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Speaking Notes – Peter Hayman

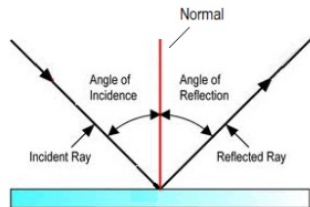
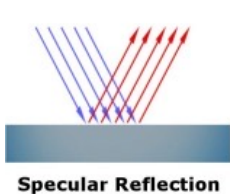
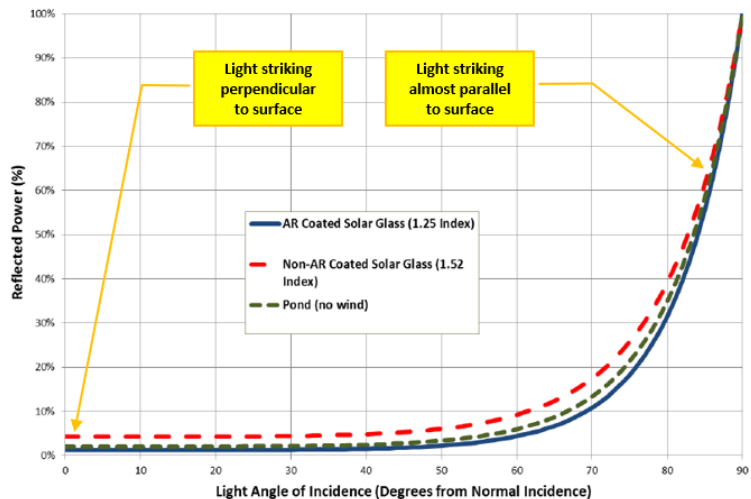
Tararua Solar Farm Hearing

August 2023





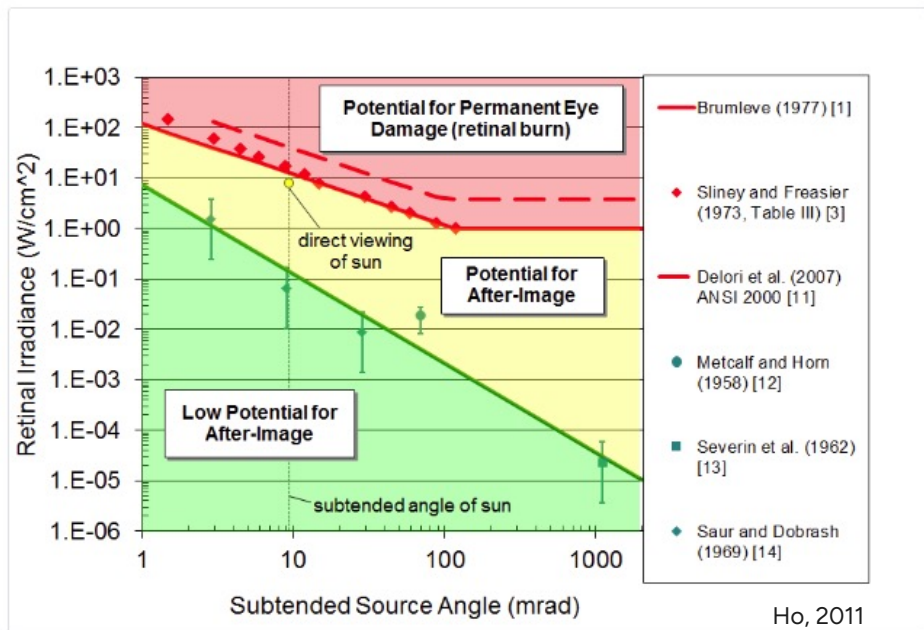
Background



- Solar photovoltaic panels aim to capture as much light as possible, so the goal is to minimise reflections.
- Dependant on the panel cover material, incidence angle and any coatings.
- The question then becomes when does a reflection become glare?



Solar Glare Hazard Analysis Tool (SGHAT)



- Firstly, permanent eye damage is not possible for typical PV panels since they do not focus the reflected sunlight.
- Began as a way to measure glare risks for pilots on final approach.
- For pilots: Green – allowable. Yellow – not allowed.
- Software assumes sunny days all year round.
- Terrain and other obstacles not considered.



Large-Scale Solar Energy Guideline

- Since its release SLR have been using the NSW guideline to interpret the results of the SGHAT modelling.
- In the absence of other guidance, it has also been applied to vehicle users.

Table 2: Impact rating and performance objectives for glare impacts to residential dwellings

High glare impact	Moderate glare impact	Low glare impact
> 30 minutes per day > 30 hours per year	< 30 minutes & > 10 minutes per day < 30 hours & > 10 hours per year	< 10 minutes per day < 10 hours per year
Significant amount of glare that should be avoided.	Implement mitigation measures to reduce impacts as far as practicable.	No mitigation required.



