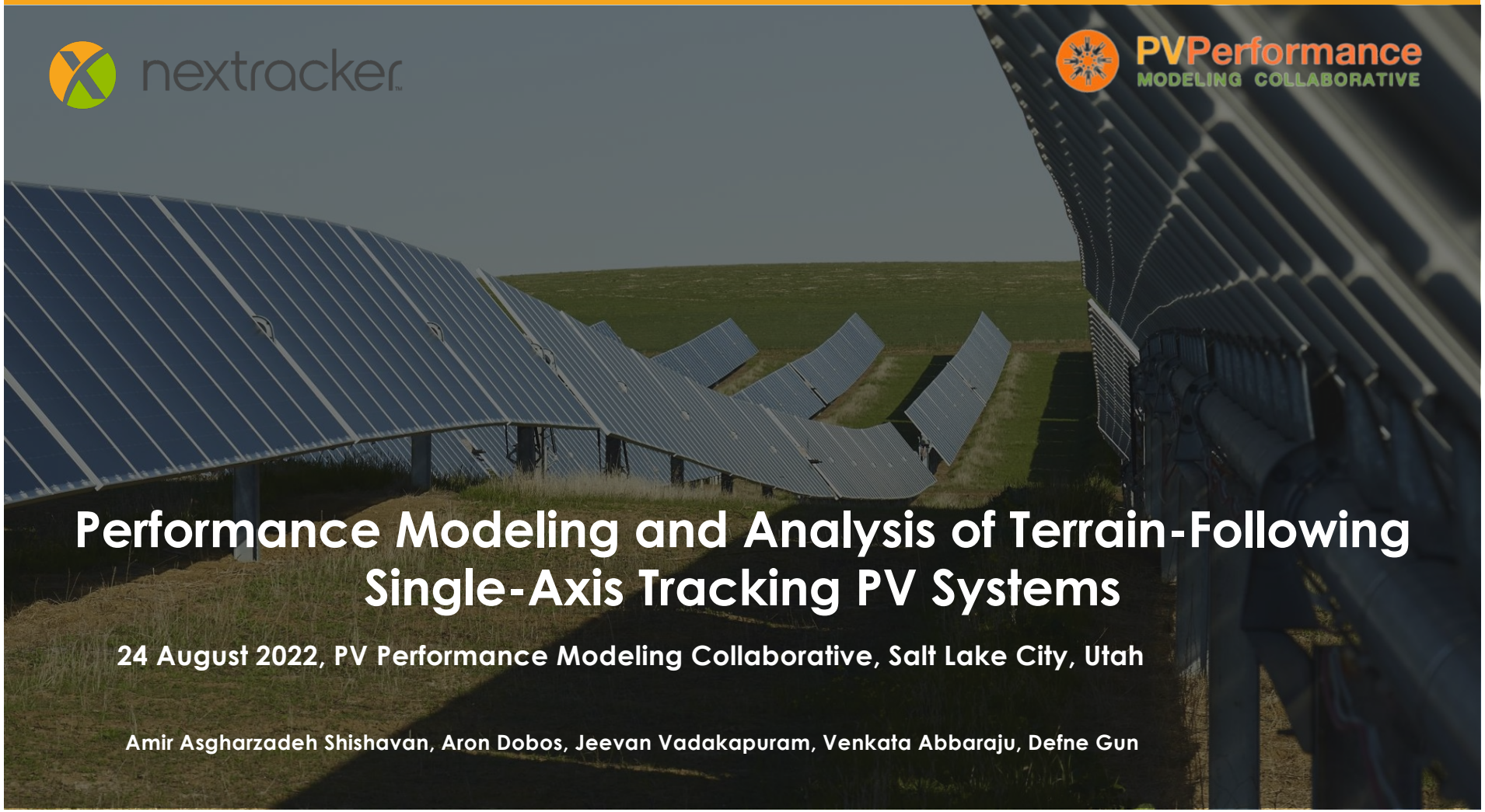


Performance Modeling and Analysis of Terrain-Following Single-Axis Tracking PV Systems

