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ADAPTING PV TRACKING TO MODULE TECHNOLOGY AND SITE CONDITIONS

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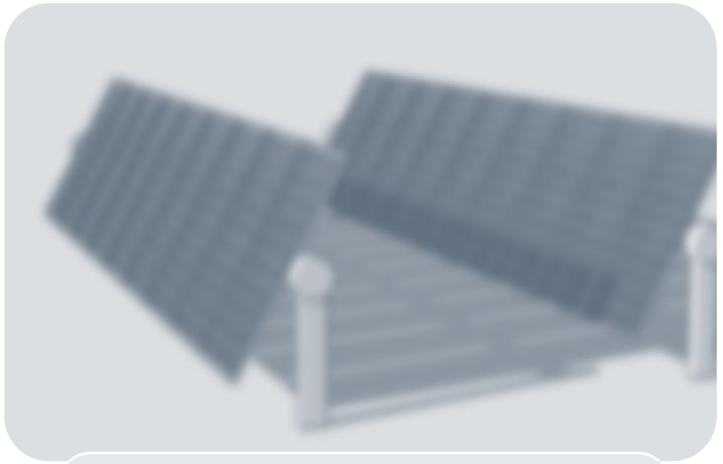
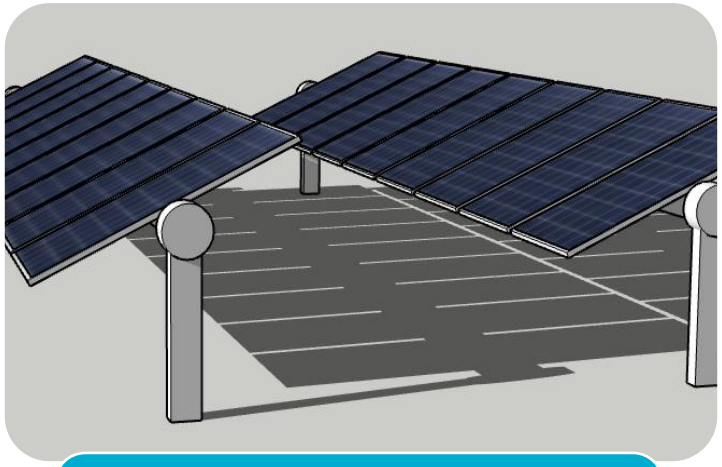
HOW ARE TRACKING ANGLES DETERMINED?



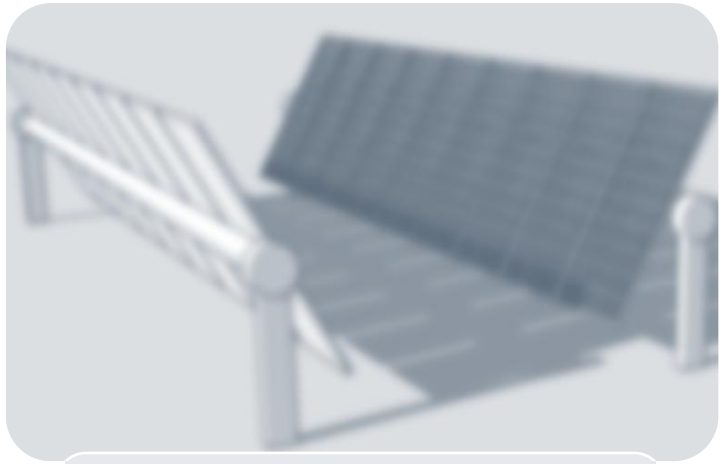
"Ideal" position

- Astronomical
- Irradiance optimization



Backtracking

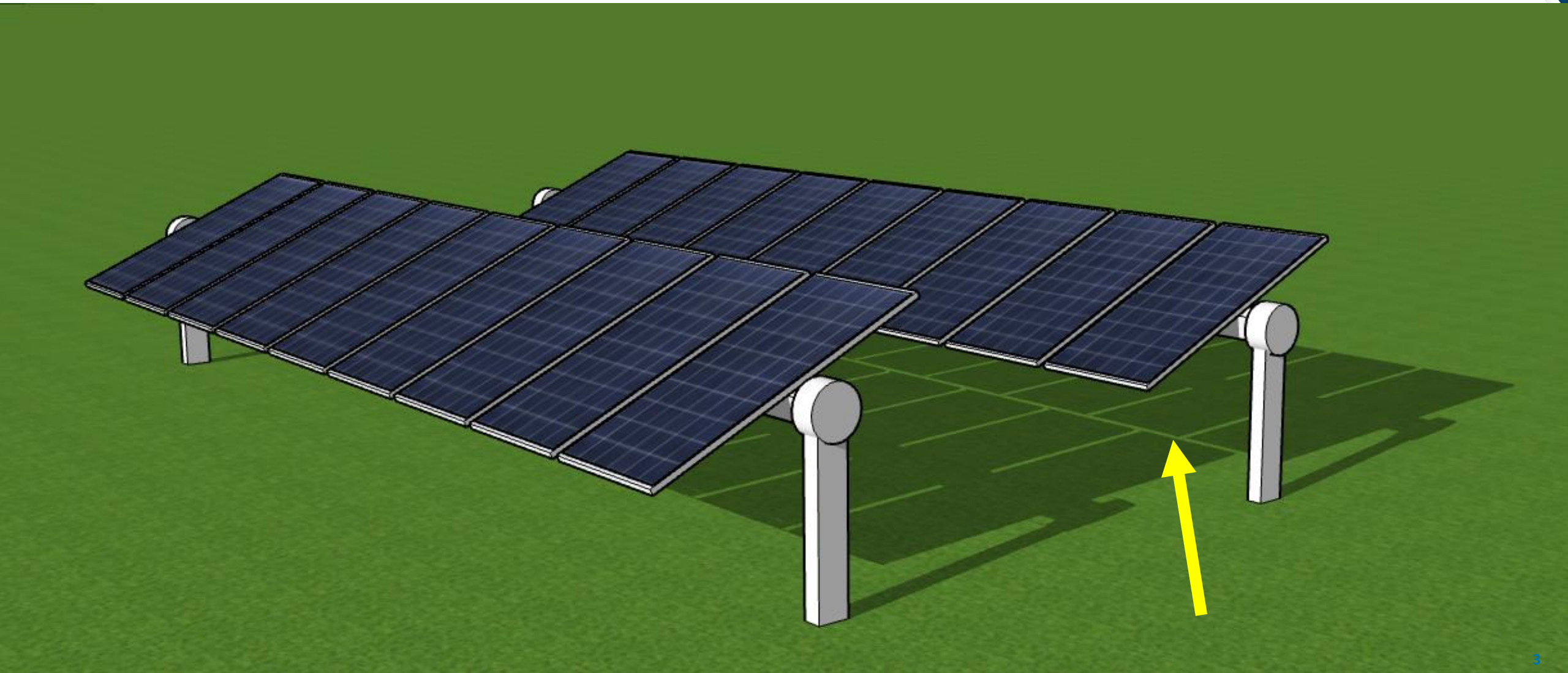
- Terrain-based
- Fractional backtracking



