SAM can run simulations from one hour down to one minute. Varying the time step that you use might help address differing questions- hourly time steps could be sufficient when you're looking at annual numbers, but sub-hourly analysis might be required if you're looking more at peak loads, demand charges, or grid integration issues.

What are the pros and cons of the DC coupled versus AC coupled BESS (Battery Energy Storage System)?

That question is slightly out of the scope of this webinar, but please feel free to ask that question on the SAM support forum to spark a discussion: <https://sam.nrel.gov/support>

Is SAM software compatible with android?

There is no mobile version of SAM. It requires a desktop/laptop computer running Windows, OSX, or Linux.

What can you do if you only have one week or one month of load data?

You would need to extrapolate the data for an entire year. You may do this in Excel and copy directly into the load input button in SAM.

Is there a master microgrid controller module or component that can be utilized in SAM? The second related question; is there a way to export the SAM simulation into a format to implement the SAM simulation scheme into a microgrid controller?

We do not currently have any way to model a master microgrid controller. SAM models grid-connected systems only. There are multiple ways to export any of the results that SAM provides, and these results could be used in other tools.

What does the term TOU stand for?

TOU stands for Time Of Use and used to describe the time structure of electricity rates.

According to your answers I think we can use data from our countries. Is there any explanation about the format of the files we should use?

Yes. The format is a CSV file that you can create in Excel and use directly in SAM. Instructions are available in the online help included with SAM. Search for "weather file formats" in the help system.

What is the 75% cliff? 75% of what?

There's a discussion of the 75% cliff on the SAM help forum, including a document describing it posted by a user, here: <https://sam.nrel.gov/node/69663>.

When you say Battery+PV; does it mean battery will be charged using PV system or grid elec?

The controller can be configured to charge using PV or grid.

The efficiencies on power conversion look low to me. Have these defaults been validated?

We try to provide reasonable default values in SAM, but you should always check and modify the parameters to be most accurate for your analysis.

***by low I meant high, but never mind. Like it should have been 95% or so, which he actually changed it to later.**

Can we manually enter the hourly PV production? (If so, then we could more easily model integrating PV into other things, like wind.)

You cannot currently manually enter hourly PV production for use with the battery model. SAM's generic systemmodel allows you to enter hourly production information to represent a generic system, but the battery model is not currently available in conjunction with that model.

Where did the load data come from?

The default load data loaded in the SAM project file is representative of a typical residential building. However, we strongly recommend modifying this default to suit your particular analysis.

Does SAM have typical load profiles for different building types, i.e. office buildings, industrial facilities, residential, etc.?

SAM has linkages to other databases for downloading electric load data. Click on the 'Macros' button at the bottom left, then select the 'Download electric load' macro. You can then run it to obtain other typical load profiles.

This is slightly off-topic but does SAM have any capability to model cold thermal storage?

That's a good question. SAM can model battery storage with PV, or for concentrating solar power (CSP) systems, molten salt thermal storage. However, SAM does not have a model for cold thermal storage.

is there a SAM program for the MAC?

Yes, if you go to <https://sam.nrel.gov/download> you may download Windows, OS X and Linux versions.

so you just adjusted the peak load by putting this factor to 0.1?

The 0.1 scales the entire load profile. So, yes, the peak is scaled by 0.1 too.

what about the module degradation rate?

Module degradation rates can be specified on the lifetime page as well. See SAM Help on that page for more details.

what is the C-rate?

A C-rate is a measure of the rate at which a battery is discharged relative to its maximum capacity.

I don't get it, the battery is AC or DC ?

The battery is DC, but is connected to the AC bus via the power electronic converters.

what is a storage dispatch controller?

The storage dispatch controller determines what time of day to discharge the battery based on the criteria you select - peak shaving, etc.

by discharge the battery you mean using it or just releasing it's stored capacity?

Yes, releasing the stored energy in the battery back to the bus.

replace the battery with what? another battery with the same original capacity?

Yes, the battery is replaced with a new one.