this webinar is powered by Trinasolar

pv magazine webinars

The benefits of hail and wind resistant solar modules

10 December 2024

11:00 am – 12:00 pm | PDT, Los Angeles
2:00 pm – 3:00 pm | EDT, New York City
8:00 pm – 9:00 pm | CET, Berlin, Madrid

Anne Fischer
Senior Editor
pv magazine USA

Billy Christie
Director
of Engineering Center
Trinasolar

Jon Previtali
Senior
Principal Engineer
VDE Americas

Tristan Erion-Lorico
Vice President,
Sales and Marketing
Kiwa PVEL

Welcome!

pv magazine webinars

Do you have any questions? ❓ 🙋

Send them in via the Q&A tab. 👉 We aim to answer as many as we can today!

You can also let us know of any tech problems there.

We are recording this webinar today. 📹

We‘ll let you know by email where to find it and the slide deck, so you can re-watch it at your convenience. 👀 💡

December 10, 2024

Hail and High Wind in Solar

AGENDA

1. Company intro
2. Product Development
3. Product Suite
4. Kiwa PVEL – Module Testing
5. VDE Americas – Hail Risk Advising
6. Wrap up

Company Intro

Company Intro

- Founded in 1997, Trina Solar has been supporting the solar industry for more than 25 years. By the end of 2023, Trina has shipped more than 190GW of modules throughout its existence.

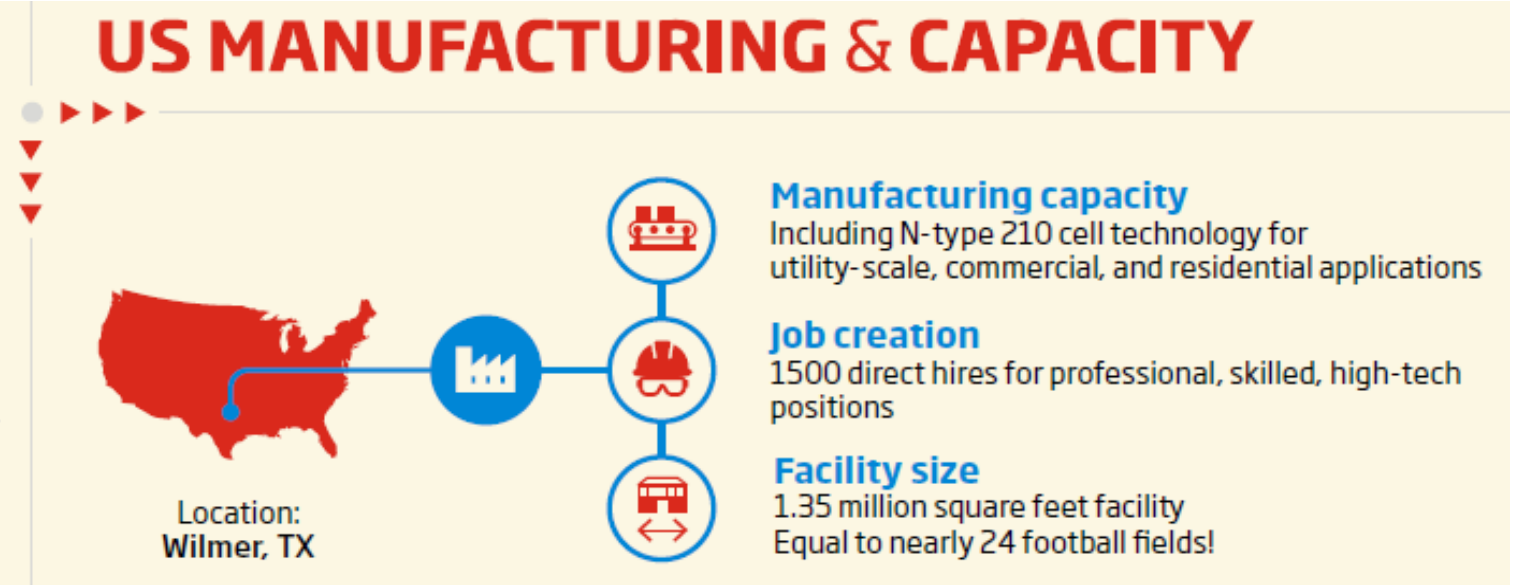
- Trina has long been a leader in the technological advancement of the industry as a whole and has received extensive technical and brand recognition from renowned independent institutes worldwide:
  - 100% in BNEF Bankability Survey for 7 years in a row.
  - “Overall Highest Achiever” by RETC for 4 consecutive years.
  - Awarded AAA ranking for 5 years in a row in the PVTech Bankability Ratings report.
  - “Top Performer” for all 9 years of PVEL’s Top Performer Scorecard.

- Large international presence as well as a strong presence here in the US. In 2023, Trina Solar US added 30% to its headcount with further investment coming in 2024. Trina’s US manufacturing facility in Wilmer, Texas will add roughly 1,500 local jobs alone.

Trina Solar US Manufacturing

Trina Solar U.S. Initial Phase - PV Manufacturing Facility and Jobs Coming to Wilmer, Texas

- Location: **Wilmer, Texas**
- **1.35 million square foot** solar photovoltaic (PV) manufacturing facility
- More than a **$200 million investment** in property and equipment
- **1,500 local jobs**
- **5 GW of modules**, with polysilicon sourced from the United States and Europe
- Starting in 2024, the facility will produce innovative large power output Vertex modules using the state-of-the-art 210mm large size wafer and the most advanced technology in the solar industry.



Complete Product Support – Trina Solutions

- Trina is now also a provider of a tracker product and energy storage product. Our goal is to support customers with a complete solar + storage solution.
- We believe our control of both module and racking design puts us in a unique position to create an optimized package to reduce cost, component count, and install time.
- Our integrated solution also reduces headaches with product compatibility, warranty and O&M issues, and overall project design.

