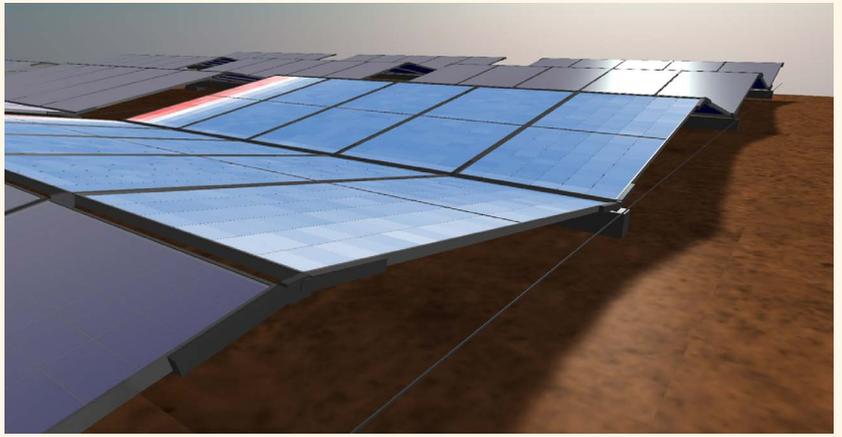# Multi–GW Project, Northern Australia



## Gigawatt-scale modelling yields hardware insights

**PROPOSED PROJECT CAPACITY**
Multi-GW

**DEVELOPER**
Confidential

**MOUNTING STRUCTURE**
5B Maverick

*The SunSolve process, using ray-tracing, provides the level of precision that's required – for multi gigawatt-scale projects, in particular. You want as much precision as possible in terms of what your yield forecast is going to be. If there's a 1% error, it's going to have a much bigger impact in dollar terms on a multi-gigawatt scale project, relative to a 100MW project. These errors become very, very impactful. Trying to resolve them is worth a lot of money.*

*David Griffin, CEO, 5B*

*There are significant opportunities when site data and site-specific modelling converge with racking solutions, module solutions, and even cell solutions. SunSolve's advanced optical and thermal modelling has allowed us to pursue such opportunities when designing for multi-gigawatt scale solar projects.*

*Adrian Turner, Technical Director, 5B*

**About 5B**

5B is an Australian solar pioneer that is rapidly accelerating the deployment of large-scale solar with its prefabricated, pre-wired ground mount technology. Founded in 2013, 5B developed a solution around the installation of solar modules in large-scale solar projects with a pre-fabricated and pre-wired 50-70 kW solar array that can be deployed in less than an hour by a small crew.

**Takeaways at a glance**

As Australia looks to foster new export industries with decarbonisation efforts accelerating at home and among its major trading partners, massive renewable energy projects are being proposed to leverage the country's vast solar and wind resources.

One such proposed project is worth billions and spans multiple gigawatts of installed PV capacity. Given this scale, even minor variations in forecast yield can have an outsized impact on revenue – making accuracy vital.

In this example, SunSolve's advanced ray-tracing technology significantly improved yield accuracy, enabling precise forecasting of power output across different PV technologies.

SunSolve modelling also revealed the expected extent of bifacial energy generation for 5B's east-west array, including reflected light within the array. The impact of temperature and soiling on power output could also be accurately quantified.

The collaboration has empowered 5B to further optimise the Maverick system, leading to next-generation developments. This includes refining the mounting structure and extending the approach to individual solar modules and even cell-level technology, ensuring each project site's specific demands are met.

**About the project**

Australian policymakers and industries are exploring how to rapidly deploy solar, wind, and battery technologies to power low-carbon industries and supply regional trading partners with low-emissions exports.

5B worked with one such major PV project to deliver a mounting structure to efficiently access Australia's vast solar resources. It proposed dispatching clean, round-the-clock solar energy.

The plan was to deploy multiple gigawatts of utility-scale solar PV in Australia's North, coupled to a large-scale BESS – utilising

planned interconnection to its full capacity and providing clean energy supply day and night.

Recognised for its ease of deployment, high-quality pre-assembled installation even in remote locations, and minimal operations and maintenance needs, the 5B Maverick mounting structure was an ideal solution for the project.

**The challenge**

5B extensively tested its Maverick system in various environments, including arid conditions, to understand the expected power output. The Maverick is a prefabricated, east-west-facing solar mounting structure that sits low to the ground and is unfurled on-site, facilitating rapid, highly automated installation and reliable performance in harsh environments.

