

Getting hard on solar soft costs

Project economics | Alumni from SunPower's recently wound up project business are spearheading a new venture targeting large-scale solar's soft cost problem. Ben Willis hears how they plan to harness the power of digital technology in tackling one of the industry's persistent pain points



Credit: Terabase

In the quest to continue driving down the levelised cost of solar energy, all facets of a PV power plant are fair game for potential savings. In recent years, the solar industry has been extraordinarily successful in targeting system hardware to bring overall project costs down; module prices have plummeted drastically and increasingly affordable innovations in inverter and tracker technology have given developers powerful new tools to wring ever more value from their projects.

But one area that is "overdue for disruption" is that of soft costs, says Matt Campbell, co-founder and CEO of Terabase, a new Silicon Valley-based venture recently launched with exactly this aim in mind.

According to Campbell, while falling costs in hardware have helped reduce the average price of large-scale PV systems by up to 88% in the past 10 years, soft costs have failed to follow a similar trajectory. The result is that these costs, defined as the non-hardware portion of a project's costs – development, EPC management, labour, logistics – are now proportionally more significant in a system's overall economics.

"There just hasn't been enough innovation applied to it yet," Campbell says. "Hardware has seen tons of innovation. Inverters today are 5MW, 1,500V; when I started doing projects they were 100kW and 400V. It's the same thing with panels, the same things with racking. So there have

been huge amounts of innovation, lots of investment. But we haven't seen the same in soft costs. The way we build projects today isn't that much different than the way they were built 10 or 15 years ago, even though the projects themselves have changed dramatically."

Industry followers may recognise Campbell's name from the many years he spent in the upper echelons of US manufacturer and erstwhile mega-project developer SunPower. During his time at SunPower, Campbell was involved in many of the company's ground-breaking ventures, but will probably be best known as the architect of the Oasis platform, an integrated power plant solution designed to streamline the construction and operation of utility-scale PV projects. Oasis and comparable modular approaches to PV power plant design and integration devised by other companies have been instrumental in helping drive down the costs of large projects over the past 10 years.

Campbell is aiming to bring similarly innovative thinking to his latest venture. Earlier this year SunPower announced it was quitting the large-scale solar development business to focus on distributed generation. The emergence of Terabase is a direct consequence of that strategic move, with SunPower alumni accounting for six of the new company's core team.

Despite the many directions a company

Matt Campbell, third from left, and Chris Baker, second from right, are two of the former SunPower staffers taking on solar's soft cost problem through Terabase

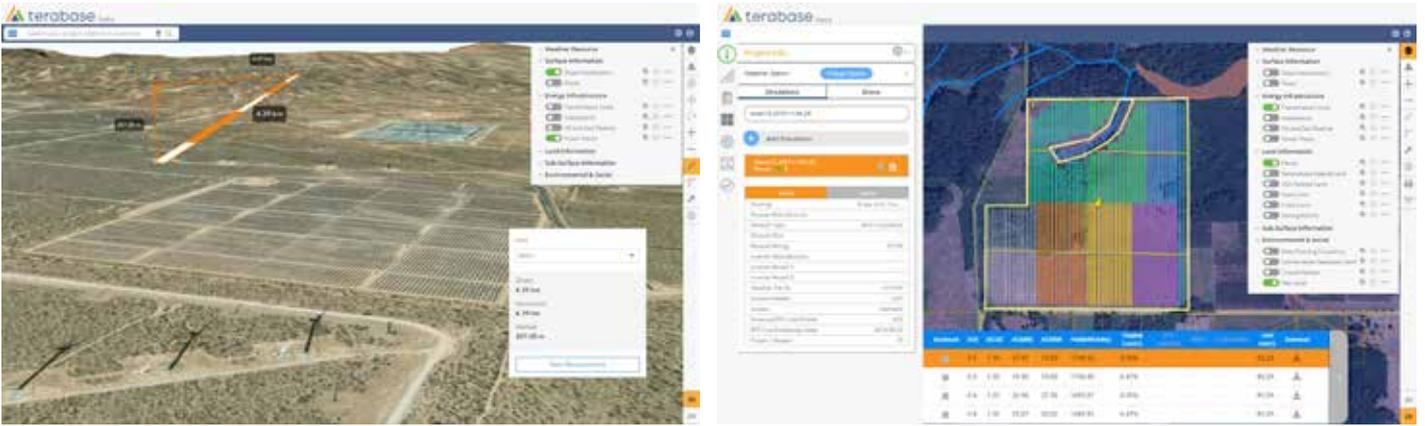
boasting such personnel could have taken, Campbell says a decision was taken early on to adopt a narrow focus: "When we started the venture, we really looked at the market and considered different business models, including project development. And we certainly come from that background. Our conclusion was that the project development market is well served – there are a lot of small and big players globally in a very competitive space, so we felt that our best way to add value was not to be a project developer.

"However, we saw that we could leverage our experience of project development to go after soft cost. The thesis is this: hardware has gotten cheap; panels, inverters and racking systems have seen spectacular cost reductions over the past 10-15 years. But soft costs have been stubborn and as a percentage of the overall project value have become more substantial. So when panels were US\$2-3 per watt, 25 cents of soft costs was less important. But now it can constitute about half the cost of a project."

