Towards standardisation in PV plant reporting

Technical due diligence | PV plant data reported to stakeholders has hitherto lacked consistency. Christos Monokroussos, Matthias Heinze, K. Dixon Wright and Mark Skidmore report on efforts by the IECRE to harmonise the information being reported to investors, regulators and others over a project's life cycle

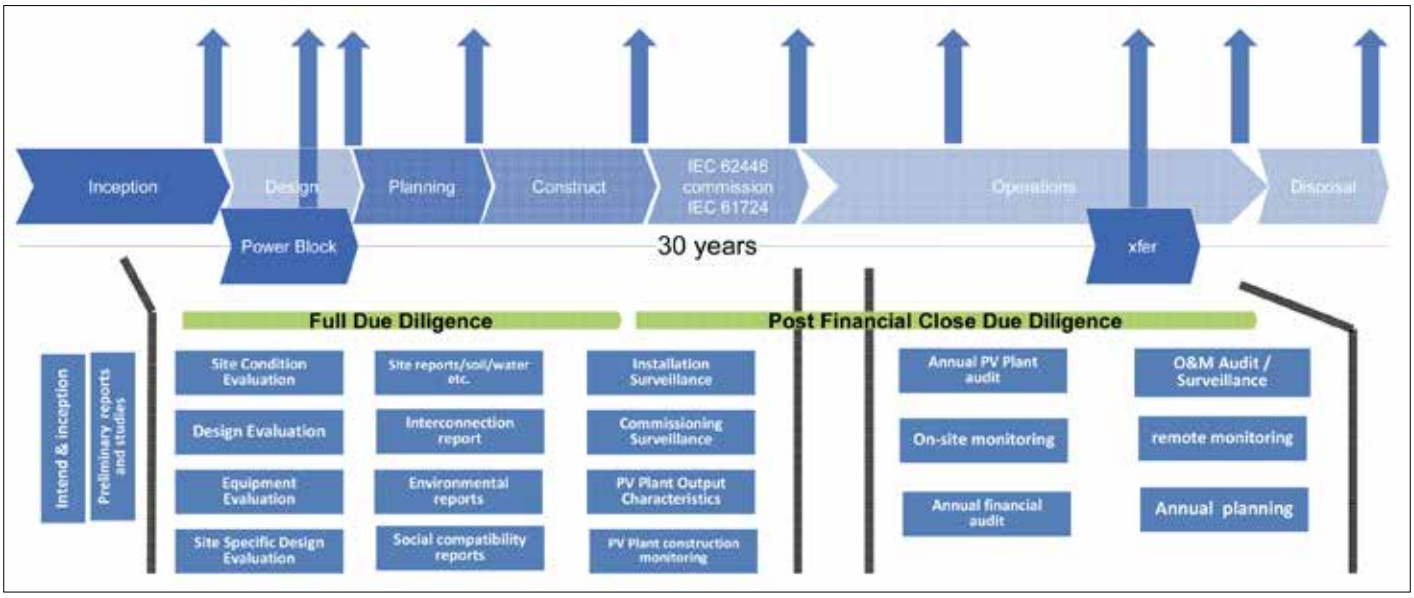


Figure 1. Plant life cycle and due diligence

PV power plants have high initial costs that can be a barrier to development. New PV power plant procurement worldwide increasingly relies on a tender process involving reverse auctions for purchase power agreements (PPA) contracts. The resulting low price should place high importance on oversight due diligence to minimise risks to financial stakeholders.

Whereas this is often scrupulously observed for administrative and legal issues, the technical component of this oversight is often less developed. It may also be noted that tenders have little if any commonalities and, most disconcerting, currently technical due diligence is neither standardised nor based on standard definitions within the industry.

We present two new avenues: 1) presenting project risk transparency to financial markets for competitive pricing on financing, financial guarantees, insurance and surety for improved bankability; and, 2) corresponding strengthening of technical due diligence for new projects to be built and to facilitate existing projects with change of ownership and re-financing.