24 August 2022, PV Performance Modeling Collaborative, Salt Lake City, Utah

Amir Asgharzadeh Shishavan, Aron Dobos, Jeevan Vadakapuram, Venkata Abbaraju, Defne Gun

Company Overview

Global Technology & Market Leader in PV Tracking

70 GW of solar tracker systems in operation / construction

Profitable from 2016 through present

Independent subsidiary of Flex (Nasdaq: FLEX) since 2015

Pursuing IPO/Spinoff

Global presence

- 550 staff worldwide, 8 global offices

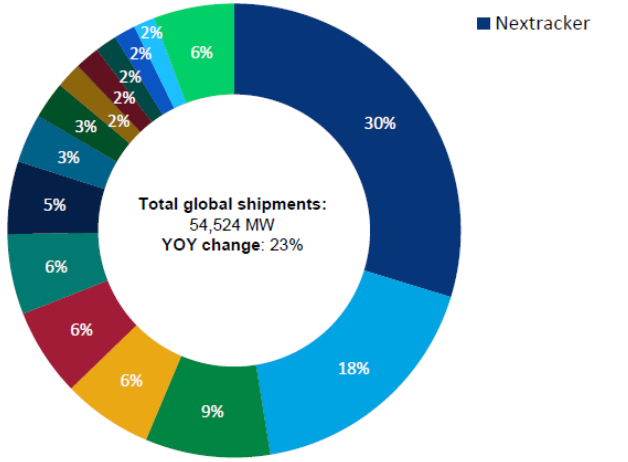
Robust product lines

- Solar trackers, software and controls

Deep PV domain

- 300+ years of collective PV executive team experience

Global PV tracker market share rankings by shipment, 2021



***#1 market share leader seven* consecutive years**

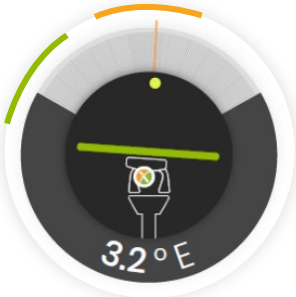
Source: Wood Mackenzie

Nextracker Pioneering Features

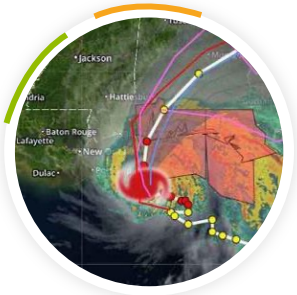
Independent, Balanced, Self-Powered Rows

TrueCapture™

Bifacial Optimization



NX Navigator™



Severe Weather Resiliency

Terrain Following

nextracker
A Flex Company

Higher Yield & Availability | Lower Operating Cost | Lower Installation Cost

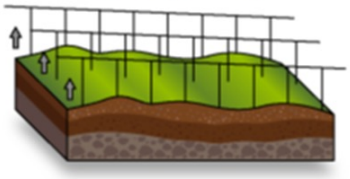
NX Horizon-XTR Terrain Following Tracker