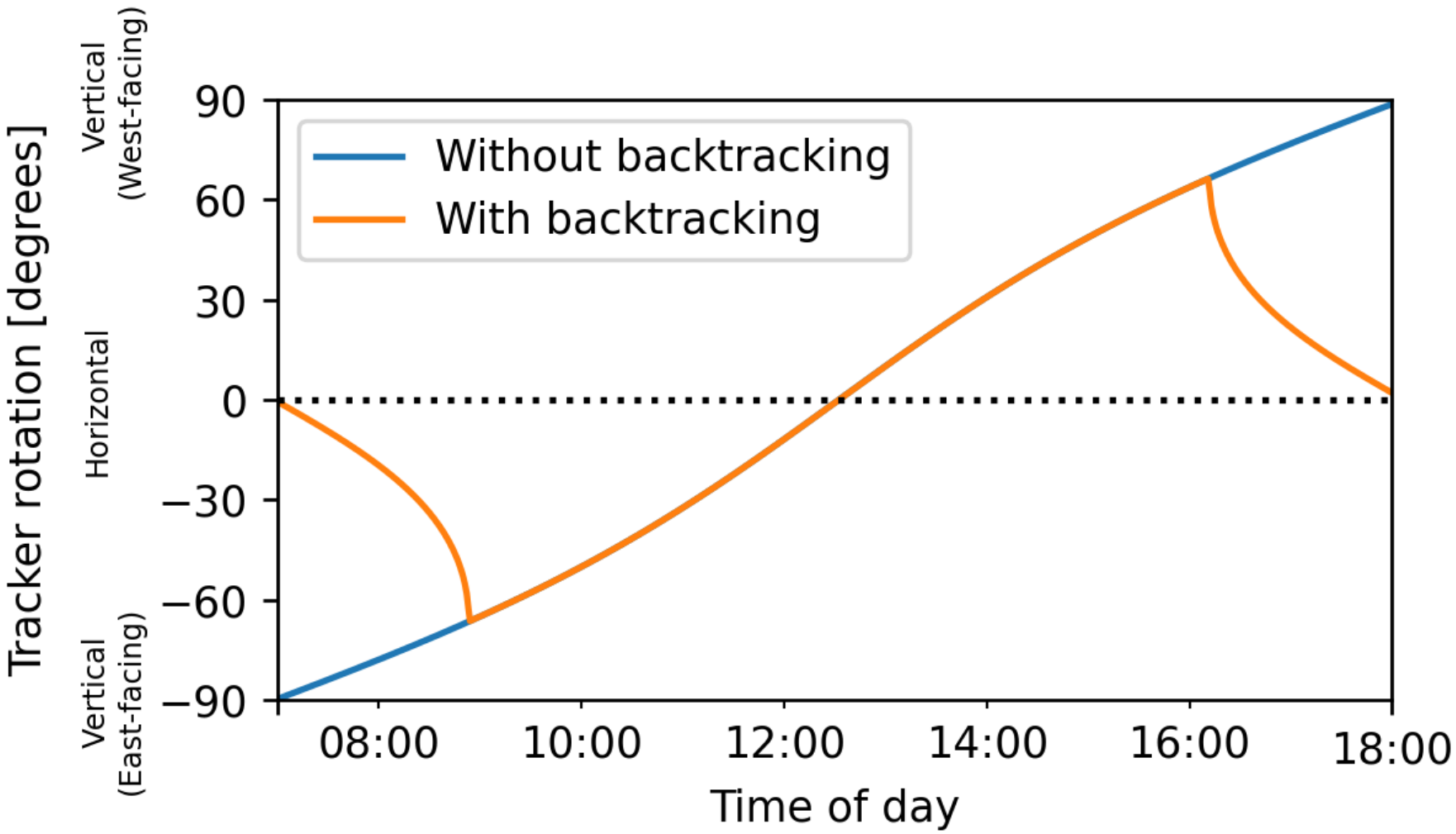
Stow

- Wind, hail
- Snow/soiling cleaning
- Agri-PV harvest

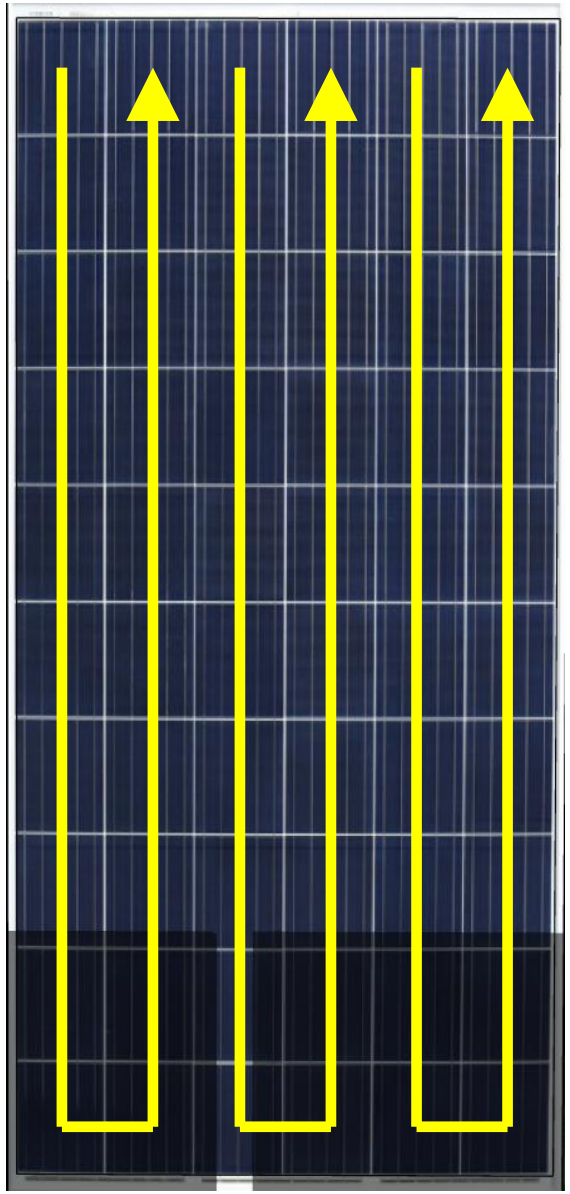