Our energy storage systems solutions

Trina Storage is a business unit of Trina Solar, a company with over 20 years of solar experience. Supported by a Tier-1 supply chain, Trina Storage provides highly-scalable, easy-to-install energy storage solutions.

With an in-depth understanding of the technical requirements, Trina Storage designs flexible commercial and industrial solutions that meet unique customer needs for the generation, transmission and distribution of solar energy.

Trina Storage builds on a strong solar heritage to deliver energy storage solutions at scale. Our mission is to lead the transition to renewable energy through cost-effective and high-quality storage. We're dedicated to providing "Solar for Everyone".

Trina Storage provides the most reliable energy storage platform on the market - from consultancy and hardware to software and service.

Product Development For New Market Demands

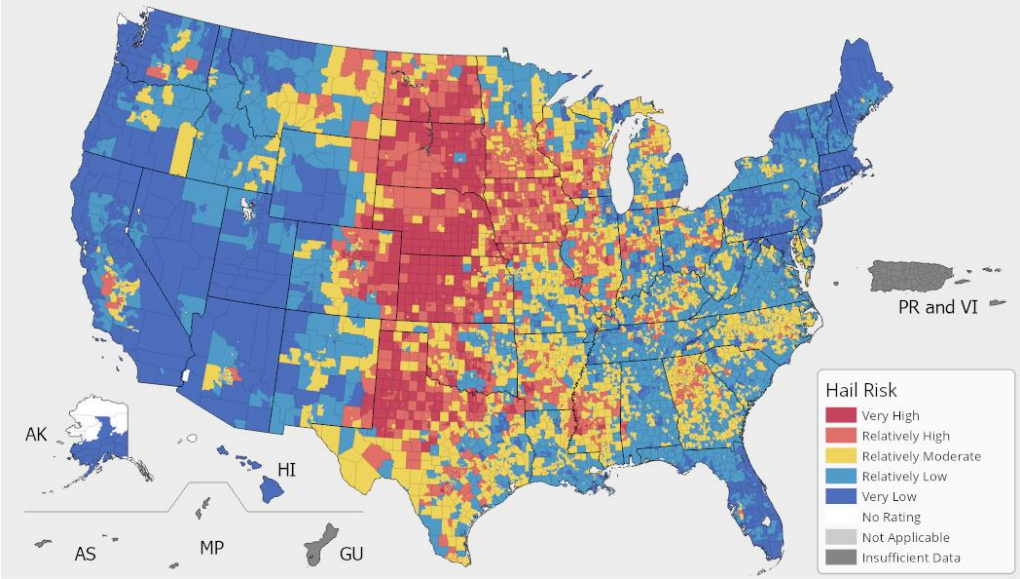
Product Development

Utility-scale PV capacity in early-stage development by state, December 2023

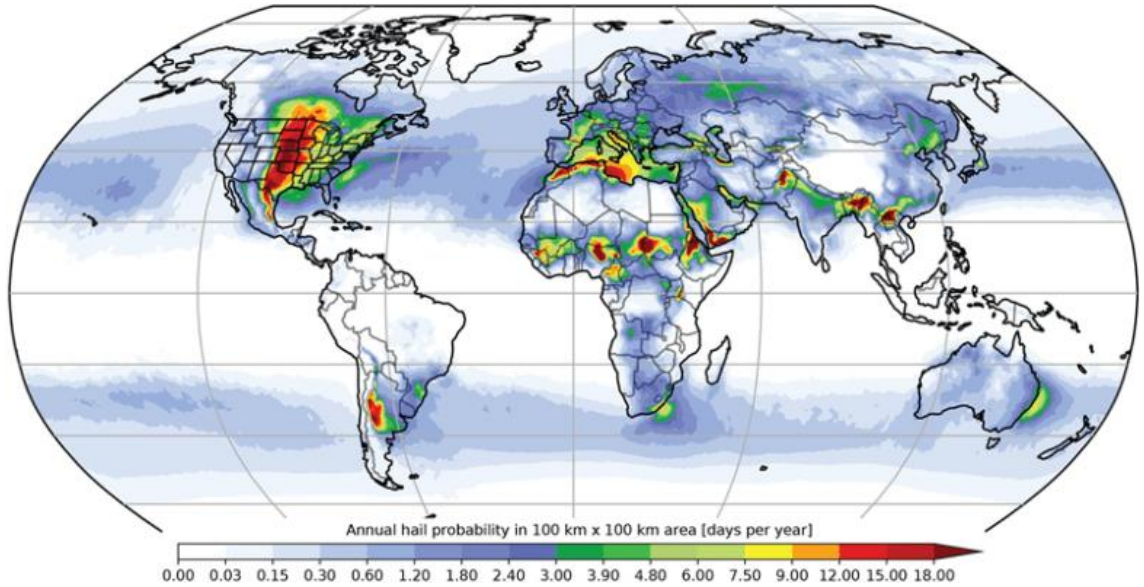
Utility-scale PV capacity in late-stage development by state, December 2023

Source: Wood Mackenzie US Utility PV Market Update Q4 2023 (December 2023)

Product Development



Source: fema.gov



Source: Annual large hail probability from 1979 to 2015. Credit: Prein and Holland [2018]

Product Development

- As climate change continues, hail events are predicted to be both more numerous and intense as time goes on.
- Hail damage has caused more than 50% of total insured solar project losses over the past five years, with events in Texas alone exceeding $300 million in 2022.
- Although hail events account for less than 2% of solar project insurance claims by volume, they account for more than 50% of total dollar losses.
- Module recycling is still relatively minimal, so lots of damaged modules unfortunately end up in the landfill.