Not Business as Usual with NX Horizon-XTR

With Conventional Solar Trackers

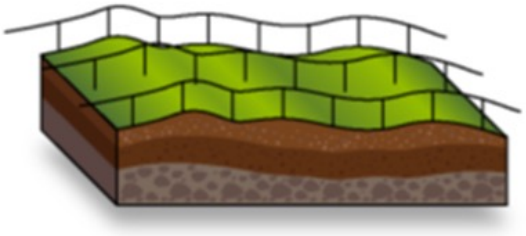
Perform Earthwork

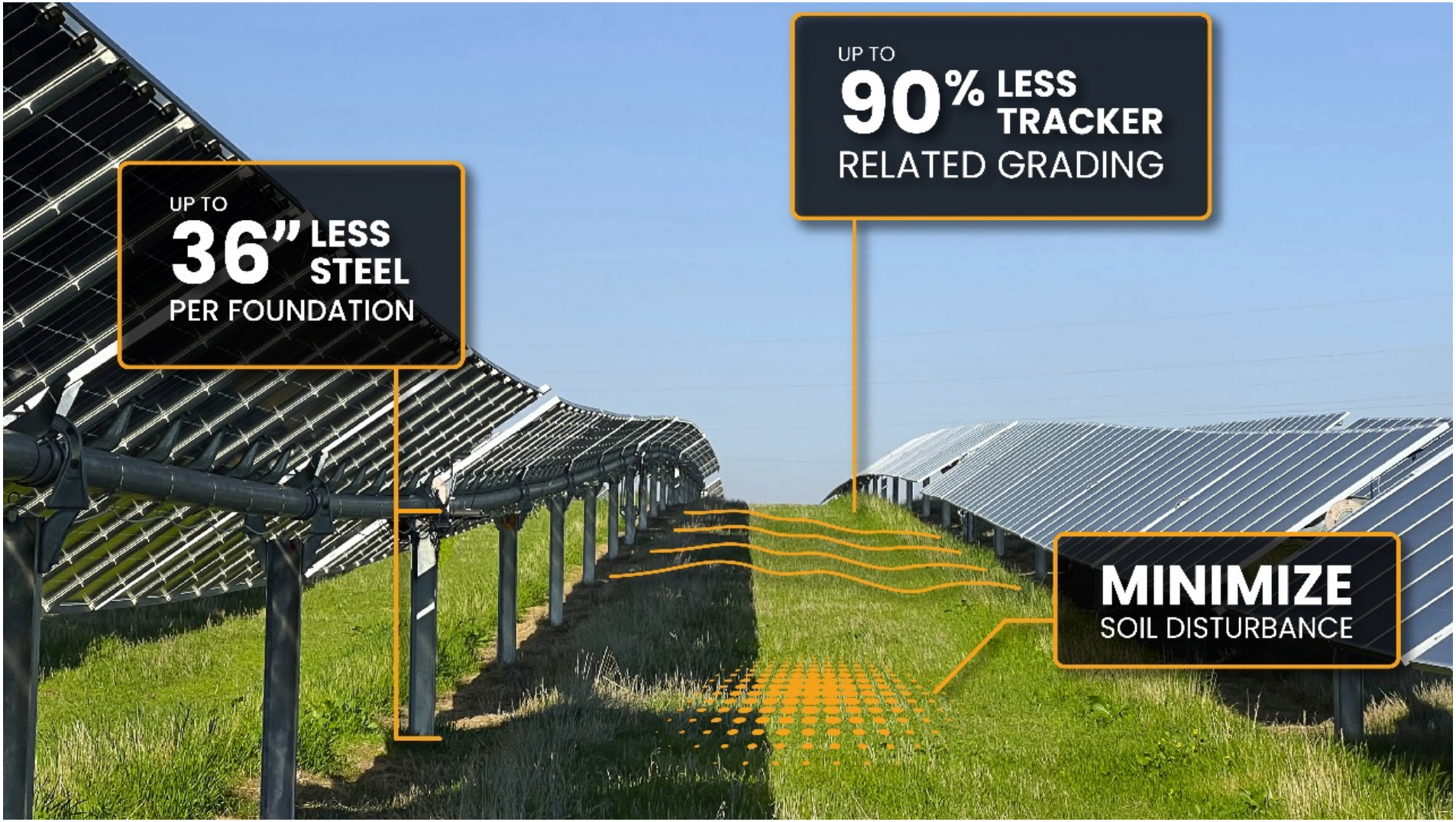
Raise array, increase pile length



With NX Horizon-XTR

Terrain Following




UP TO
36” LESS STEEL
PER FOUNDATION
UP TO
90% LESS TRACKER
RELATED GRADING
MINIMIZE
SOIL DISTURBANCE

NX Horizon-XTR Features & Benefits

Save Project Cost

Less earthwork
Up to 90% less tracker-related grading reduces cut/fil Up to 3,000 c.y. / MW savings

Shorter foundations
Up to 36" shorter overall pile length saves steel. Up to 9,000 lbs / MW savings

Less re-vegetation
Up to 90% less land disturbance minimizes re-seeding. Up to 5 acres/MW savings

Reduce Project Risk

Simplify permitting
Up to 90% less earthwork and land disturbance reduces scope of environmental review

Mitigate delays
Up to 90% less earthwork reduces likelihood of grading-related delays

Avoid remediation
Up to 90% less land disturbance mitigates risk of vegetation & soil erosion issues during plant operation

