Ed Rosenberry of Enteligent (see posting #41 in this thread for a short description of their neat stuff) was kind enough to set up a Zoom call with Sol-Ark to go over some questions and concerns that I had regarding some unclear and/or conflicting information that had been disseminated via various methods regarding Sol-Ark inverters.

The first - and biggest - issue was spelled out in (my) posts #244 and #245 of this thread, best summarized as Tom Brennan making some confusing and apparently contradicting claims in a YouTube webinar regarding the ability to double the (AC) output of a 12K or 15K inverter simply by adding micro-inverters and AC coupling your existing PV panels. The rep said that, after reading my analysis and viewing the salient points of the webinar, he couldn't figure out what Tom was trying to assert. The closest he could come up with was being able to utilize battery ESS input (during the daytime) simultaneously with AC coupled panels, but he said that this configuration is not something that Sol-Ark would normally recommend. After all the time I spent trying to make sense of this issue, I felt a little better that a Sol-Ark expert couldn't figure it out either.

We then discussed the virtues of being able to AC and DC couple PV panels simultaneously in both the 12K and 15K inverters to extract the maximum amount of wattage available for any available PV "geography", if you will. We also discussed the much higher simultaneous output capabilities of the 15K over the 12K.

The 12K has a max 13 kW *input* (6500 from each MPPT) from DC coupled panels, with a max 9 kW inverted to AC to loads and/or grid, and an additional 3 kW *DC* output to a battery ESS, hence the 12K name (and yes, the debate over the name rages on…). Additionally, one can AC couple PV panels (via micro-inverters ("MIs") or via another string inverter) up to an additional 9.6 kW *input* (they strongly recommend AC coupling via the gen input). However, the total max combined AC *output* (of the inverted DC coupled panels and AC coupled panels) is 16 kW.

The 15K has a max *input* of 19.5 kW of DC coupled PV panels (yes, the spec sheet says 17 kW, but he said that it is still 6500 per MPPT, for 19.5 kW). The max *output* from this DC coupled input is 15 kW (which includes any combination of output inverted to AC for loads/grid, and DC output to a battery ESS). Again, additionally, one can AC couple PV panels up to a max of 19.2 kW. The total max combined *AC output* (of the inverted DC coupled panels and AC coupled panels) is 34.2 kW. We also discussed how the PV input specs in the spec sheets (for both the 12K & 15K) being higher than the inverter output represents the DC to AC ratio.

With all I wanted to go over, I don't know why I next chose to go over the rather unique setup of @canxane. Probably because of the seemingly contradictory feedback from various Sol-Ark sources, and the resulting confusion regarding the "gen input". Anyway, the rep said that he had read the posts and Sol-Ark replies/clarifications that I had copied from this thread, and believed that there was some misunderstanding between the forum member(s) and Sol-Ark Support, as the information reportedly returned by Sol-Ark Support indicated a pretty significant lack of understanding of the system. I further described the rather unique setup in detail, and in an attempt to resolve the misunderstanding, the rep said that one thing that cannot be done with the gen input is to use it both as AC coupled input and as a smart loads output. He further said that the "generator input" would be more accurately represented by the term "auxiliary connection point", as it can function *either* as a generator input, AC coupled PV input, *or* smart loads (a.k.a., "dump load") output. The important words in that last sentence being "either" and "or", as one can configure the inverter with only *one* of these three functions at any given time. He said that the inverter setup screens (either in the app or on the inverter itself) prevent any invalid configuration of the gen input. He also stated that the manuals explicitly state "DO NOT USE" the gen input for both AC coupling and a generator (this is true for *load side* AC coupling of PV panels; I guess they assume that not attempting to use the gen input for both AC coupled PV panels and a backup generator falls under "common sense" restrictions). He said that if the gen input is configured for AC coupled PV input, it can absolutely feed AC wattage out to the grid. By default, it

satisfies the loads and battery charging first (subject to configuration parameters), and any excess wattage is sent back out to the grid. One *can* also have a backup generator connected to the Sol-Ark inverter, but the generator ATS must be connected to the grid input. When I reiterated that this unique set up has AC coupled PV and a generator connected to a separate inverter in a workshop with the question of the output of that inverter being connected to the gen input of the Sol-Ark 15K inverter in the main house, he thought that might be OK, with the caveat of not knowing how the external (shop) inverter would handle frequency shifting commands from the Sol-Ark to shed excess AC wattage. (I later realized that I may not have represented the layout of this unique setup perfectly, but I knew (from past experience) better than to ask the owner for any further clarification. So it is what it is, as described.)

I returned to the list of questions I had. They (and the responses) are as follows:

Assume a Sol-Ark 15K with a battery ESS.