Product Suite and Testing

Vertex N

Trinasolar

NE19RC

Maximum Power Output

Up to **620W**

Maximum Efficiency

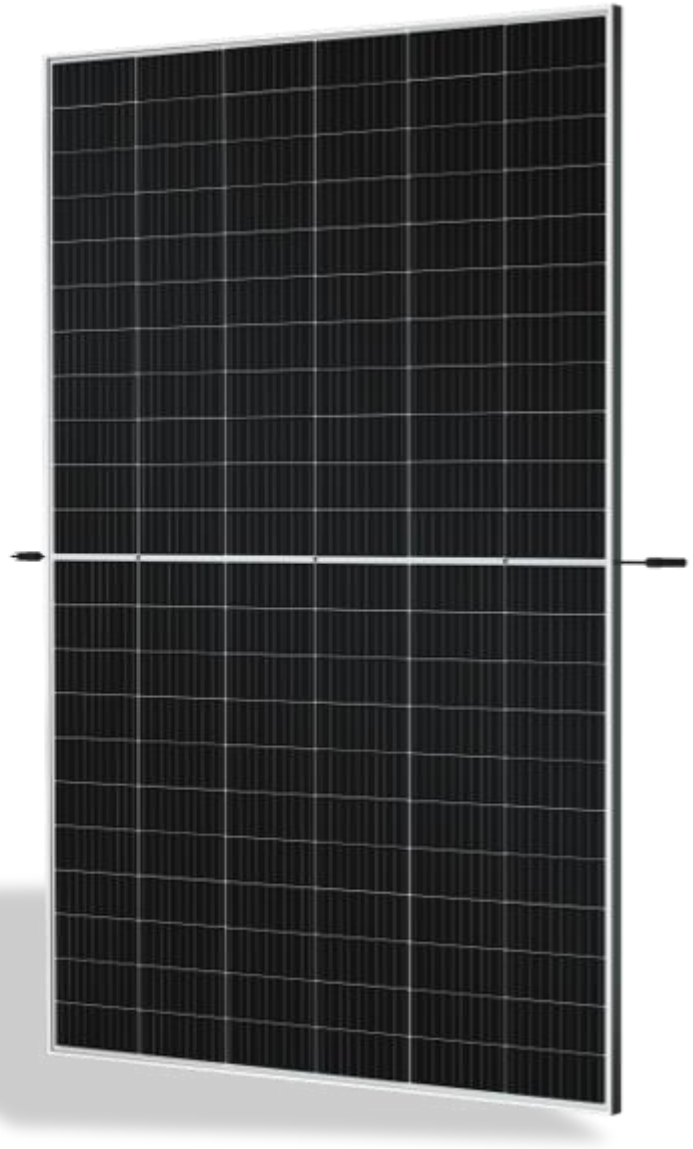
Up to **23%**

Electrical Parameters

- Open Circuit Voltage ： 49.6V
- Short Circuit Current ： 15.91A

Mechanical Parameters

- Single Glass 3.2mm Fully Tempered
- 65mm Hail Test Performance
- High Load: +5400 / -2400 Pa
- Dimensions ： 2382*1134*35mm
- Weight ： 28.8kg