Minimize Environmental Impact

Preserve topsoil
Up to 90% less land disturbance preserves native topsoil and healthy vegetation

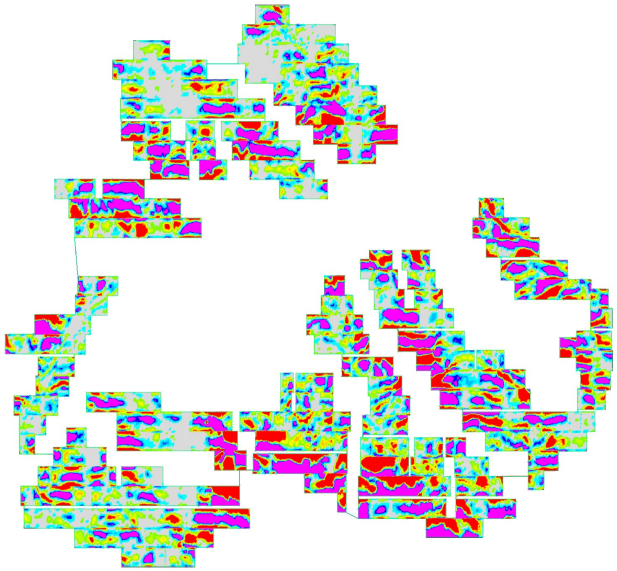
Reduce dust
Up to 90% less land disturbance minimizes construction dust

Prevent erosion
Up to 90% less land disturbance minimizes stormwater runoff & scouring

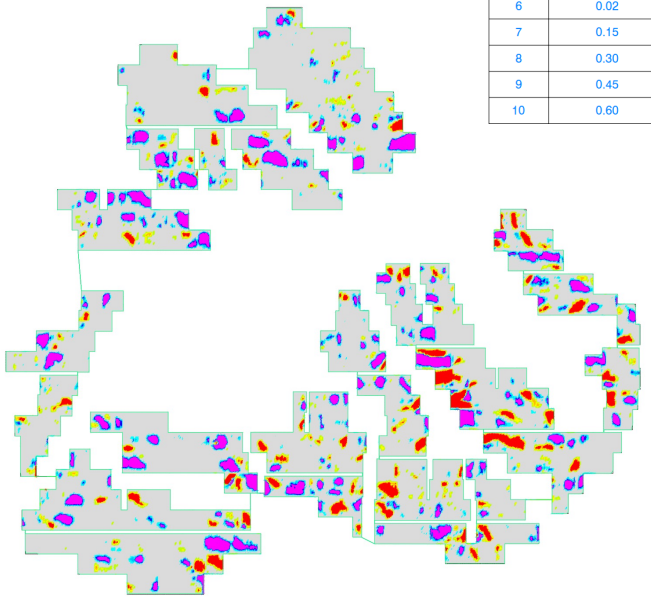
Case Study: Grading Heat Map

250 MW site, 65% reduction in grading volume (950k m^3)

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-8.31	-0.45	544402.24	
2	-0.45	-0.30	139093.93	
3	-0.30	-0.18	158631.70	
4	-0.15	-0.01	397535.52	
5	-0.02	0.02	912169.65	
6	0.02	0.15	348790.40	
7	0.15	0.30	195837.75	
8	0.30	0.45	128477.44	
9	0.45	0.60	91604.18	
10	0.60	8.31	344357.91	



Standard NX Horizon



NX Horizon-XTR

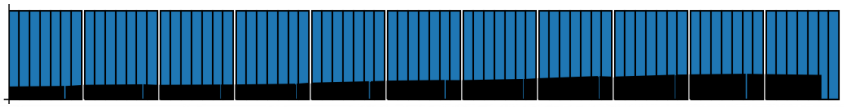
NX Horizon XTR: 3 GW in operation; 4.6 GW contracted to date

Performance Characteristics of Terrain-Following PV Tracking Systems

What do we need to consider when modeling these systems?