WHAT IS BACKTRACKING?

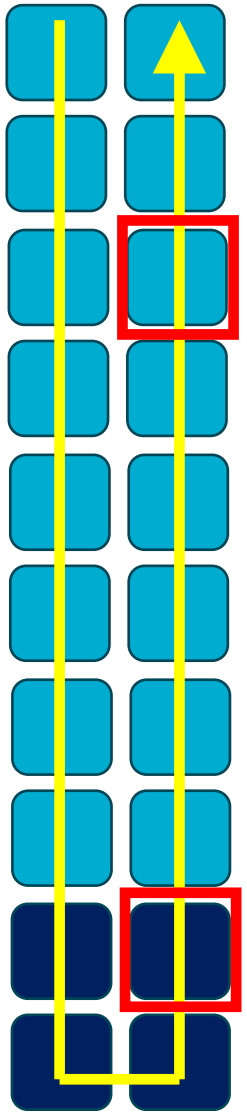


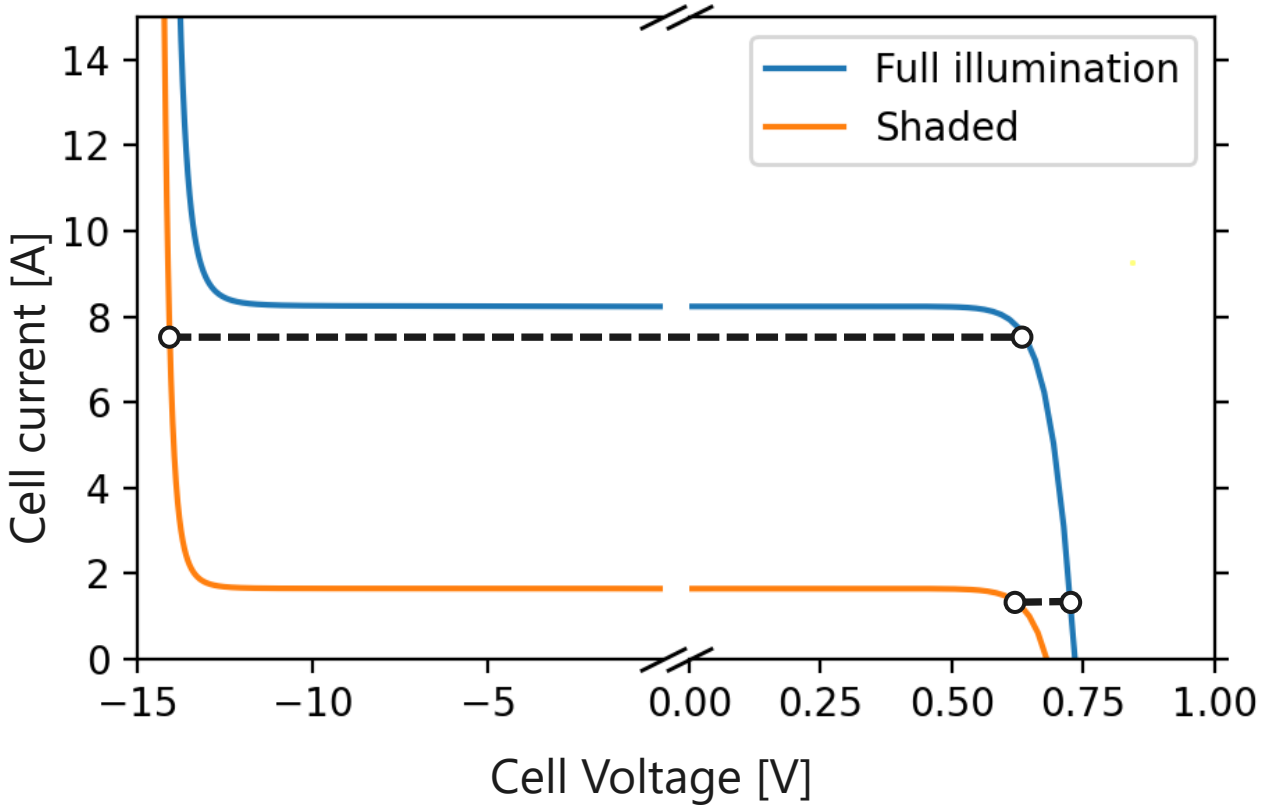
WHAT IS BACKTRACKING?



