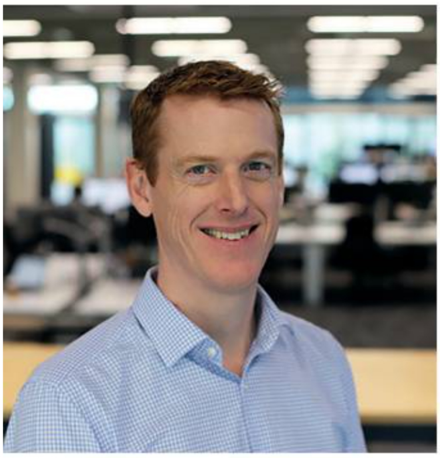
Solar – getting to grips with glint and glare



As we transition towards more renewable energy, solar farms have emerged as a crucial component of the country's sustainable energy strategy and demands the need to address potential environmental impacts, particularly glint and glare. By **James Bentley** and **Emma McRae**, both landscape architects and planners with Boffa Miskel.

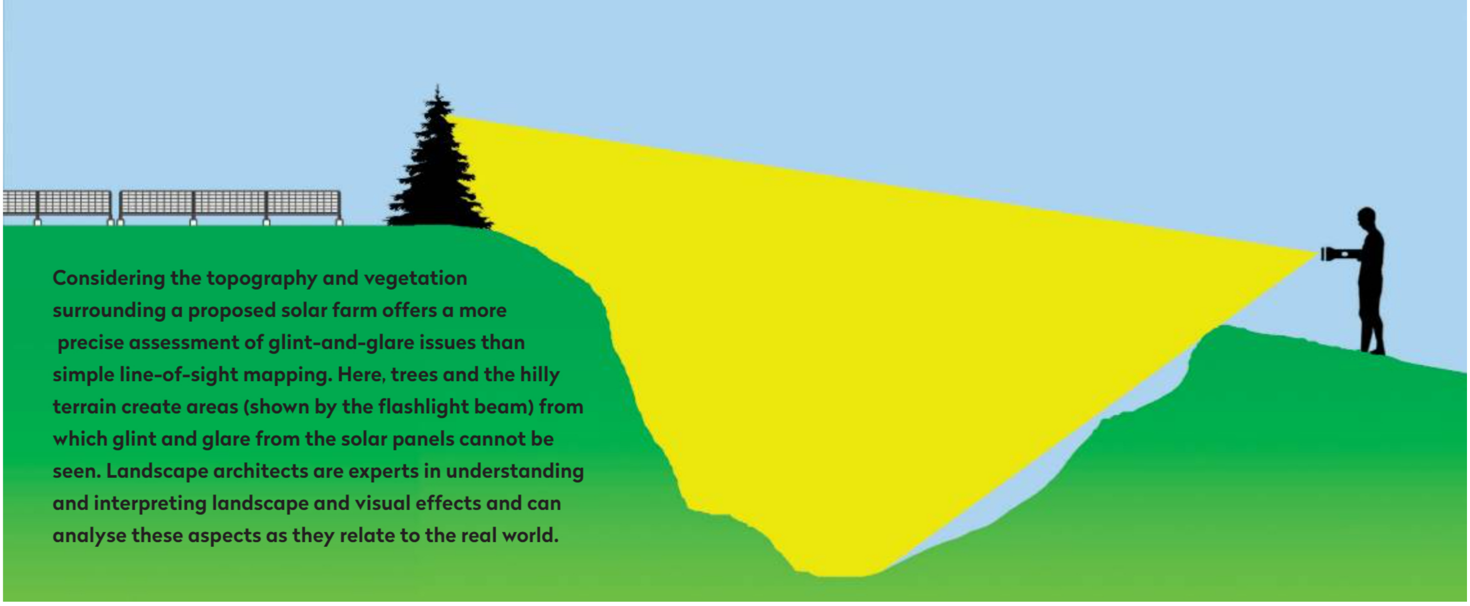
Glint and glare phenomena not only affect the aesthetics of the landscape but also the safety and welfare of local residents and wildlife, councils around the country are faced with understanding the potential effects in relation to solar project applications.

'Glint' is a bright, momentary flash of light, reflected off a smooth, shiny surface, while 'glare' is a more sustained and broader reflection of light that causes discomfort or difficulty with vision. Both are influenced by the angle of sunlight, the positioning of solar panels, and their reflective properties.

In the planning and resource consenting stages of solar farms, understanding and mitigating glint and glare is crucial for several reasons.