Roads and Rail

- Mangamarie Road and Tutaekara Road showed no potential for glare with an after image, with planned shelterbelts at 3 or 4 metres.
- Without the planned mitigation there is a small window of yellow glare in December during the late evening with 9 minutes annually and no more than 1 minute per day. This falls into the “low impact” category.
- The Rail line to the west of the arrays showed no potential glare conditions.



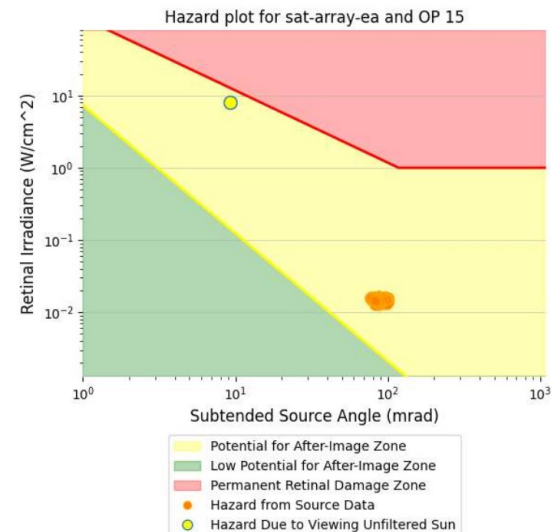
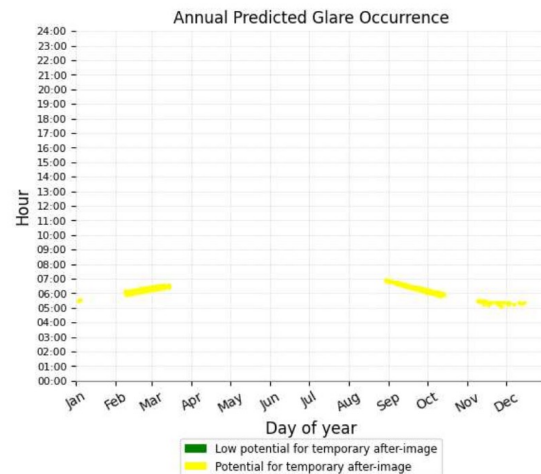
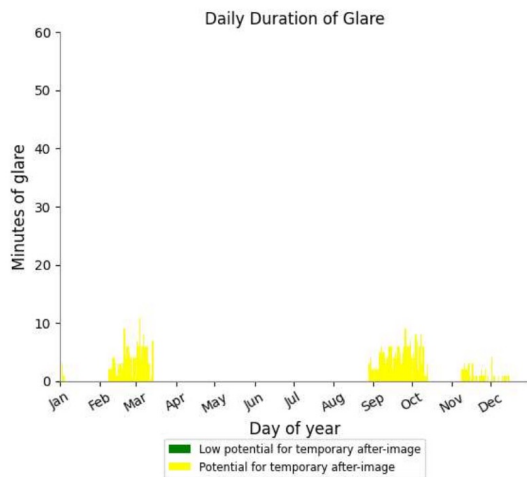
Existing Residential Receivers

SGHAT Observer Point	Address	Minutes per Year	Maximum Minutes per Day
OP3	3 Fouhys Road	267	13
OP6	223 Tutaekara Road	271	10
OP12	154 Tutaekara Road	130	6
OP13	129 Tutaekara Road	111	4
OP15	391 Mangamaire Road	398	11

- Results in the table are for the initial run.
- 2nd and 3rd runs with and increase in array height and a reduction in shelterbelt height showed no yellow zone glare
- All points below 10 hour per year. OP3 and OP15 push just above 10 minutes per day and into the “moderate impact” category.



Example Results for OP15





Potential Receivers

- Possible future receiver locations were also modelled, particularly on the elevated areas to the west.
- Some locations showed “high impact” levels in the modelling.
- While this information is useful it is my opinion that approval for this project should not be based on something that may or may not happen at some unspecified time.



Mitigating Factors

- As mentioned, the model is conservative due to its assumption of sunny days all year round.
- By looking at local weather modelled for Palmeston North and Masterton it is expected that conditions will be mostly cloudy or overcast 35% of the time. This will reduce the number of minutes of glare.
- Further, it can be seen in the example results that the glare conditions occur very early in the morning. At these times it is expected that reflections are at very high incidence angles.
- In these circumstances an observer would perceive the reflections coming from virtually the same direction as the direct incoming solar rays.
- When the angle difference between incoming direct solar rays and their associated reflections are small (i.e. less than 10°), such reflections are not considered to be “glare”, as the brightness of the direct solar rays would be significantly higher than the reflection’s and dominate an observer’s field of view.



Conclusions

- Initially some yellow zone glare was found for existing dwellings.
- Mitigating effects of real weather patterns and times of occurrence also need to be considered.
- Further modelling showed reduction or elimination of glare conditions for existing receivers.
- In my opinion the proposed solar farm with its shelterbelts will have no to low glare impact on surrounding dwellings, road users or rail users.



Questions?