Vertex S+

Trinasolar

NE09RH.05

Maximum Power Output

Up to **445W**

Maximum Efficiency

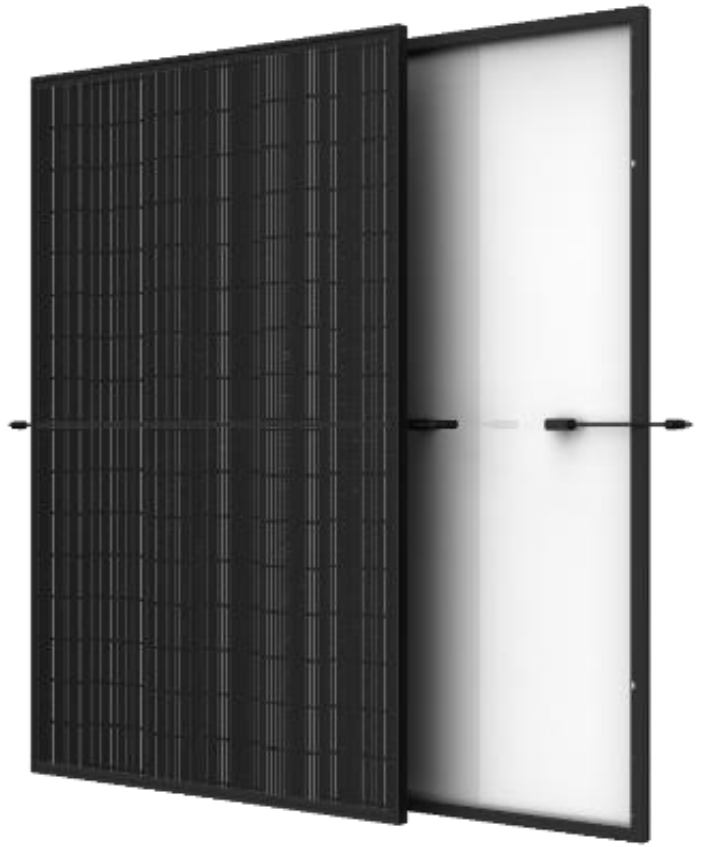
Up to **22.3%**

Electrical Parameters

- Open Circuit Voltage ： 35.1V
- Short Circuit Current ： 16.07A

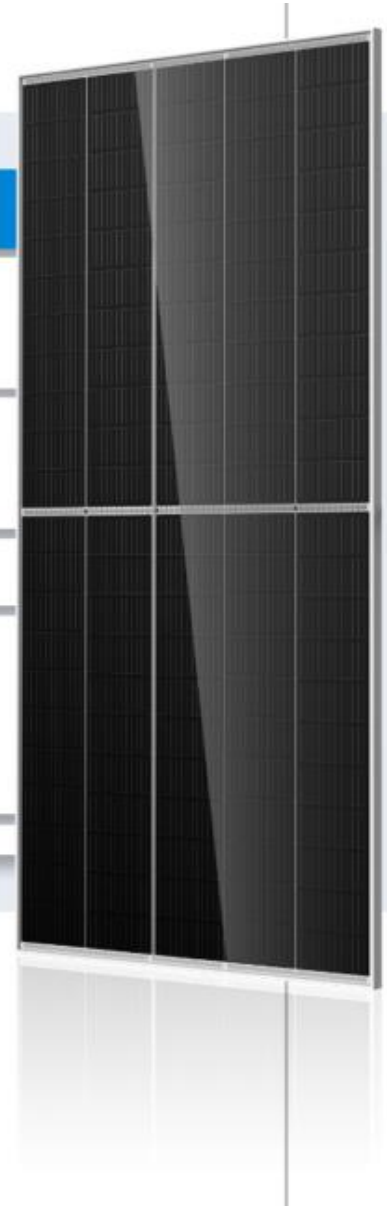
Mechanical Parameters

- Single Glass 3.2mm Fully Tempered
- 65mm Hail Test Performance Expected
- High Load: +6000 / -5400 Pa
- Dimensions ： 1762*1134*35mm
- Weight ： 21.5kg



Hail Testing Results - RETC

Model #	Type	Hail Size	Stow Angle	Testing Remarks
NEG19RC.20	2.0mm+2.0mm dual glass modules	45mm	50°	No Defect
		55mm	65°	No Defect
DEG21C.20		45mm	50°	No Defect
		55mm	65°	No Defect
NEG21C.20		45mm	50°	No Defect
NE19RC	3.2mm single glass backsheet module	45mm	0°	No Defect
		55mm	50°	No Defect
		65mm	60°	No Defect