WHY BACKTRACK?

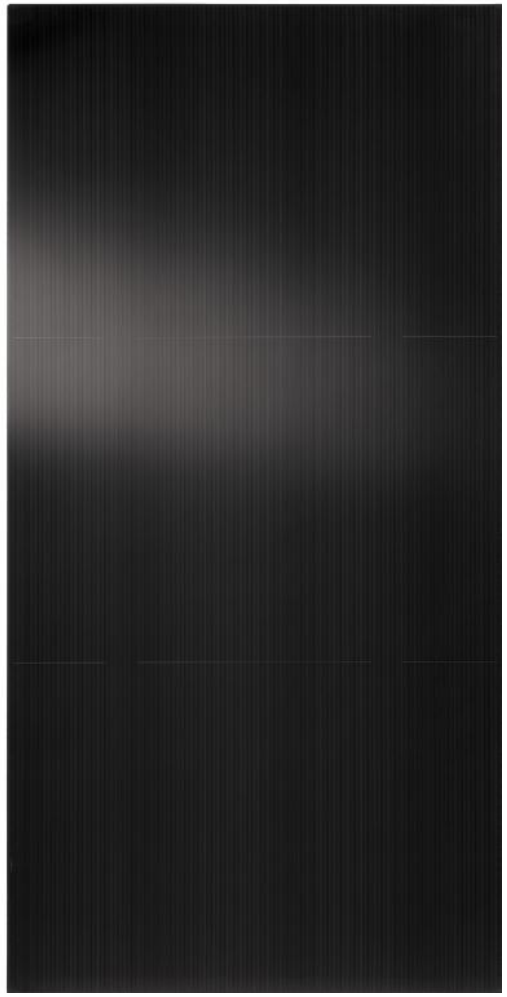




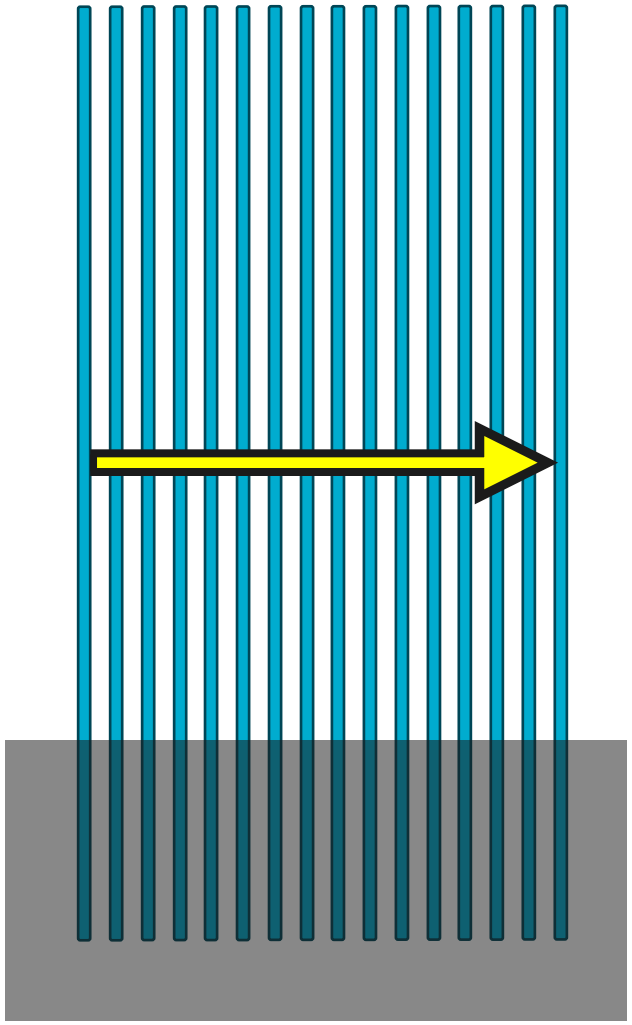


Series cells illuminated differently = mismatch loss

DIFFERENT CELL TOPOLOGY: THIN FILMS



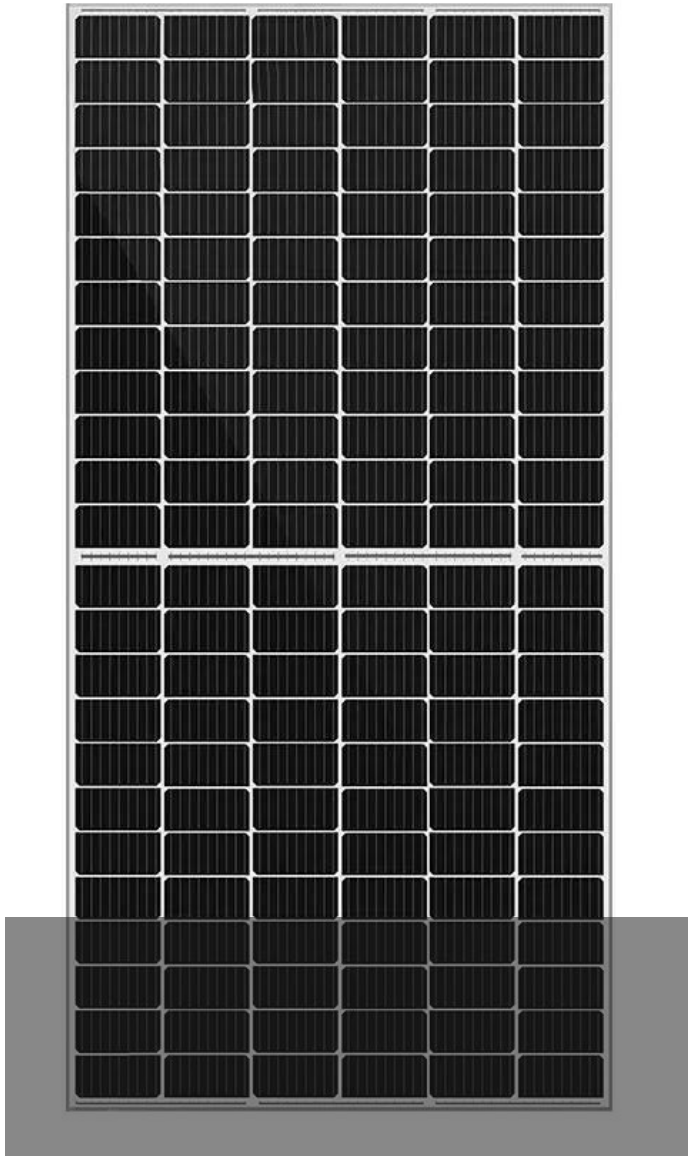
First Solar, Series 7

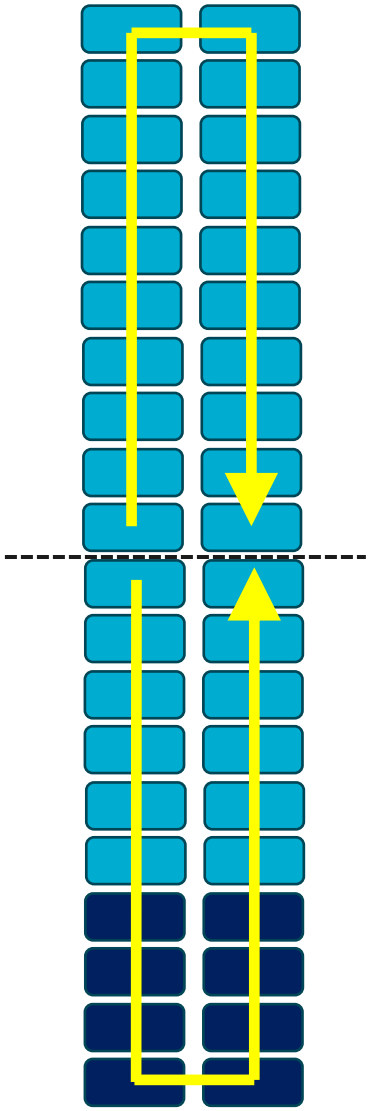