POA Variation Within Strings

Electrical Mismatch



Irregular Row-to-Row Shade Patterns

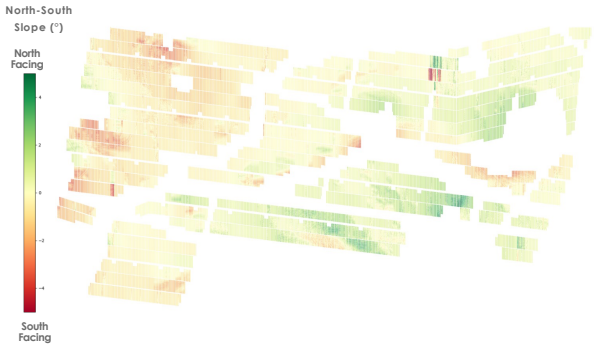
TrueSim

NX Internal Modeling Tool

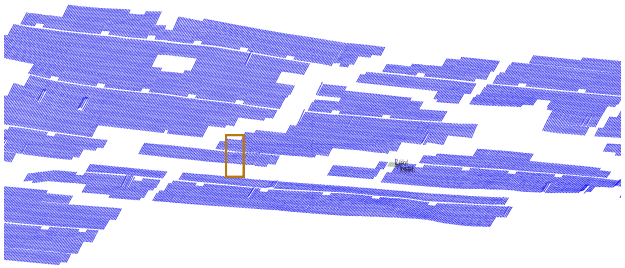
- Used internally to assess the performance of PV systems and calculate benefit of tracking optimization algorithms
- New generation is under development
- Utilizes open-source software such as SAM, PVLIB, PVMismatch
- Models performance of terrain-following trackers accurately