Status quo of PV system expenses from financial markets

The lender and financial markets currently underwrite projects by coordinating the various information and analytical assessments from multiple stakeholders in the given project. The coordination requires aggregating data from different sources, each with their own nuanced treatment of data that requires manual interpretation, manual processing and data entry into systems. Each of the components from the financial markets that impact the financial cost of project development likewise aggregate data from different sources; again each of these has its own particular nuances as regards interpretation and entry into industry-specific systems to generate premiums, fees and interest charges.

Figure 1 depicts a highly simplified view of a project lifecycle, showing a typical US project flow and tranche assignments. All 'up' arrows represent minor (small arrows) and major (large arrows) transfers of funds, a "tranche". The list of reports and documents may be neither necessary nor complete for each milestone.

The role of independent engineering reports

Independent engineers (IE) provide unbiased and impartial evaluations, reviews and assessments as part of the due diligence process during various phases of the PV plant life cycle. IEs use a combination of technical, financial and other necessary information and

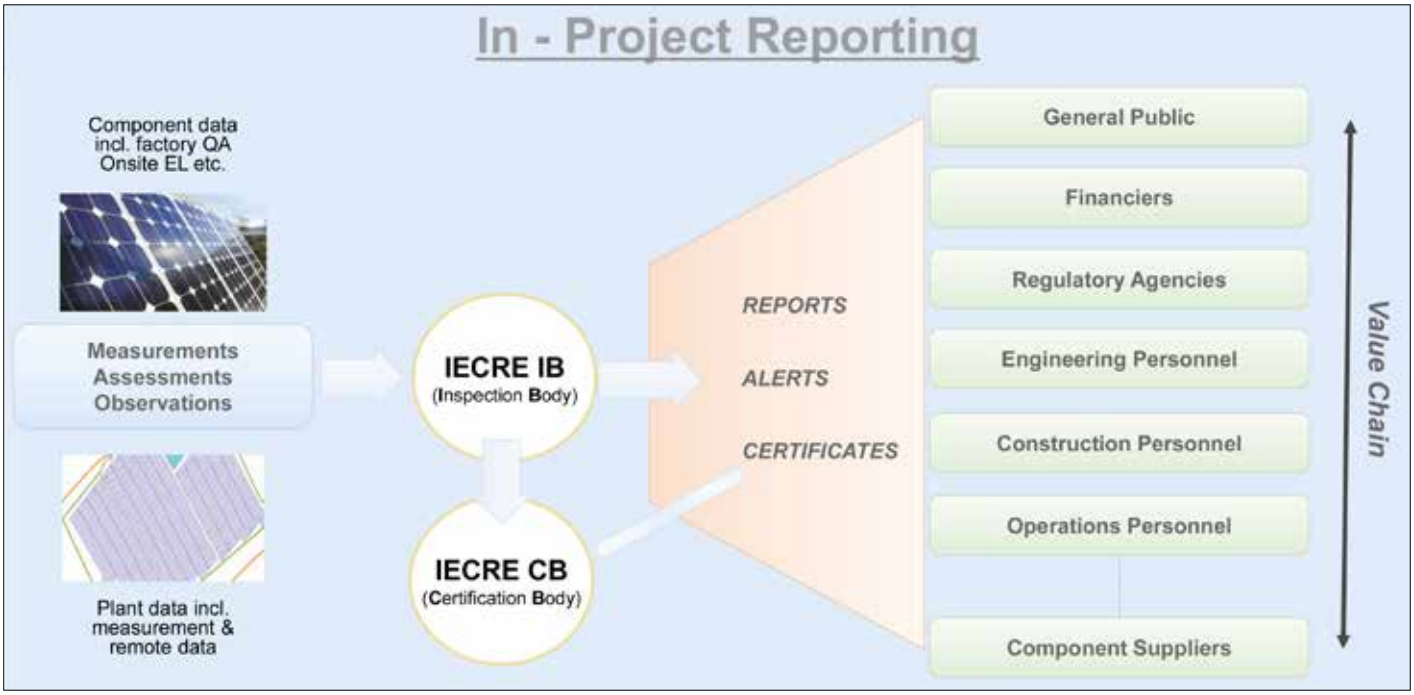


Figure 2. In-process IECRE reporting

data to assess the performance metrics that help stakeholders gain confidence and may be required as part of their fiduciary responsibilities. IE activities may be required at each life cycle milestone. IE involvement may be continuous at intervals or at specific instances (e.g. continuous monitoring, warranty reviews, yearly performance audits, damage assessments). Independent engineering's principal object is the PV plant, but all components are potentially a target of IE scrutiny. IEs may exercise oversight in all phases of plant life cycle as required by stakeholders. Figure 2 shows how IECRE due diligence in-process reporting would be structured from a value-chain perspective.