As part of its planning for the proposed project, which was set to be located in Australia's North, the project team evaluated the Maverick alongside traditional single-axis tracker systems.

However, conventional solar design and modelling tools, such as PVsyst, are not well-suited to assess innovative mounting systems like the Maverick. A more sophisticated modelling approach was required.

Given that the project would involve millions of modules, even minor variations in system performance – either gains from bifacial generation, reflected light on east-west-facing modules, or losses from high temperature and soiling – could translate into dramatic differences in energy output and revenue.

Though the potential deviations in yield were small, the financial implications were enormous.

**The SunSolve solution**

SunSolve's physics-based approach draws on over a decade of experience in modelling solar cell and module performance, extending this expertise to the system level to deliver highly accurate yield forecasts. Using advanced modelling, the software can resolve optical, electrical, and thermal complexities for every hour of the year.

In collaboration with 5B engineers, SunSolve modelled the novel Maverick system using project-specific site conditions and design parameters for the proposed multi-gigawatt array. The result was a detailed 12-month simulation of expected power output. Notably, ray tracing analysis of the Maverick's bifacial performance uncovered some surprising insights.

Despite the Maverick's low ground clearance, the common assumption that there would be zero bifacial output proved incorrect. SunSolve's modelling, which captures how solar irradiation interacts with the front and rear sides of modules and the mounting structure, revealed a 1–2% boost in power output due to bifacial generation. When applied across gigawatts of capacity, it translated into a substantial revenue uplift.

The 5B Maverick, designed for rapid deployment and pre-assembly, unfurls on-site in a concertina pattern, with alternating east-and west-inclined modules. The effect is a unique optical interaction – reflected light bouncing between module surfaces – which is not captured by conventional modelling tools. SunSolve's ray-tracing engine accounted for this complexity, ensuring more accurate performance forecasts.

Temperature also played a significant role. PV output declines as module temperatures rise, and while individual temperature coefficients for different technologies are understood, predicting system-level thermal effects is more complex. In Australia's North, where daytime temperatures can exceed 40°C, the cooling effect of wind passing beneath the Maverick's low-slung structure becomes particularly important.

SunSolve's granular thermal analysis enabled precise calculation of the system's effective temperature coefficient, leading to a more reliable forecast of annual power output.

Lastly, soiling, especially in dusty, arid environments, can significantly degrade performance. However, soiling impact is highly site-specific. By incorporating data from local soiling and weather stations, SunSolve determined that the soiling losses at the project site would be minimal. This was a positive finding for project proponents,

indicating strong performance without the need for frequent cleaning or an intensive de-soiling regime.

**Why it matters**
The application of SunSolve's ray-tracing technology revealed a bifacial gain of 1–2% at the project site – where traditional modelling tools like PVsyst would have assumed zero bifacial contribution. On a gigawatt-scale project, this seemingly modest gain translates into many additional megawatt-hours of generation – and tens to hundreds of millions of dollars in added revenue, or reduced capex.

The project team identified an opportunity to adjust the array orientation by several degrees to take advantage of prevailing wind conditions at the site. Using SunSolve's optical modelling, they were able to confirm that the yield improvement from reduced module temperatures due to greater airflow beneath the Maverick mounting structure would not be offset by optical losses from the angular change, resulting in a net 1% yield improvement.

These combined gains, and the deeper insight into site-specific yield, can dramatically enhance investor and lender confidence. This is particularly critical in the context of DC-coupled battery systems. While utility-scale BESS costs are declining,

the upfront capital investment remains considerable. Right-sizing the battery and maximising solar generation are essential, and both can be optimised through SunSolve's advanced modelling capabilities.

Another key benefit of SunSolve's analysis is its contribution to the ongoing development of the 5B Maverick system. The interactions between various solar cell and module technologies and the Maverick's unique design are complex. Every site also differs in terms of climate, soiling risk, and ground reflectivity (albedo).

SunSolve's precision modelling enables these variables to be thoroughly assessed, allowing the Maverick to be optimised for performance at the design phase, prior to committing to costly real-world testing.

Ultimately, accurate data is foundational to advancing the next generation of photovoltaic technologies – from the cell and module, to the mounting system, and the overall power-plant design. SunSolve provides this critical data, empowering both project developers and hardware manufacturers to drive innovation and achieve superior technical and financial outcomes.

*SunSolve acknowledges and thanks 5B for generously sharing their insights and time in supporting the development of this case study.*

REALISED PROJECT
**Multi-GW Project, Northern Australia**