Glare can pose significant risks for drivers on nearby roads and can also obstruct visibility for pilots. Intense reflections can distract or temporarily blind individuals, leading to potential accidents. It can be a source of visual nuisance for locals whose properties are located near a solar farm and communities are often concerned about the visual impact of solar farms. Glint and glare can exacerbate these concerns, potentially leading to opposition against proposed projects.

Until recently, many assessments for glint and glare were undertaken from an engineering perspective and were presented as a series of numerical-based results that can be difficult for anyone without expert knowledge, including council officers, to interpret. As a result, landscape architects have been drawn into the mix to provide further interpretation of this data and



Considering the topography and vegetation surrounding a proposed solar farm offers a more precise assessment of glint-and-glare issues than simple line-of-sight mapping. Here, trees and the hilly terrain create areas (shown by the flashlight beam) from which glint and glare from the solar panels cannot be seen. Landscape architects are experts in understanding and interpreting landscape and visual effects and can analyse these aspects as they relate to the real world.

explain how it relates to visual effects of solar farm proposals.

As experts in understanding and interpreting landscape and visual effects, landscape architects are well-placed to interpret the modelled effects of glint and glare and provide a clear and understandable analysis of these effects for potentially affected parties – councils and resource consent hearings commissioners.

Generally, the first few applications for solar farm projects did not address glint and glare because the potential risk was not fully understood. So, it was not included as a specific matter to address in district plan rules or matters for assessment.

Over time, as our understanding of the potential effects of solar developments has grown, addressing glint and glare effects has become more commonplace. In our opinion, assessing such effects should be standard practice.

Our view is supported by the Fast Track (COVID-19) Consenting Panel's Decision on the recently consented Opunake Solar Farm that determines glint and glare assessment should form part of the baseline requirement for any solar farm application.

In their decision, the Panel highlighted the importance of glint and glare assessment and said; "The Panel also sees significant merit in having a consistency in approach to solar farm applications so that parties understand baseline information requirements on relevant (and common) issues. For example, glint and glare is always going to be an issue that needs to be addressed."

However, this poses a challenge to applicants and councils alike as there are no best practice standards or guidelines here for undertaking glint and glare assessments and, in particular, for determining what is an acceptable level of effect. Commonly used software tools for undertaking such an analysis calculate the duration of glint and glare effects using the geographical location and layout of the proposed solar farm, the geometry of the solar panels and the relative locations of the panels and the viewer.

In our view, these tools are quite blunt as they do not consider topography or any land-based features (such as buildings or vegetation) in the modelling.

Instead, they rely on a line-of-sight analysis. The results, therefore, can present potential effects which appear to be excessive. To assist in refining the results, it is possible within commonly used software to incorporate obstructions, or walls, that will otherwise act as land-based deflectors – i.e., something that 'blocks' a line-of-sight towards a site.

While a step in the right direction, this standard software has many limitations; notably that it is only possible to include up to 10 obstructions and that each obstruction has a maximum of 10 individual points in which to delineate the feature.

Obstruction Points are not reflective of the surrounding landscape, since vegetation especially retains a variable height, and endeavouring to 'capture' its true nature in a basic model, will inevitably produce results that are not entirely accurate.

It is therefore important that any data is presented with accompanying analysis in order to accurately understand the outputs as they relate to the real world.

We have developed an enhanced methodology to undertake this analysis, based on commonly used tools, but also utilising GIS (Geographic Information Systems), digital terrain models and visual techniques that have been industry tested through a range of consent processes. We have also applied this method to numerous proposed solar farms throughout the country and found that it helped to demystify potential glint and glare impacts on the receiving environment.

Zone of Theoretical Visibility analysis (ZTV) using LiDAR (Light Detection and Ranging) can be used to generate a more precise understanding of the potential visibility of the solar arrays, and therefore where glare may actually occur.

LIDAR generates precise, three-dimensional information about the shape of the Earth and its surface characteristics, such as vegetation and buildings. Used in combination with standard analysis tools, and on-site analysis carried out by experienced landscape architects, this can provide a more accurate picture of potential glare effects.

As solar farms become more prevalent in our landscapes, addressing glint and glare impacts has evolved from a secondary concern to a key element in the planning and approval process. The inclusion of glint and glare assessments as part of baseline application requirements ensures that decision-makers can comprehensively evaluate the potential effects.

Given the limitations of current assessment tools, it is crucial that the data generated is interpreted by experts who can relate it to real-world conditions. **LG**