Of special concern is that PV plants rely on mass production of components, making production, process and supply chain-related quality assurance (QA) services necessary as part of the due diligence process prior to commissioning. In this context, it is important to note that the standard IEC 62941 for PV module production QA has recently been released by the IECRE (IEC Renewable Energy).

The IECRE role and fundamental principles

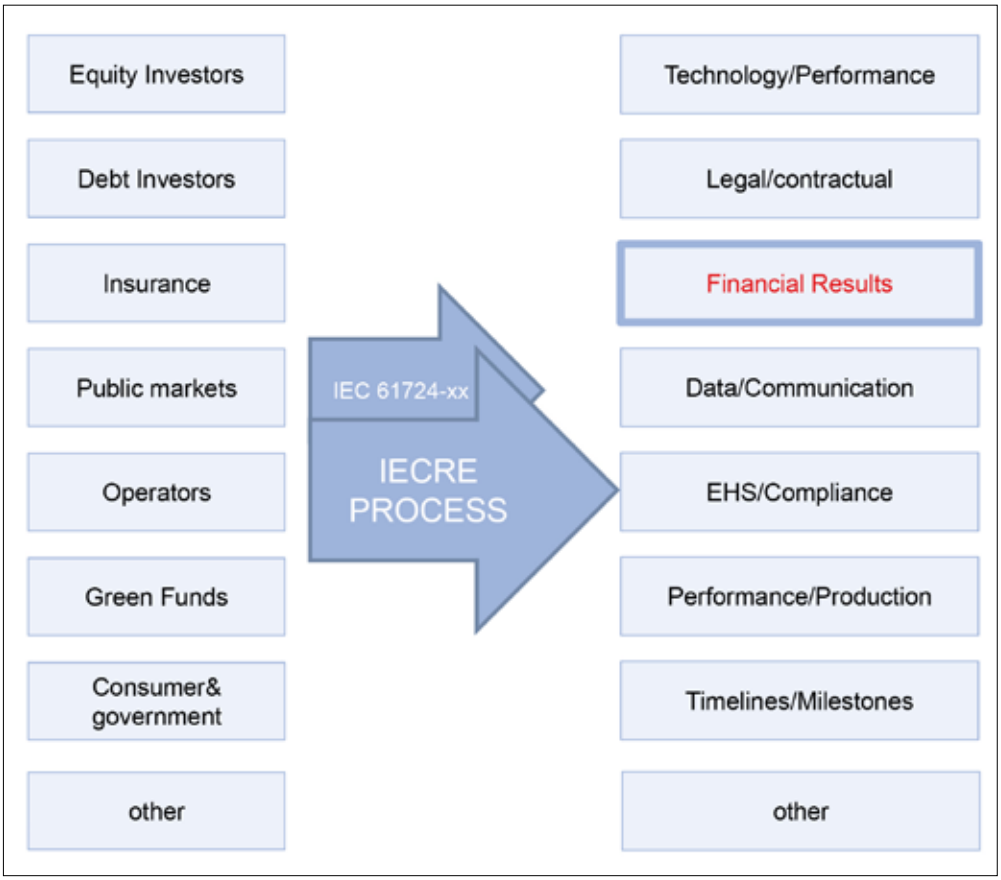
The IECRE is setting out to bring a modicum of standardisation to the process of due diligence assessments in PV power plants (known as the IE process). The status quo hitherto was that those conducting IE work were doing so at their own discretion. Not only was nobody checking the checkers but the process, the output, information and data could be entirely undefined and the resulting data could not be interoperable – one measurement may or may not compare to another.

As an example, buyers of stocks or bonds would be oblivious that the "capacity" of a PV power plant in megawatts could mean a variety of things; "capacity" in one statement could mean something else in another.

The IECRE is ensuring that all inspection and certification bodies are subject to a strict peer review process that verifies impartiality, competence, accountability and transparency of the data.