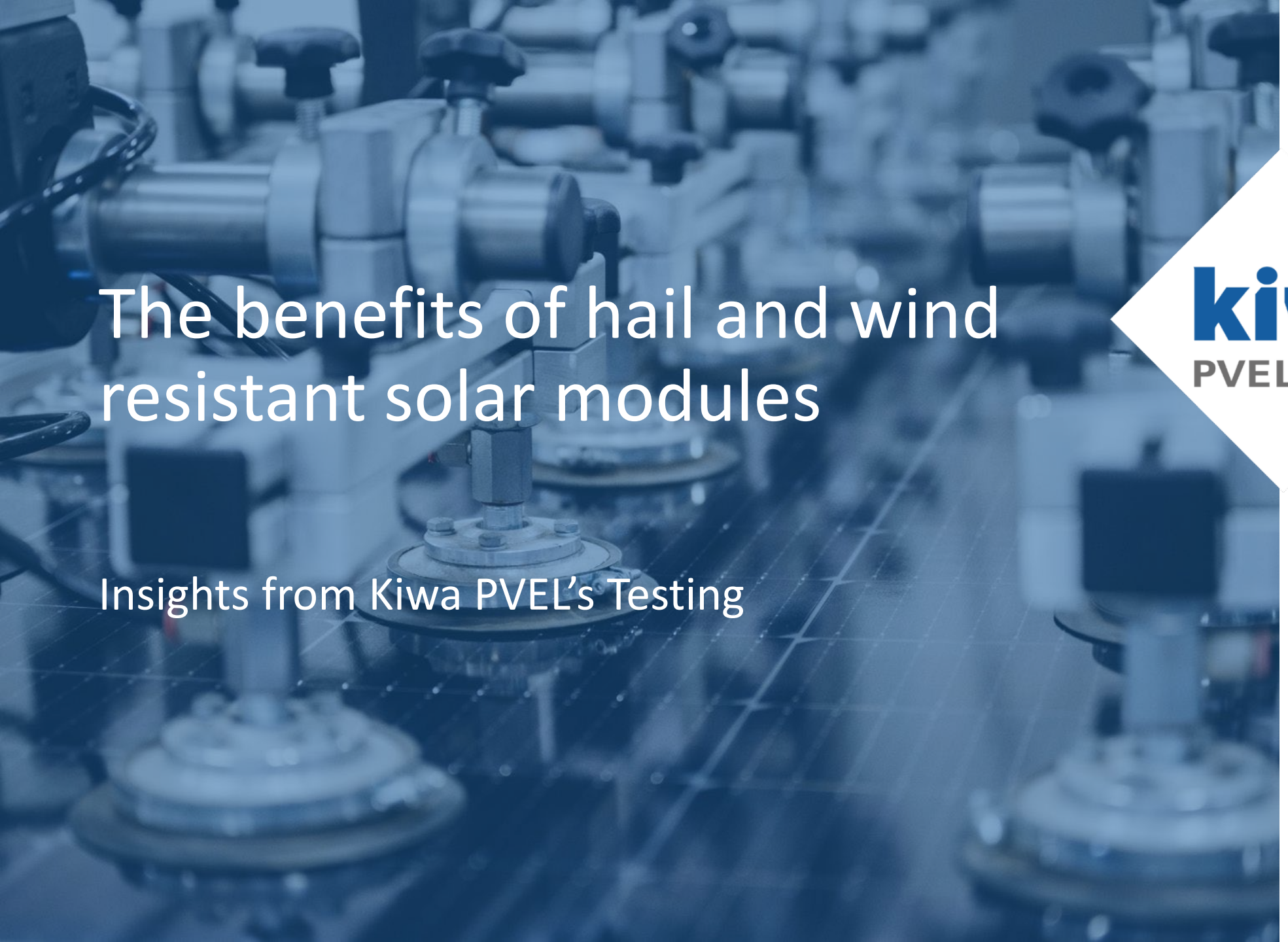


Wrap Up

Wrap Up

- Solar growth in hail prevalent areas such as Texas, climate change, and the increasingly large size format of utility scale solar modules are all driving the need for hail-hardened solar modules.
- Hail events can be catastrophic for solar plants if their effects are not mitigated. Hail accounts for less than 2% of solar insurance claims by volume, but more than 50% by dollar losses.
- Using modules specifically designed for hail events, along with proper tracker stow protocols, is the best way to prepare a plant for the possibility of a severe storm.
- Hail testing is an important way to ensure that hail-hardened modules can truly be expected to survive severe hail events and Kiwa PVEL is a leader in this area with hail testing being incorporated into their PQP testing protocol.
- VDE Americas' has developed statistical models that allow one to better understand the financial implications of the products they're using for their solar projects. This data can be used to better understand what losses an owner can expect from hail events throughout the life of a system and help negotiate for more favorable project insurance premiums.
- Trina offers 3.2mm/backsheet modules to serve the hail-hardened module market. Our NE19RC module is ideal for both the C&I and utility markets while the NE09RH.05 module is perfect for the residential space. These modules both utilize our top-of-the-line N-type TOPCon technology so that there is no detriment to performance in pursuit of higher durability.


Trinasolar
Thank you!



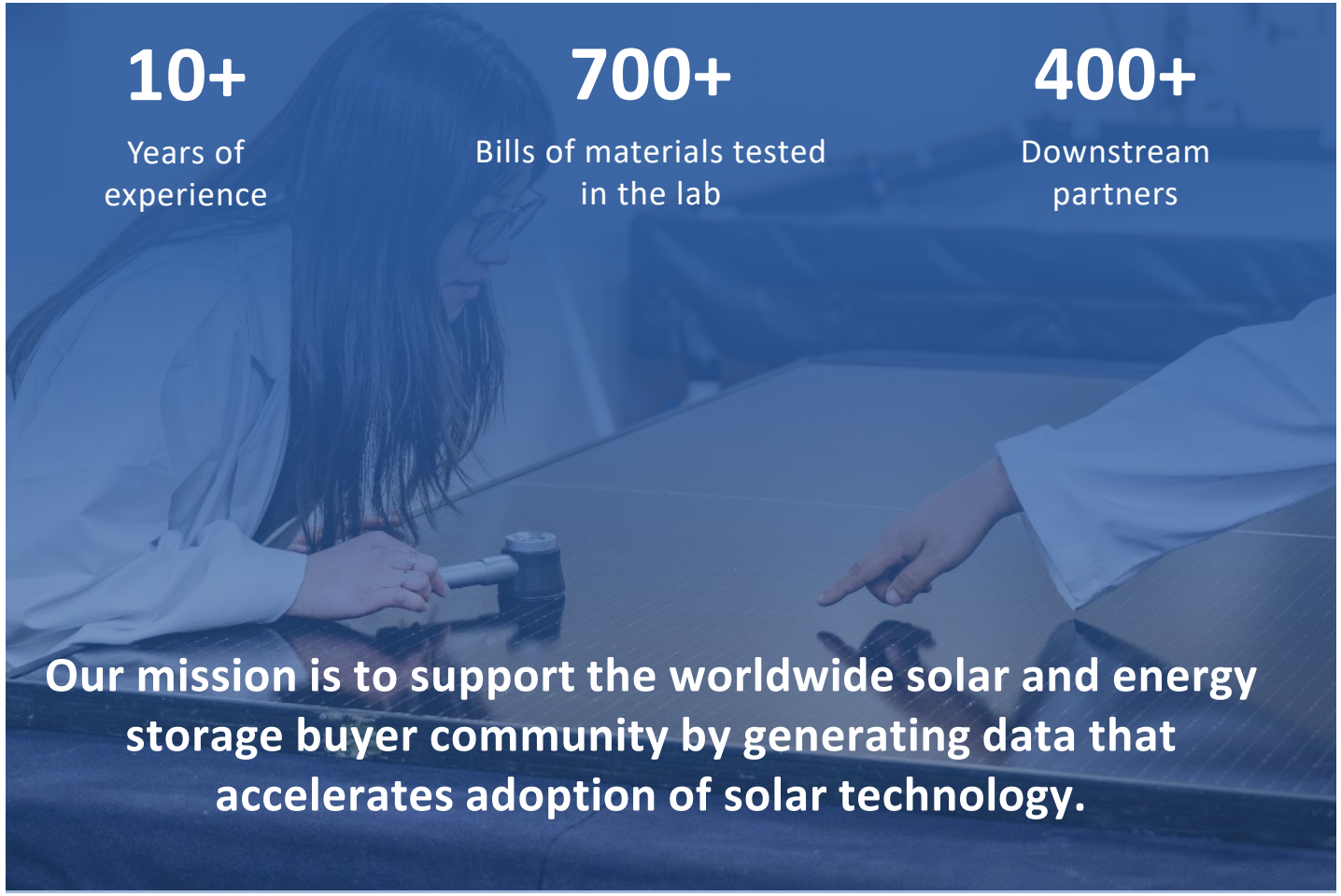
The benefits of hail and wind resistant solar modules

Insights from Kiwa PVEL's Testing

kiwa PVEL

We Create Trust

Kiwa PVEL is the Independent Lab of the Downstream Solar Market



Services at a glance:

- Extended reliability and performance testing for PV modules
- Batch testing of PV modules
- Outdoor testing at PVUSA, an iconic grid-connected research site
- Data services for PV buyers and investors