1. If just DC coupling PV panels:
    a. Can I configure the priority for wattage to go to battery or loads first, then the other, then excess goes to grid?
        i. Answer: realistically, unfortunately no. There is a feature to do this, but Sol-Ark has seen a lot of issues with it, and it is not recommended. By default, it goes to battery first, then loads, then grid feedback. I gave feedback that this is a feature that I would like to be able to use.
    b. If I want to use the battery at night, I can configure the inverter to do that before using grid, right (up to a specified SOC/V)?
        i. Answer: Yes.
    c. When the grid goes down, I can specify that PV handles loads first, then add battery if it needs more, right?
        i. Answer: Yes, this is actually the default.
2. If just AC coupling PV panels (micros) through the (preferred) gen input.
    a. Same question as #1a above:
        i. Same answer, but in this case, it goes to loads 1st, then battery, then grid feedback.
    b. Same question as #1b above:
        i. Same answer
    c. Same question as #1c above:
        i. Same answer
3. Assume you have both DC & AC coupling of PV panels (assume 10 kW ea. for sake of argument).
    a. Same question as #1a above, but can I also specify to use MPPT PV input to charge batt (1st) & AC coupled to supply loads (1st)?
        i. Same answer, but it does what I describe by default (because it is most efficient for the inverter)
    b. If the battery ESS becomes fully charged (per the parameters in the configuration), does the inverter take the wattage entering through the MPPT, invert it, and add it to the load output?
        i. Yes
    c. If the AC load is fully satisfied, does the inverter take excess (PV AC coupled) wattage coming in through the gen input, invert it, and send it to the (DC coupled) battery ESS to charge it?
        i. Yes

I then gave some constructive feedback that the user manuals for the 12K and 15K could use a lot of work as far as ease of comprehension goes.

I already supplied some information in post #318 regarding "the Chinese connection" of the physical location of user (inverter) data and firmware update servers, which is currently inside the PRC. The rep subsequently followed up with their team and has "confirmed that our AWS servers will be physically located in the US".

Questions asked in a subsequent email:

1. I noted that when I posted on the DIY Solar Forum about simultaneous DC and AC coupling with the 15K & M1000/2000 micros, one member wondered whether there might be any tighter "integration" between them in the works (say, to increase wattage from AC coupling, etc.). I just thought I'd ask if there was anything you can say about this (like "watch this space", etc.)?
    a. Response: Not much in the way of tighter integration with those units. We will be able to accept the same amount of AC coupled power with the 15K whether the customer is using Enphase or our micros. The only added benefit would be a single UI for all the monitoring of the system.
2. In the event of an inverter failure, does the AC coupled wattage (from micros) coming into the gen port become useless, even with the 200A pass-through? IOW, is the 200A pass-through unidirectional (only from the grid to the main distribution panel) or is it bidirectional?
    a. Response: As long as grid is there, MIs will continue to be able to provide power and that will be passed through to loads and the utility.
3. I remember hearing in a couple of places about AC coupling of solar panels to the "grid side" of the 12K and/or the 15K. The only way I can think of that this would work is an off grid situation where there is no generator hooked up to the grid input, but rather the AC coupled solar panels. Do I have this wrong? Is there some way to AC couple solar panels (either simultaneously with DC coupled panels or by themselves) to the grid side in a grid connected set up?
    a. AC coupled solar will only continue producing off-grid if landed on the gen or load connections of the inverter (GEN strongly preferred). Nothing stopping you from putting AC coupled solar on the grid side of the system, but for all purposes, our unit will just view it as utility power.
4. Does the Smartloads 14 (interacting with the 12K or 15K) help to load level between L1 & L2 (so it doesn't trip max wattage on either line)?
    a. TBD - I imagine we will shed loads to keep the system from overloading on one phase but I am not 100% certain so I do not want to misguide you.
5. I left the final question for my final follow-up email for a reason, because the question has – in the past – seemed to be a bit of a sensitive subject. The question was: I've been hearing for some time now (around a year) in webinars and such that Sol-Ark has been planning on moving manufacturing of the basic inverter from China to your nice new location in Plano, Texas. Is this still the plan, and do you have any idea of what the timeframe might be? This goes to the same concerns that I raised for user data hosting and firmware updates.
    a. On the question of manufacturing, there is nothing imminent I can share regarding moving manufacturing to the US. As much as we'd like to, it is realistically cost prohibitive for us at this time. I would not expect any such movement toward that end until mid 2024, at the absolute earliest.

He ended up spending over an hour with me and Ed on the Zoom call, and more time answering a couple of follow-up emails. I told him that there were others on the forum for whom these questions had influence on their inverter decisions. I also told him that I was much appreciative of his time, effort, and candor.