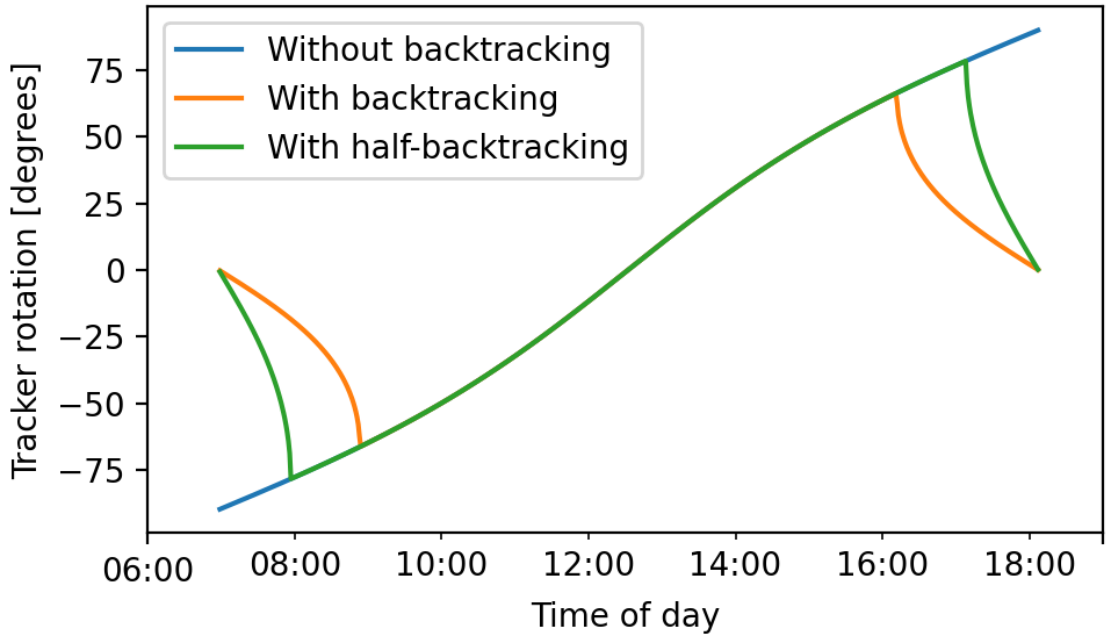
All cells illuminated equally

→ No mismatch loss!

DIFFERENT CELL TOPOLOGY: HALF-CUT







Mismatch in lower half only

BACKTRACKING BASED ON MODULE TYPE

Conventional wisdom

Silicon: backtrack

Thin film: don't backtrack

Potential new wisdom
(not yet fully investigated)