Figure 3 identifies stakeholders that the IECRE is serving and the informa-

Figure 3. Stakeholders and data needs



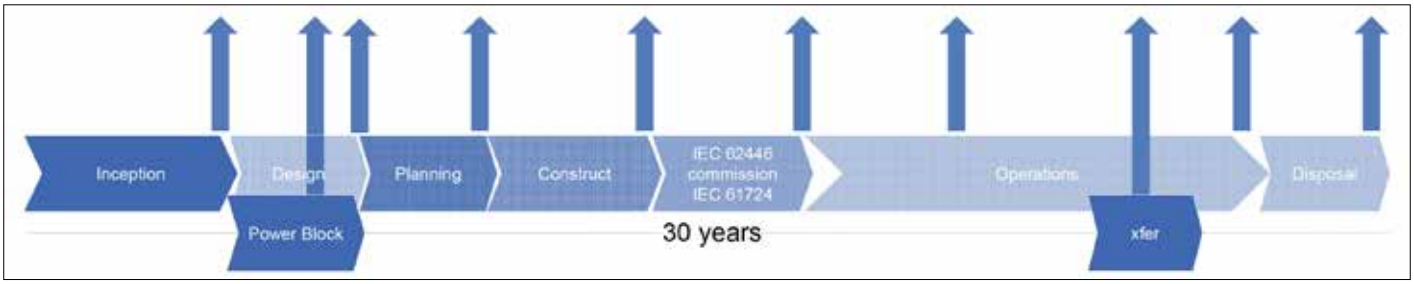


Figure 4. PV plant IECRE milestones

tion provided to them within the IECRE process. IEC 61724-xx (i.e. various parts of this standard) is one of many standards that the system draws on to achieve standardised data. In PV systems financial, legal, contractual and technical data are interconnected; they must all be included in the taxonomy. The IECRE is providing the strict naming and identification to transport such data. A large number of critical data elements of interest to stakeholders are identified and precisely defined in IEC standards. Some data elements have no underlying specific IEC standards currently in existence and for some there may never be IEC standards.

Yet the mere fact that a unique identifier can be used, an overarching process is provided and the parties conducting due diligence are subject to a peer review process, improves on the status quo.

Figure 4 illustrates how data is collected in reports and then collated. The results of these reports are formal "certificates" that contain a predetermined set of data fields. They are issued by qualified independent engineers at the major milestones. Milestones may also entail transfer of funds and require the associated reporting by independent parties (e.g. annual reports). In case of the ICERE process this data is obtained by the IECRE inspection bodies and verified (certified) by the IECRE certification bodies. Data is submitted to the IECRE and selected data – certificates – made available at the IECRE for the public to view. Other IECRE data, such as detailed technical data and related financial figures, is communicated at these milestones to the stakeholders in accordance with contractual obligations and authorisations between the stakeholders and the IECRE inspection body.

Informal internal reports utilising the ICERE standards can serve as low-cost interim reporting to stakeholders in between formal milestones (i.e. certificates) set according to stakeholders' needs and contractual obligations.

These internal B2B reports are helpful, and follow the traditional practice of internal balance sheet and profit and loss reporting in between CPA financial statements for company financial performance. Just as the third-party annual CPA statement is a routine practice, reporting the annual IEC certification from an independent qualified third party is a critical component.

Being able to track internal reporting against the IEC certificate for system reporting will be just as important as tracking the company financial reporting against the CPA statements. The regular providing of performance data, companywide or system specific, provides financial markets with information that can support better terms and conditions, and the CPA and ICE formal reports provides confidence.

Data elements are uniquely named, identified and characterised where possible (where IECRE standards exist). Critically, references to supporting international standards (IECRE/IEC) are made in the Rules of Procedure in the normative and informative annex of the document. The process of obtaining data, determining tolerances, QA issues, definitions etc., is contained in international standards such as the IEC 61724 – x series; data thus obtained is unambiguous – for example capacity is defined in the IEC standards along with the measurement technique.

Individual data element reporting occurs along this timeline for every milestone. Where data elements repeat they will be reported using the same identifier and definition, for data elements with underlying IEC standards, using the same (e.g. measurement) technique.