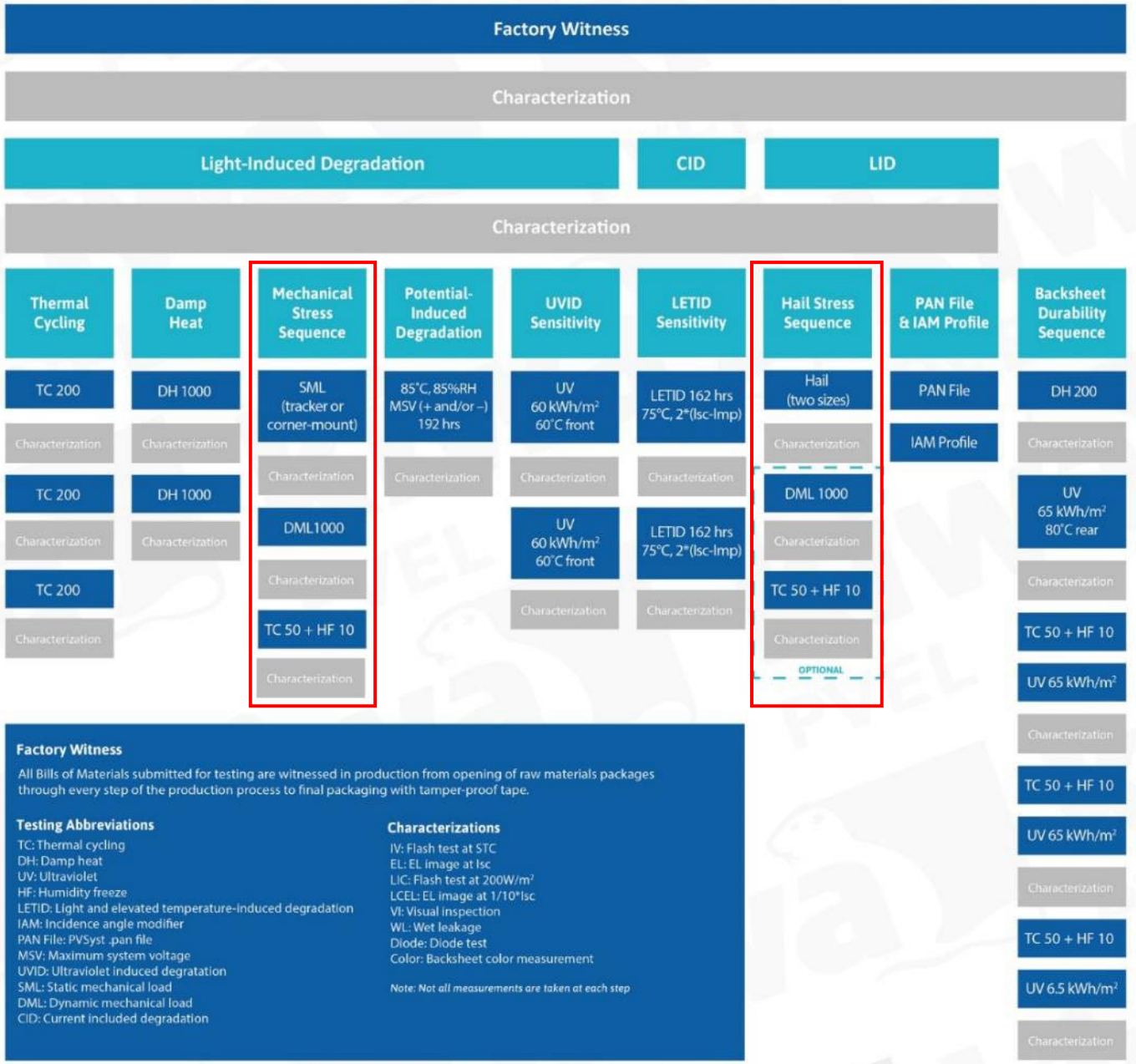
See more details at kiwa.com/pvel

PQP Test Sequence

The PQP evolves every two years based on feedback from Kiwa PVEL's downstream partners, module manufacturers, and the industry's collective understanding of module failure modes and test mechanisms.

The most recent update introduced the new UVID test and streamlined many of the tests leading to faster execution of PQP projects.

Learn more about the current version of the PQP test plan at kiwa.com/pvel/pqp.



