

Solar reporting – where does the data come from and who needs it?

Reporting | The growing range of stakeholders in the solar business, from the owners of small rooftop systems to pension funds, require timely and adequate information on asset performance, but to varying levels of detail. Edmée Kelsey looks at how the industry is rising to the increasingly onerous reporting challenge



Credit: First Solar

The investment appetite for solar PV seems insatiable: the total global installed base of solar PV is estimated to be at around 300GW today. Early investors in the industry were assuming higher perceived risks in return for higher investment returns. Investment in solar PV is now becoming more 'mainstream' and is attracting new investors and new service companies. Investors have gained more comfort to support their investment decisions, because there is a lot more experience data available today, compared to a few years ago. It is one thing to rely on the claims of cell efficiency of panel manufacturers, but it is a completely different thing to have a history of actual operational data available to support those claims.

Different market actors need different data and different reports. Some require very deep technical data on a real time basis and others are happy with a periodic high-level overview on the financial performance of their investment. Although the industry has become a lot more professional in recent years, reporting is still a cumbersome process.

Where does the data come from?

To answer that question, it is interesting

to have a look at the evolution of solar data since the early days of the industry. Initially data was mainly available through web portals provided by manufacturers of inverters, combiner boxes, meters and data loggers. These manufacturers were addressing an emerging need in the industry. They were differentiating their product by packaging it with a monitoring system. This was a great first step to visualise performance data and alarms, and create reports.

But the industry soon discovered the limits of those monitoring systems: for investors who own multiple solar projects, it is a hassle to log in to multiple web platforms on a daily basis. In addition, many industry participants soon requested additional data points or customisation of those platforms to meet their needs. Since inverter companies make their profits on their hardware solution, the improvement of software has never been their top focus.

This is why a new breed of independent monitoring providers jumped at the opportunity by creating hardware-independent monitoring solutions. These monitoring solutions claim they are "hardware agnostic". They are able to acquire data from multiple hardware solutions and multiple renewable energy sources. They will standardise the

The breadth and depth of data from PV portfolios and the range of players demanding information create reporting challenges for the solar industry

data sets so that investors can create portfolio reports and compare the performance of solar plants against each other.

Until recently, investors in larger PV systems had less of a need to standardise, simply because their portfolios have not been large enough. They are typically relying on data from O&M service providers, who draw the data from the SCADA system on site. The issue with the SCADA systems is the challenge to view performance data remotely. Apart from cyber security concerns, these SCADA systems are also highly customised, so integration with a monitoring system often requires additional investment. Any investor who is interested to see real time or near real time data from a portfolio of large-scale solar plants should budget for a cloud-based remote monitoring solution.

As the industry continues to grow, it is attracting attention from players from different industries. New entrants believe that their experience with big data and IoT (internet of things) can bring additional efficiency and insights to the solar industry. They are planning to bring down the cost of monitoring through more efficient data acquisition and more modern data models. These IoT players are likely to have a lower cost structure because they can amortise the software development over much larger data sets, since they are not just developing a solution for the solar industry. Cost consideration will be extremely important, especially if monitoring requirements go to down to panel level data, in which case the data sets will grow exponentially. In addition, these new entrants are applying knowledge of neural networks and machine learning to build sophisticated "event handlers" that can create automated tickets based on highly customisable algorithms.

The data reported by the various monitoring systems is mainly technical in nature. The reports will analyse if the plant was under or over performing based on the

actual irradiation measurements. They can analyse the production lost to downtimes. More flexible monitoring solutions can also calculate complicated custom performance ratio guarantee formulas stipulated in O&M agreements. But it is still a far cry to get from this technical data to cash-flow planning or calculation of investor returns.

Who wants reports and what type of information do they need?

There are many different stakeholders in the industry and they all have vastly different reporting needs. Their information requirement will usually vary by the type of involvement they have.

The doctor or dentist: An example of an affluent homeowner who invested his personal funds in solar panels on his home. He will have made this investment for a combination of reasons, such as supporting the environment and to save money on lower utility bills. He will love to flash out his smartphone at parties and show off the performance of his home's solar panels on a mobile app.

The school: Many schools have adopted solar to save money. But they will have also considered the educational component and may have incorporated solar into their curriculum. They typically have a large digital display in the school entrance hall to show the current solar electricity production and the lifetime production.

The supermarket or department store: Until recently most companies' main driver for investing in solar has been that they are using solar for marketing purposes. They want to be perceived as helping the environment and will want to show their clientele how much CO₂ emissions they have saved.

The O&M service provider: Real time alarms and alerts are the core data source for O&M service providers. Based on the alarm type, they will decide if they need to dispatch a service technician to investigate the problem. O&M service providers are typically paid to "keep things running". They may have availability guarantees and performance guarantees in their contracts. But the financial implications of their decisions are not part of the scope of their work. So if they need to decide to dispatch a technician to one of two plants with the same problem and same capacity, they will most likely first go to the plant that is closer



Financial and business reporting for asset managers is a headache, but software is becoming increasingly sophisticated

or has stricter guarantees, not to the one with a higher feed-in-tariff.