If requested, the client also receives comprehensive "reports" at each milestone.

Data elements are provided as "IECRE certificates". This data can be divided into three groups (see Figure 5). Data from preceding milestones is of relevance at later milestones. However, this only yields useable information if the data is uniquely identified and the information is standardised. As an example, a uniquely named data "availability_1" must be precisely defined (in case an IEC standard is being prepared) in order to be meaningful compared between year two and three in the plant's life. An example for fixed data is a plant identifier (a unique name for the plant) and location (latitude/longitude).

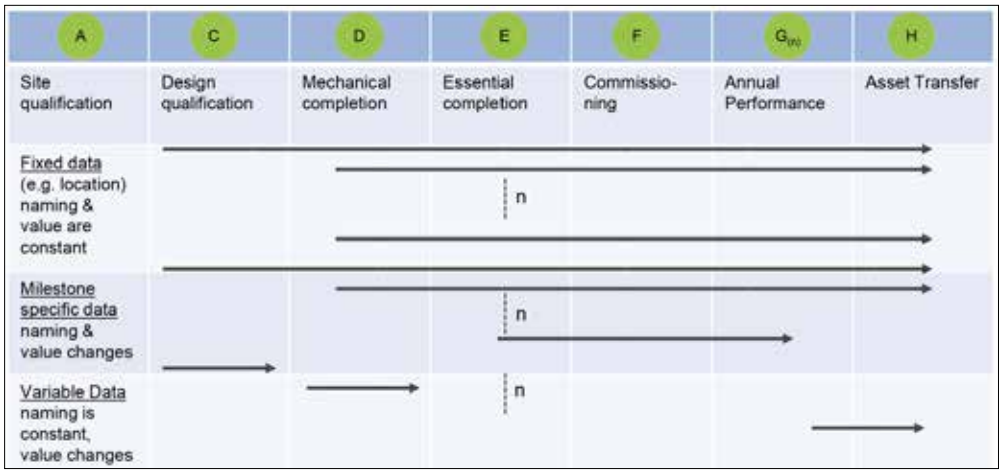


Figure 5. Sample data flow over time

IECRE and XBRL

XBRL is a structured data format for data reporting between financial institutions, regulators, financial