The power of digital

Terabase hopes to succeed where the industry has so far perhaps not failed altogether, but certainly failed to act in a concerted fashion, by offering developers a powerful tool to begin driving out some of those persistent soft costs. Its central offering is a digital platform designed to accelerate and simplify the early stages of developing a project, which can involve a labour-intensive and costly set of processes. By merging a wide range of datasets, the Terabase platform is intended to enable a developer to undertake in a few simple, desk-based steps what might otherwise take months or years.

"[The platform] focuses on the decision-making processes from the very beginning, where you're doing greenfield siting and trying to find an optimal site, right through to design optimisation, where you've got a piece of land, you've got a project footprint and you're trying to finalise your technology choice to optimise the value of your PPA and minimise your LCOE," explains Chris



Credit: Terabase

Baker, another Terabase co-founder and now the company's executive vice president of sales and marketing. "And that's a one-to three-year cycle probably on a project before you go into detailed engineering."

To enable such streamlining, Baker says, the Terabase platform incorporates publicly available GIS data with a number of proprietary layers to enable users to gain a quick understanding of a prospective site's key attributes and constraints – things such as topography, weather data, transmission access, underlying real estate and so on. It also features a number of pre-set kits that enable a non-technical user to simulate and compare the performance of different technologies – PERC, bifacial, half-cell, trackers, fixed-tilt – on their prospective sites.

"The old school way of doing this is site surveys and physically going out to capture that information," Baker continues. "Now, you still need to do that to build the project, in almost every case, because you've got to field-verify what you're seeing with publicly available data. But the big benefit is that you are deferring the need for some of these field surveys by doing a pre-check using digitally available layers. And you're spotting obvious risks and constraints so you know what to go and look for."

"The way to think about it is it's half a GIS tool and half a solar project engineering tool," adds Campbell. "There's different software that's available in the market, especially in the DG space, but we built our platform exclusively focused on the utility space, which has a much different set of requirements. And we thought this integration of GIS with project engineering is important. The other thing is we really target a non-technical user, because normally you've got a developer working in partnership with a technical team; we wanted to empower the developer to do a lot of the early technical economic assessment quickly, using software but without the need to go through a lot of detailed engineering."

Added value

The data held within the Terabase platform is of course largely available already on various digital platforms, but bringing it all together in one system generates certain efficiencies to the user who no longer has to toggle back and forth between several different systems, says Baker. "But the big benefit is really more to be able to defer engineering spend earlier in a project's life. You can cast aside bad projects quicker, you don't spend time or money on them and pick better sites right from the get-go," he adds.

Campbell says there are plans to improve the breadth and depth of data held on the system and also to add new functions, such as one that will automatically generate estimates of a project's likely EPC cost and internal rate of return. "Those two components are important because we want to help the developer find which configuration has the best economics. So this will provide a quick answer to that question," he explains. Further planned functions include the ability to generate a bill of materials, a schedule and optimised logistics plan. "So this is just the first step in a long journey of digitalisation," adds Campbell.

The basic Terabase platform is currently offered free over the internet. The company operates a premium business model, in which it then offers clients products and services on top of the basic platform. "For example, if you want half-metre resolution on satellite data, we can sell that data to you through the platform," says Campbell. "We can commission drone flights, we can do detailed CAD engineering in our engineering back office we've set up – there are a bunch of paid services we can offer. But we think there's a lot of value in the basic functionality being free, because it's a great tool for developers and we want as many people to use it as possible."

Campbell is hopeful that the Terabase platform and the company's additional services will make a meaningful contribu-

Terabase's platform offers a variety of digital tools to speed up the early stages of project development and design

tion to reducing the hitherto persistently high soft costs of large solar projects. "Obviously it's project dependent, size dependent and country dependent," he says. "But I would generically say that for an average 100MW project the target for us in terms of value creation is 7 cents a watt, which depending on the location could be about 10% of the project value. And that's a combination of building projects less expensively and building them faster."

"A juggernaut of solar"

Looking at the bigger picture, Campbell believes that the wider digitalisation of solar, of which the Terabase platform is just one part, is a necessary process the industry must go through if it is to capitalise on the huge opportunities that lie ahead. His view is that in spite of the industry's many successes to date, in terms of large-scale power plants, "less than 1% of what will eventually get built has been built". "It's just going to explode in the coming years," Campbell says.

A game changer for Campbell is the likely adoption of bulk storage, which he predicts will come of age in around five years' time, leading to a significant uptick in the scale of solar projects being built. "That will just unleash a juggernaut of solar, because if you have cost-effective bulk storage, you'll do projects that are four or five times bigger," Campbell says.

When that happens, the industry will have little choice but to be a whole lot smarter about the way it builds projects, and his hope is that Terabase will be at the forefront of this process. "That's the philosophy of our company; our name is reflective of that – 'Tera' is for terawatt and 'base' is for baseload energy. And the hypothesis is, if you're going to terawatt-scale baseload solar, how would you do it? And the conclusion is, it's got to be completely digital. That's not tomorrow, next year, but over the next five to 10 years."