Mechanical Stress Sequence Trends

Mechanical Stress Sequence

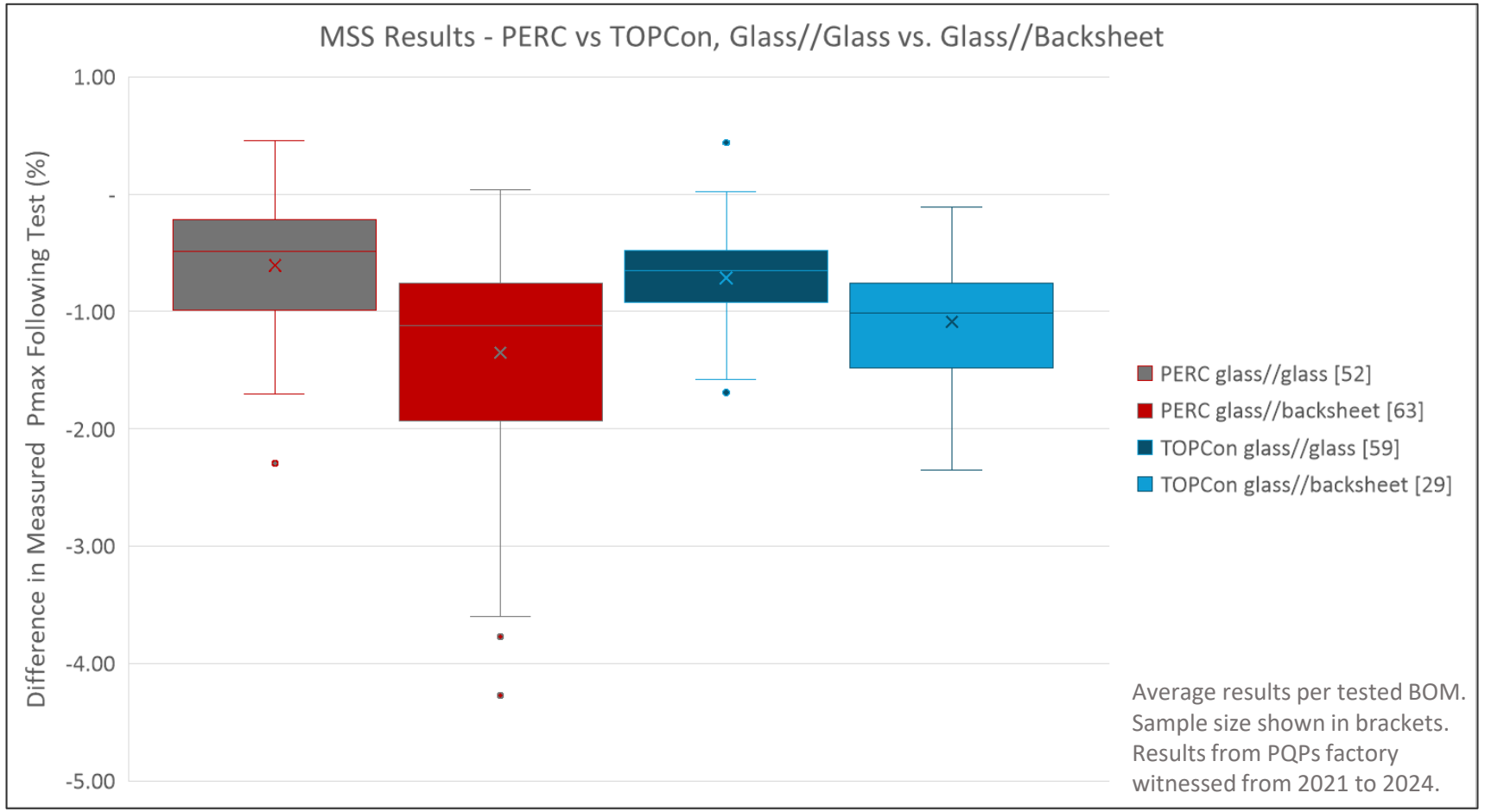
SML
(tracker or corner mount)

DML1000

Characterization

TC50 + HF10

Characterization



Mechanical Stress Sequence Outlier

Mechanical Stress Sequence

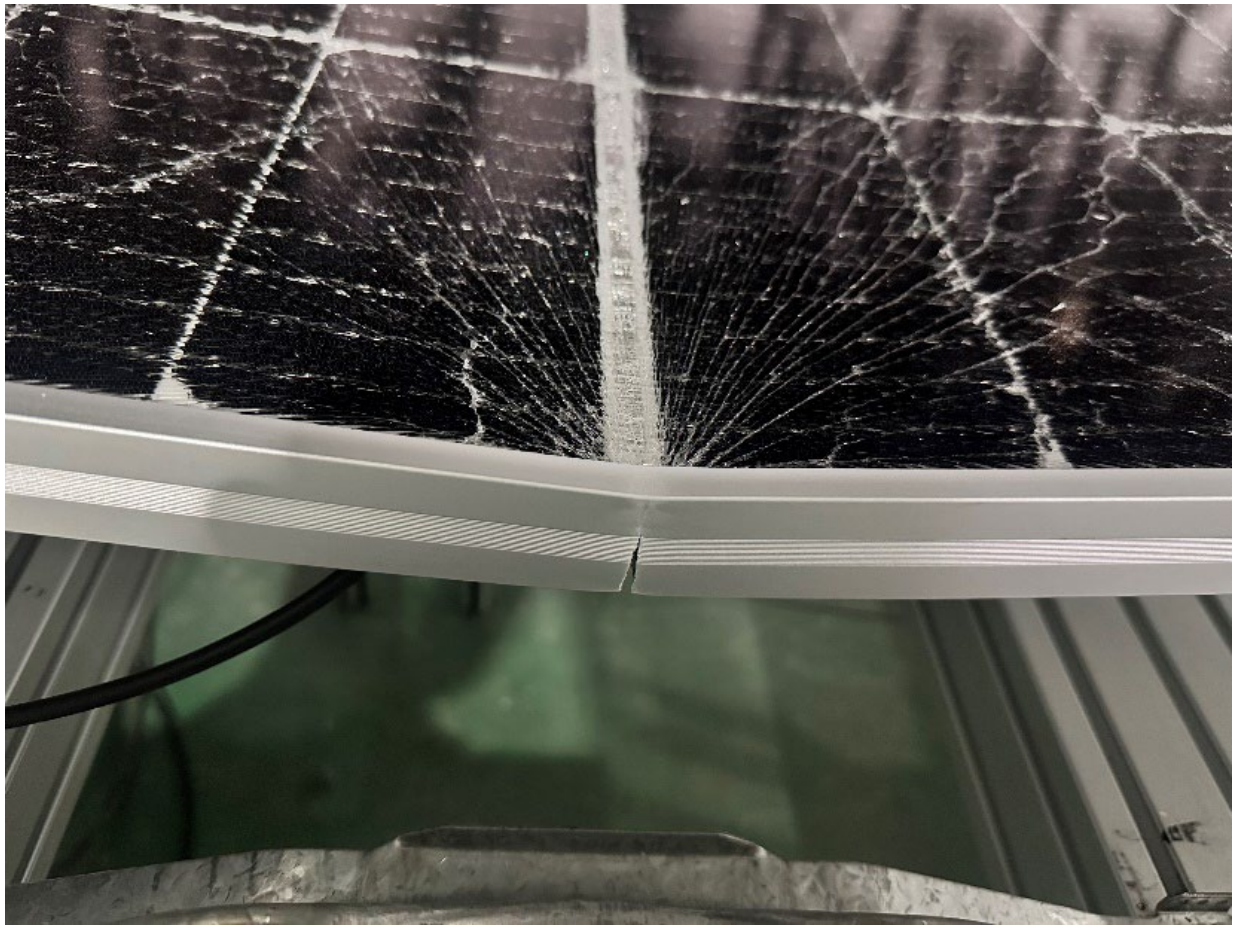
SML
(tracker or corner mount)