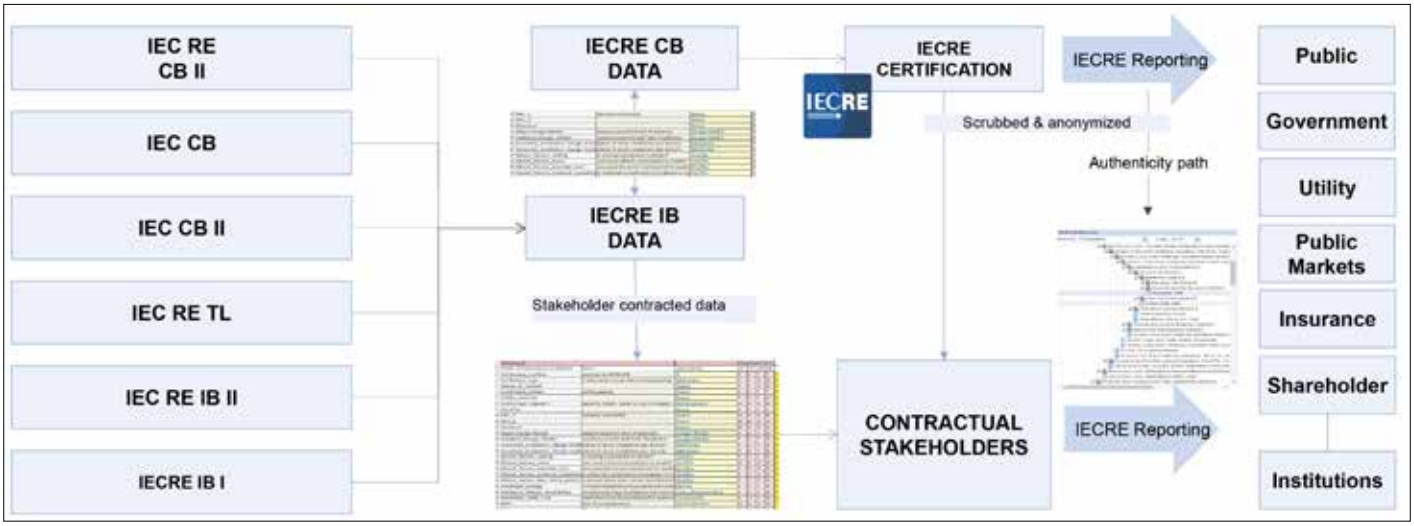


Figure 6. IEC data to XBRL reporting

markets, investors and other parties that demand data consistency and interoperability. Many public markets require reporting in XBRL. IECRE data identifiers and definitions have been incorporated into the XBRL taxonomy (see Figure 6) as part of the USA Department of Energy-funded Orange Button programme. All data generated in the IECRE scheme can be presented in XBRL format. The individual fields in Figure 6 maybe not be visible but the functioning of the IECRE system should be visible (for further information see www.xbrl.org). Note that the IECRE releases only the smaller set of certificate data to the public whereas other data may be made available by stakeholders in PV projects.

Surety as a risk management tool in PV project financing

Surety bonds are financial products similar to letters of credit except they can respond to a default by providing a cure. A letter of credit is often cash collateralised due to its "on demand" liquidity, leaving the beneficiary with the responsibly for managing the default and accountable for the use of the funds drawn. The surety, on the other hand, responds to a default by working to cure the default, in collaboration with the beneficiary, and relieves the beneficiary from having to manage the external aspects of the default by tendering the problem to the surety.

By employing Surety Based Risk Management, PV project owners seeking financing can demonstrate mitigated risk from contractor default during construction, which can help secure competitive pricing. Project owners can also use surety bonds where financial guarantees are required to lessen the need for additional lender financing through letters of credit. Reduced credit requirements can make it easier for lenders to provide the capacity required for funding the project.

The surety industry is active with XBRL US and has been expanding the XBRL taxonomy to incorporate surety terms and definitions. XBRL US is likewise active with the Orange Button to expand the XBRL taxonomy to incorporate IECRE 61724 data terms and definitions.

With the surety industry, as with other financial markets, able to leverage the XBRL taxonomy for high data quality and reliable data exchange for processing and administration of surety risks, they will be able to streamline and implement data analytics for underwriting, predictive analytics for risk mitigation and quantified, mutually accepted data benchmarks for predicable claims response.

Conclusion

The IECRE is providing a new standardised process to address the issue of widely diverging tenders, RFQs and, consequently, due diligence reports. The IECRE provides process standardisation, a peer review process for the IECRE inspection and certification bodies, standardised data naming and definition for data along the entire PV plant life cycle. Not only does this provide for greater performance transparency, it is critical to the transactable energy network of the future that, for example, would employ blockchain technology. Sophisticated financing demands sophisticated, digital, timely, well-defined and reliable data to meet due diligence needs. Bank financing combined with Surety Based Risk Management, with both leveraging common IECRE data, enables improved risk management, and reduced risk will support more competitive terms and conditions for PV asset financing. ■

Authors

Christos Monokroussos has 10 years of experience in the field of PV research. His activities centre on characterisation of solar cells, PV modules, PV measurement systems and PV module reliability. He is an active member in the IECRE. Christos earned his doctorate degree in photovoltaics at Loughborough University, UK. He is the director R&D in the TÜV Rheinland Group solar and fuel cells business field.

Matthias Heinze has several decades of experience in the field of PV plant qualification and monitoring, laboratory module and component testing, performance measurement and failure analysis. He is an active member of the IECRE. Holder of a university degree in engineering, Mr. Heinze serves as director business development of TÜV Rheinland Group.

K. Dixon Wright is senior vice president at Wells Fargo Insurance Services and leads the SGIP PAP25 for Harmonising Financial Data and the XBRL-CET (Construction Energy Transportation) working group to promote the use of data standards in the solar, construction and surety industries.

Mark Skidmore has over 14 years' experience in the solar industry, and over 18 years' experience in the construction contracting industry. As a registered professional electrical engineer, certified energy manager, and NABCEP solar professional, Mr. Skidmore also holds a university degree in mechanical engineering and serves as solar plant services manager at TÜV Rheinland Group in Tempe (USA).