Faculty of Engineering
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Harvesting photons using High Ground Coverage Ratio (GCR) approaches

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How to catch a photon

GCR 1
How to catch a photon
How to catch a photon

GCR 0.5
How to catch a photon

GCR 0.4
How to catch a photon

GCR 0.3
So how do we go from this.....
To this?

GCR
0.3
Several people are onto the high GCR approach

- Three current approaches that have in common a high GCR in their design.
- It is not the only value proposition of these approaches, but just one feature.
How do we make this decision?

- Start with the cost stack
- Some of these costs have a component that scale with land area.
- Most high GCR technologies are also trying fundamentally to remove structural costs.
- A single-axis tracker style installation has a higher capacity factor compared to a high GCR style installation.
  - This means each module makes more power
- When is it worth it and when isn’t it?

NREL Q1 2018
Capacity Factor Simulations

- Use SAM to model capacity factor of a 5B-style E/W array (EW) compared to a bifacial modules on horizontal single axis tracker (HAT) that are popular in Australian utility installations right now.
What is a capacity factor gain worth?

And the winner is…. too close to call for the general case!

High GCR approaches are highly competitive and the best approach is context driven.

Requires a high level of accuracy and confidence in your models.
But it can get even more complicated

- Land has cultural significance that can sometimes be irreconcilable with monetary values.
- Module technology and tariff structure changes will also impact on the equation.
Conclusions

• Purely from a cost perspective, high GCR approaches are highly competitive with dominant low GCR approaches
• Some aspects of bifacial technology will also suit High GCR approaches
• The best approach is very site and situation dependent and requires modelling accuracy beyond what has been shown here.
  • Further refinement is required on my introductory modelling.
• The balance is shifting further to low GCR approaches as module prices drop and as high GCR approaches mature and strip out other installation costs
• Land costs alone will only be a significant driver in some cases, but what other “value” will be placed on land as our energy system transitions.

Thank you
QUESTIONS?
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