TrueSim Process Flow

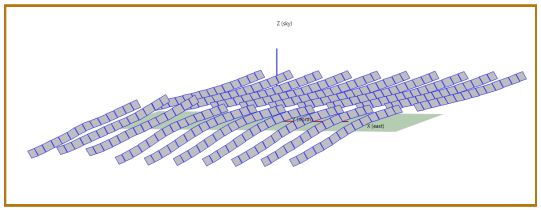
Individual Pile Height Data



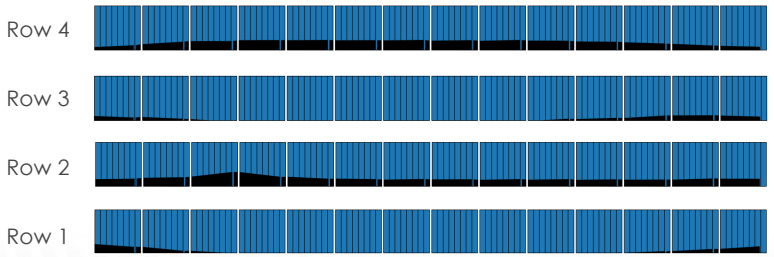
3D Shade Modeling



Ability to Model Terrain-following Trackers

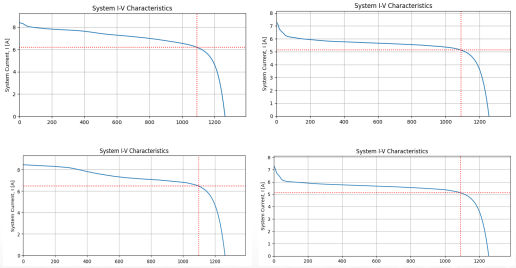


Determining Shade Polygon on Each Tracker



Assigning Cell-level Effective Irradiance

DC Energy Modeling String IV Curves

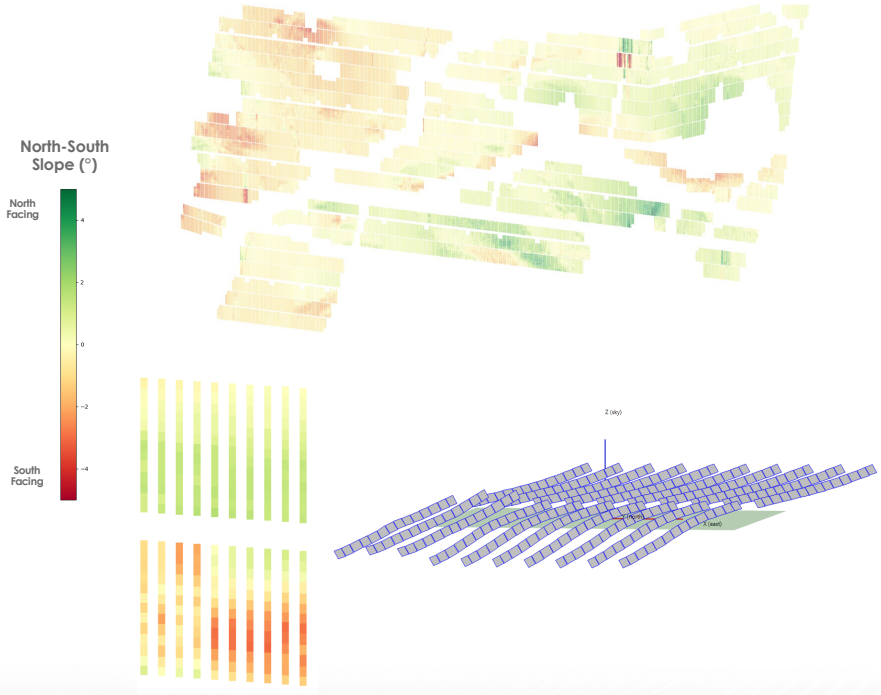


nextracker
A Flex Company

Case Study

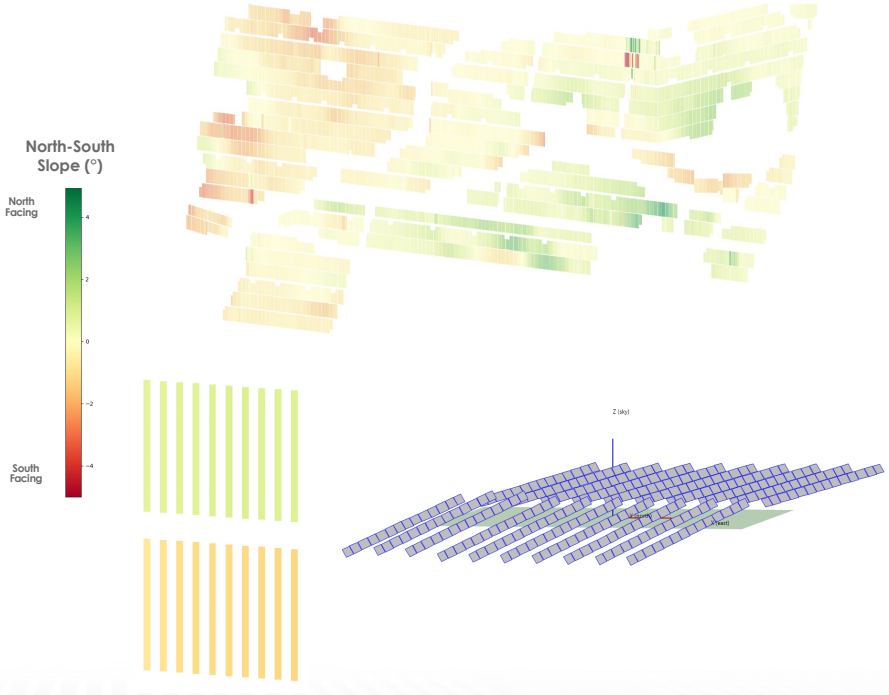
Location: Austin, TX (hourly simulation using TMY weather file)