The NOC: Larger O&M service providers and independent power producers (IPPs) will have a network operations centre (NOC), a room filled with monitors and trained staff. This NOC will monitor millions of alarms a day and will have a set of analytic tools to evaluate performance of the solar plants in depth. The staff at the NOC will be able to produce very technically oriented reports and make recommendations for performance improvements.

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The IPP: The IPP is quickly becoming the most vertically integrated player in the industry. While they invest other people's money, they will typically also invest themselves or have retained ownership in the project. They are involved in the development, construction and operation of the solar plant. While they traditionally only performed asset management, they are now increasingly involved in O&M activities directly. IPPs are very data hungry. They need data and reports for many different reasons. The performance of their own portfolio provides a great feedback

loop to their development team and will help make smarter hardware choices. In modern IPPs, the asset managers will have P&L responsibility for the project companies that own their projects. This gives the asset manager the responsibility for the overall management of the projects in such a way that they generate maximum cash with minimum risks. The management of the IPPs will require extensive internal reporting to manage their business. Investors in the IPP will require monthly reporting of financial and technical performance of each individual project company and also on the portfolio as a whole.

The bank: The reason banks are involved in the solar industry is that they want to realise a margin on their loans. They are not particularly interested in the technical performance of the plant, but need to have comfort that the plant is producing according to the financial forecast. Because the bank is not participating in any financial upside, their main focus is on minimising risk. If the plant is underperforming, they will see this as a risk that needs to be mitigated. Their reporting requirements are focused on the cash returns of the solar project and how the cash is able to service their debt. They typically need reports on quarterly or semi-annual intervals. In each case they will need to see comparisons of the actual cash generated versus a variety of budgets and they need the calculation of ratios that are part of the loan agreement, such as the debt service coverage ratio.

The pension fund: Traditionally pension funds have invested in solar in an indirect manner, i.e. via a third party investment fund or an IPP. Some pension funds are starting to invest directly. But operating solar assets is not their core business, so they typically outsource this to an independent asset manager. The pension fund will have invested in relatively low-risk projects. As long as they meet the expected IRR, they will not be very interested in in-depth technical and financial reporting. But because risk minimisation is very important to them, they will require frequent risk reporting. They need to monitor regulatory and contractual compliance very closely to safeguard their investments.

The exchange traded investment fund: Depending on what stock exchange this investment fund is traded, there will be many specific reporting requirements. These funds will typically have external

audits to prove that they are compliant with regulations. Compliance reporting is becoming increasingly important for those funds. Another challenge that publicly traded companies face is that they will need to close the financial month end very quickly, sometimes on the third or fifth business day. For many solar projects, the actual revenues will not be known yet at that point, because they are waiting for utilities to provide utility statements or feed-in tariff payments. In this case the publicly traded company will need to book an accrual that they will later need to reverse when actual data comes in. Another level of complexity for financial reporting.

The utility: For many utilities solar is still a very small segment of their total generating capacity. They will already have many different departments in place, which each will pick up part of the activities of a solar asset manager. Because of that "fragmentation" of the solar asset manager's job, it will be challenging for them to get a complete overview report of all aspects of a solar project. As long as the solar business is still relatively immaterial to their overall business, this may not be an issue.

How are the reports created?

Reporting is still one of the major pain points in the solar industry. It is mainly a manual recurring job. Most modern monitoring systems can produce customised technical performance reports. But where things get a lot harder is in translating kilowatt-hours into euros or dollars.

In the early feed-in tariff regimes, this was relatively easy: you just multiplied the kilowatt-hours by the applicable tariff and that was it. Today most solar projects have more market-based pricing, which adds a whole new level of complexity. Solar projects sell their generation based on time-of-day-based PPAs, benefit from reduction of the utility's time-of-use capacity fees, will sell green certificates, renewable energy obligations, will sell solar energy on day ahead markets, be involved in energy price hedges and so on.

Financial and business reporting needs to incorporate and analyse the project's revenue and cost information and to compare it against the original investment case. Currently this information lives in "data silos": information systems that do not talk to each other, like monitoring systems, spreadsheets and accounting

systems. The creation of reports requires a lot of copying and pasting from one system to another.

Solar asset management software providers like 3megawatt are there to help. These cloud-based software solutions will provide integration of the various monitoring systems with spreadsheets and accounting systems to create different reports for different stakeholders. It is not a completely automated process yet. But the industry needs to get this right quickly to address the every increasing reporting requirements of the various market participants. ■

Author

Edmée Kelsey is founder and CEO of 3megawatt, a software solution provider for the renewable energy industry. 3megawatt has developed BluePoint, the largest and fastest growing enterprise-class asset management platform in the industry. BluePoint is designed to automate and control the entire renewable asset management lifecycle. Kelsey was the former CFO of Main Street Power, where she closed project financing for over 100 distributed solar PV projects and was responsible for the asset management of those solar assets. She was also formerly a VP at the investment bank JP Morgan and managing director of a clean energy corporate finance advisory firm.



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