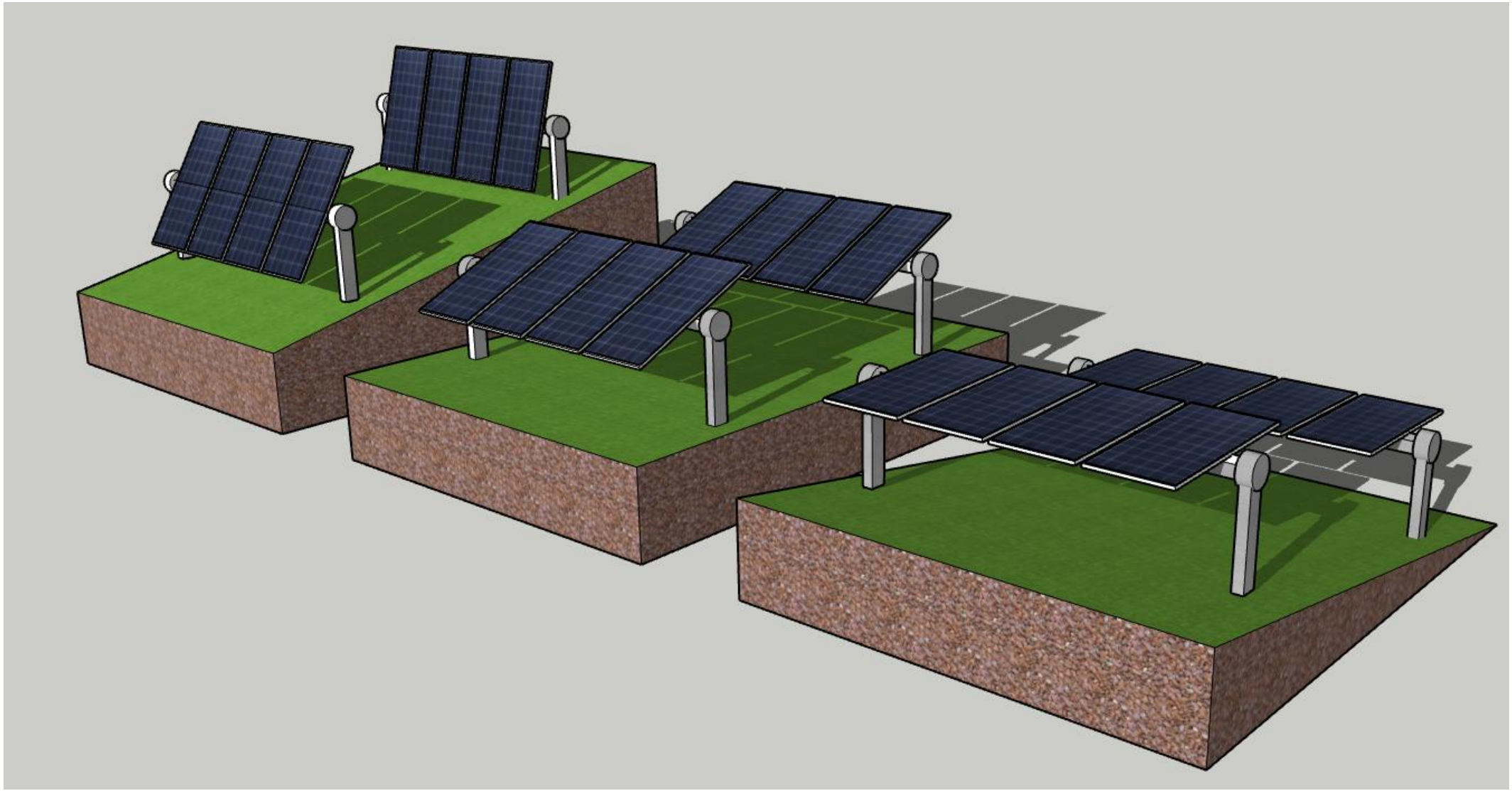
Full cells, 1-in-portrait: backtrack

Full cells, 2-in-portrait: maybe half-backtrack

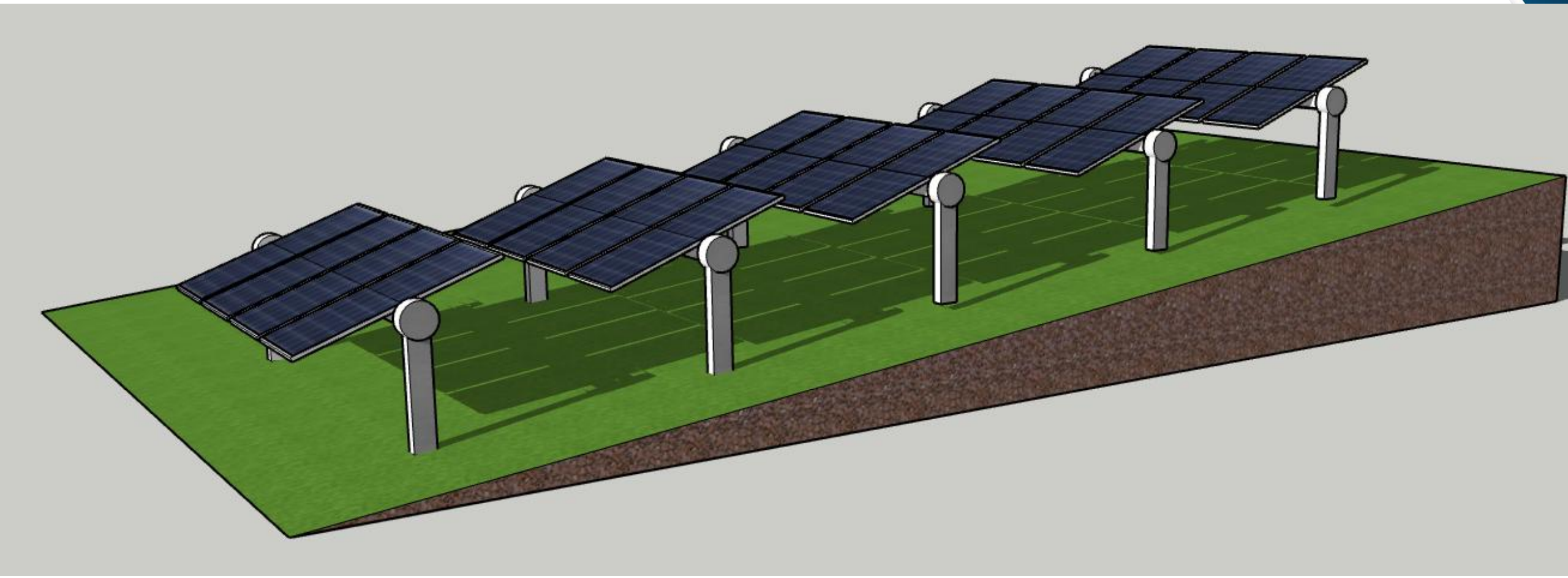
Thin film: maybe backtrack