NX Horizon-XTR



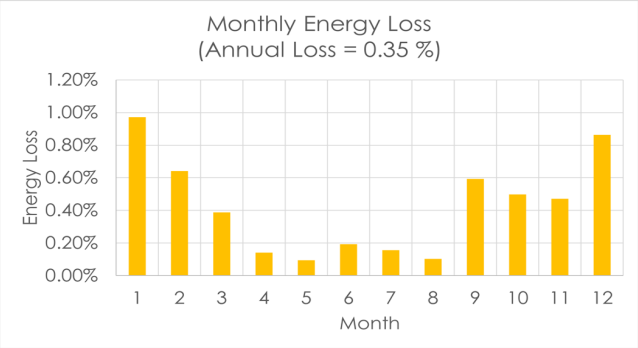
VS

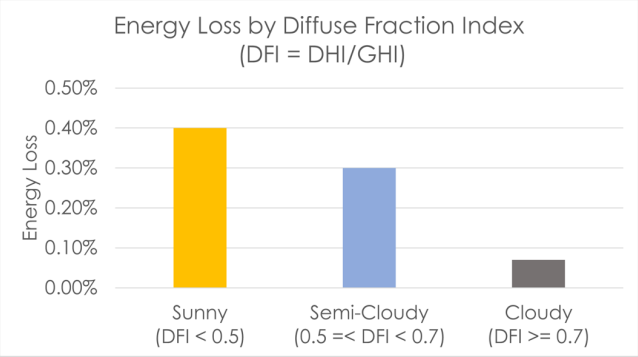
Standard NX Horizon
(Baseline)

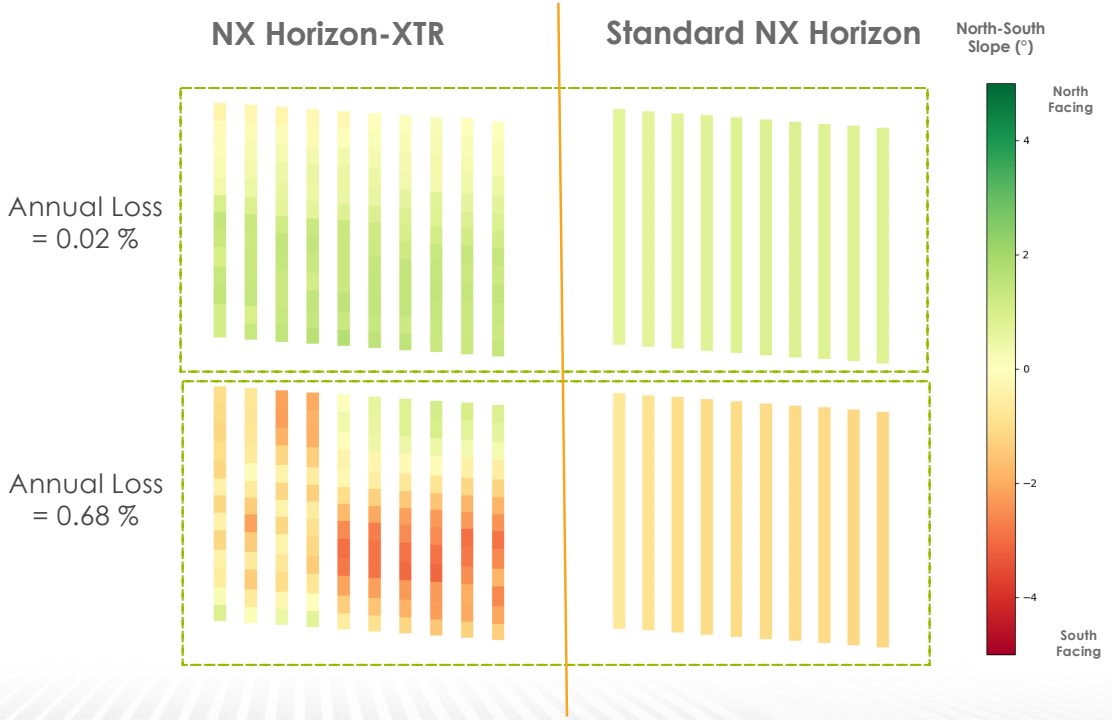


Case Study Results

Annual Energy Loss of 0.35 % for NX Horizon-XTR Compared Against Standard NX Horizon







Conclusions

- Terrain-following tracker solutions can significantly reduce projects cost and risk while minimizing environmental impact
- To model the energy performance of terrain-following trackers, we should consider:
  - POA variation within electrical strings
  - Potential irregular row-to-row shading
  - Electrical mismatch
- Next generation of TrueSim (NX internal modeling tool); developed using open-source software, can model the performance of terrain-following trackers
- A few commercially available software tools can also model terrain-following systems
  - Seeking collaboration to benchmark and improve the accuracy and efficiency of the models


nextracker
A Flex Company
Thank you