



# African Solar Success Series

## All-in-One

This topic starts with some statistics. Let's assume there are at least 600m people living in sub-Saharan Africa and most have some kind of a power problem – either no power, unreliable power, or expensive power. Then let's count the number of *competent* solar companies that one would trust to install a solution for them – maybe 600 companies at the very most? So we have a one in a million problem.

There are one million customers to be served by every competent company – and they are probably overbooked already! Of course we realize that, without financing, most of these people can't afford the kind of systems we sell – but will serious financing ever come if we don't increase our capacity?



As I have trained over the years, I constantly think about how hard it is to become truly competent and to learn all of the many details that are required to design, install and program today's solar systems. The results are wonderful when we get all the parts and pieces right, but I often ask myself whether such complex systems are a recipe for growth. Will we be able to train and re-train enough people to competently keep up with demand? Is that one of the reasons we see so many bad systems?

All of this thinking makes me wish for simpler systems with less need for sizing and programming and wiring, or in other words, less room for error. And about five years ago I started asking our favorite manufacturers to consider making what I called an "All-in-One", an inverter/charger with a MPPT integrated. This would need to be different than a "power panel" or an "easy solar" where the parts and pieces are wired together at the factory and then shipped (at a slightly higher price than buying the components). It would even be a step further than stacking inverters in the same box and giving it good software (like a Radian). The unit I was hoping for would have all functions seamlessly integrated and provide a single point for monitoring and control.

The manufacturers were understandably skeptical. These were uncharted waters and none of them wanted to plunge in. And then one day about five years ago, we found something at Intersolar that caught our eye. A small French start-up called Imeon was building an all-in-one! We started working with them and even put five units in the field around Africa as a test. But there were problems, of course. The DC charging capacity was too small (20 amps) and Imeon couldn't believe that anyone would need a larger charger. The software needed to be re-written to suit our countries where we don't sell back but we do want to off-set utility. We sold less than a dozen and shelved it until further progress.



Less than two years later a well-known power electronics firm in Asia that specializes in OEM products introduced their version of the same all-in-one. Except that their components and capacity (and price) were dramatically lower than Imeon. We brought in a few units and tested them. The sub-\$500 price for a 3kW rated unit should have told us what we needed to know, but the testing confirmed it. This was not a product we would be touching.



I was discouraged until a colleague came back from Intersolar this summer and told me it was time to take a look at the new improved Imeon. “Compared with the Imeon”, he said, “that low-priced unit is just a toy”. He was right. Apparently Imeon had listened to us and their new 3kW unit offers a 60 amp charger, an MPPT charger that can handle 4kW with a 560 max VOC, updated software and an AC smart meter in the box. The on-board computer

runs Linux with 8gb of RAM and creates its own WiFi hotspot. As you might expect, the graphics and monitoring are great. The Imeon can operate without a battery as a grid-tie inverter, as a back-up inverter, or standalone. The pricing, which is controlled by Imeon, puts it \$200 above an Outback 3kW inverter and MPPT on our price list. But installation is simple – MC4 connectors snap into the array, connect the battery cables and the AC in and out and then do the programming. The units are available in 3kw single phase or 9kw three phase.

So what is the practical impact of this inverter? Many of us try to make standard packages to reduce complexity of quoting, selling and installation and the Imeon might be an important step in that direction. No PV combiner boxes are needed because the MPPT operating maximum is either 480v or 750v, depending on the model. No separate MPPT controller, including raceways, cable and mounting brackets is required. A single user interface controls the MPPT and the inverter, and no separate cables or control panels are required to access it remotely. The WiFi network is on board, so you simply select that WiFi network to interface with the inverter - no additional router or connection is required. And one model will do grid-tie or battery backup or standalone inverting.



It is true that there are only two models of Imeon and they are both 48v, and the size of the MPPT is fixed and cannot be changed. This is less flexible than a traditional system built of separate components. But those two models can do a wide variety of tasks in a very simple way.

Is it durable? It is a high frequency design and we are traditionally suspicious of those. But, so far we have only lost one unit and we suspect that was from lightning. Imeon provides a 10 year warranty if you run their monitoring software and keep your device connected to the internet at least 95% of the time. An optional 20 year warranty can be purchased. The units seem about as tough as the transformer-type inverters that we supply. I think you will like this inverter and what it can do for you.