Half-cut cells: maybe half-backtrack

BACKTRACKING ON UNEVEN TERRAIN

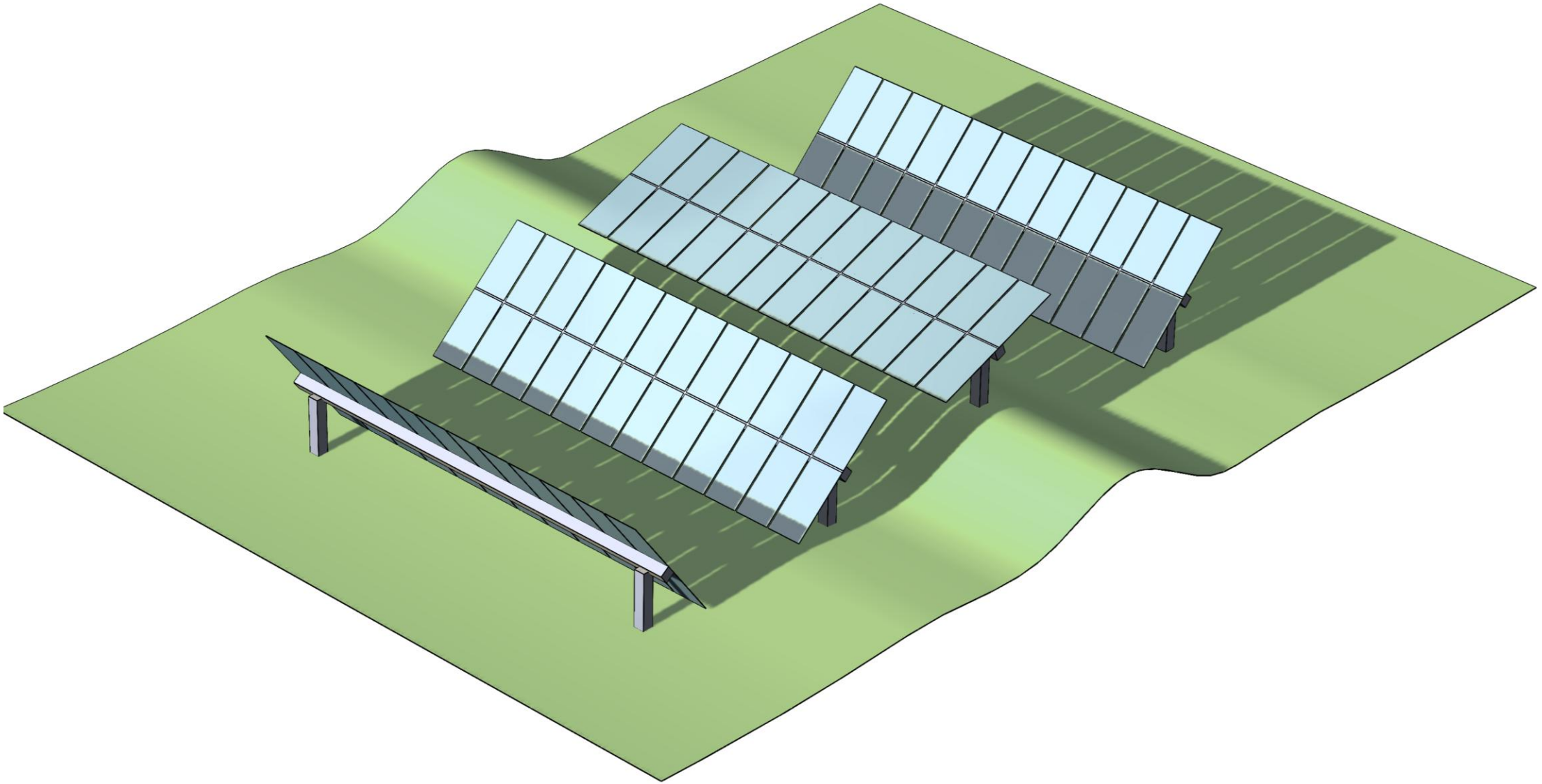


UNIFORM SLOPE



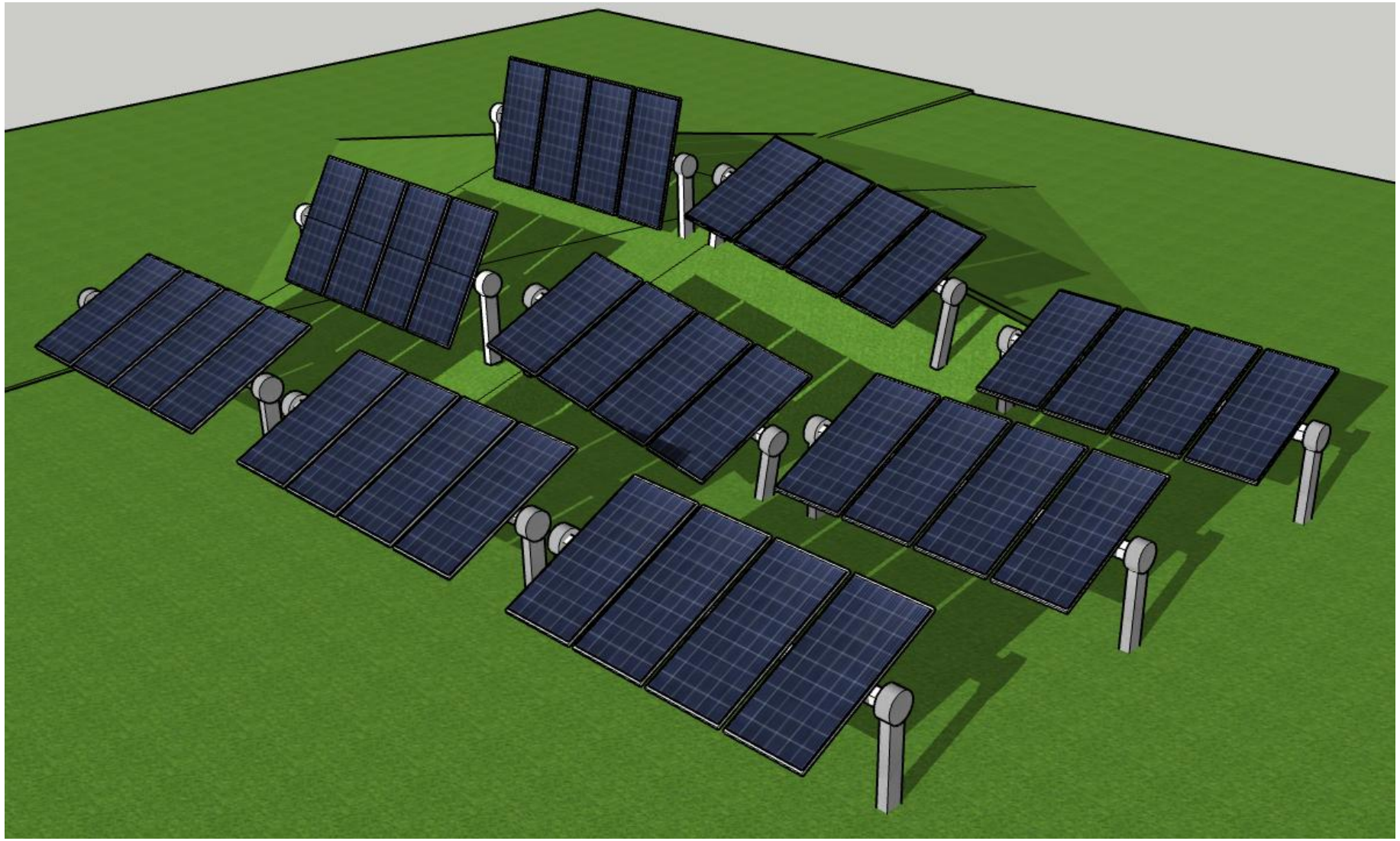
Solved problem; now available in many PV modeling tools

“ROLLING” TERRAIN



Partially solved, approximate methods available in some tools

ARBITRARY TERRAIN



Partially solved, approximate methods available in some tools