



## African Solar Success Series

Quantity and depth have always been the two challenges of solar water pumping. You could have one or the other, but you could not have both. Not that people didn't try... do you remember the days of the Grundfos SA-1500 pump inverter that converted PV power to 65 VAC three phase electricity and was paired with a special 65v Grundfos pump? Or the Aerovironment USPC pump inverter used by the likes of World Water and Total Energie to make very large pumping systems that only a few could afford? More recently SunPumps converted a conventional variable frequency drive to make their own large pump inverter - it worked, but the cost and complexity was a real challenge.

Many companies make good variable frequency drives. For example, I use a Danfoss drive for my AC-powered borehole pump on the farm, and I love it. But the challenge for the solar industry is adapting those drives to the variations that occur when the power source is a PV array. We began to wish that Grundfos and their Danish cousins at Danfoss would work together and create an awesome variable frequency drive that would use a PV array and drive a conventional three phase pump motor.

Well, our dream has finally come true....



**Luke, I am Your Father.**

Grundfos finally announced a solar powered pump inverter that looks like something from Star Wars



and performs like a storm trooper. It will accept a PV open circuit range from 400v – 800vdc, is IP66 rated (spray it with the hose pipe), and will power up to 37kW motors. There is no need for an array sensor because the drive measures and manages the PV input power. The programming is simple via a removable on-board control panel and if you use a Grundfos pump, it will be in the inverter's library – just select your pump from the list. If you can't be on site yourself, you can program the inverter at the office and then send it to site with its non-volatile memory. And the memory stores two years of operating data, to make trouble-shooting easier. There are 12 models to choose from in 380-415v or 208-240v three phase output. And the inverter can also accept 3 phase AC power and act as a motor controller for the pump when running from AC.

Sizing can be done at [www.product-selection.grundfos.com](http://www.product-selection.grundfos.com), including printing out a full proposal with graphics and detailed specifications. Contact your territory manager for notes on how to get everything to display nicely. A quick sizing rule is to assume 1.5 times PV name-plate watts to the P2 (power required by pump). Of course the RSI is also a soft-starter, so your pump motor will start up gradually and save motor wear. Consider using a sine wave filter if your pump depth exceeds 30 meters – they will help your pump motor last longer by smoothing harmonics.

Best of all is the pricing. We can't publish pricing in this letter, but I can tell you that the 2 – 15 kW models are less than the cost of a SQFlex pump. These can be very economical systems and will compete with generators, easily providing payback for your clients in less than a year.

### **So Now What?**

These inverters are available today and we are ready to sell them to you. There are already hundreds of RSI inverters installed in Africa and working. So what do you do with it? I would suggest that anyone pumping water with a generator is your first and easiest customer. You could use their existing three-phase motor in the borehole and fit an RSI and solar array with a changeover switch to allow them free solar pumping during sun hours. Grundfos tells us that efficiency and performance are best when the RSI is paired with a Grundfos SP pump, but in many cases we understand that the customer will want to use their existing pump, and most of those will work.

You may have turned customers away in the past because their water requirements were too big for anything we could do practically with solar pumps. With the RSI in hand, you can re-visit those customers and power up to 37 kW systems. This will open opportunities in agriculture, municipal water supply, industrial pumping. The technology is here now – let's go find uses for it!