DML1000

Characterization

TC50 + HF10

Characterization



- Breakage occurred during SML (during downward pressure)
- Significant laminate deflection before breakage
- Frame was not robust enough to prevent breakage

Mechanical Stress Sequence Outlier

Mechanical Stress Sequence

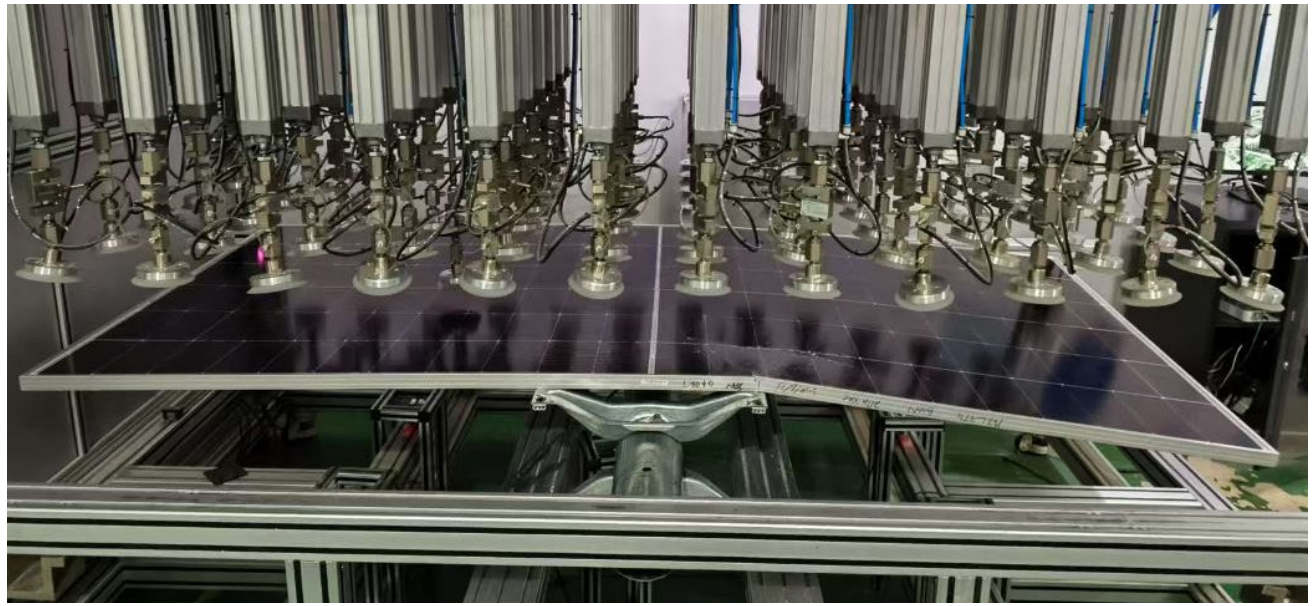
SML
(tracker or corner mount)

DML1000

Characterization

TC50 + HF10

Characterization



- Breakage occurred during SML (partially through the second downward pressure cycle)
- Bent frame inducing structural failure and broken glass
- Aggressive frame design via thin walls

Mechanical Stress Sequence Outlier

Mechanical Stress Sequence

SML
(tracker or corner mount)

DML1000

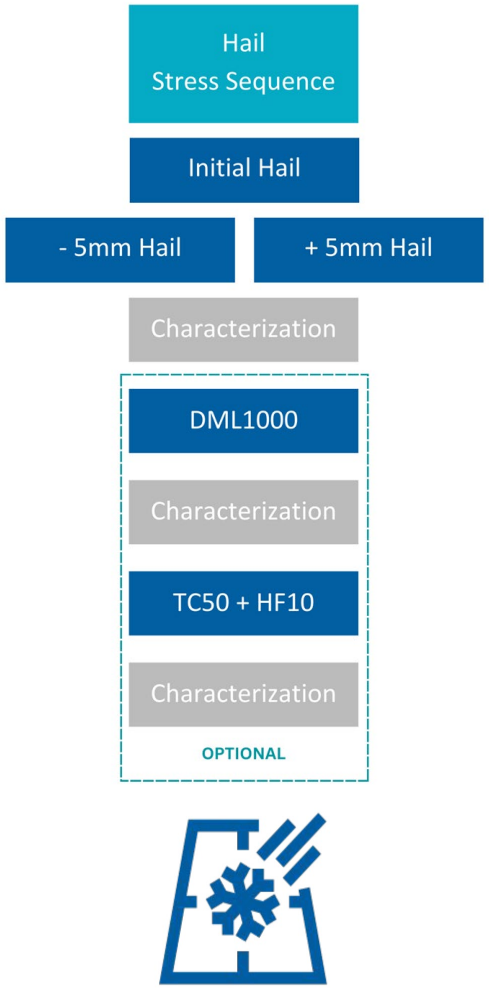
Characterization

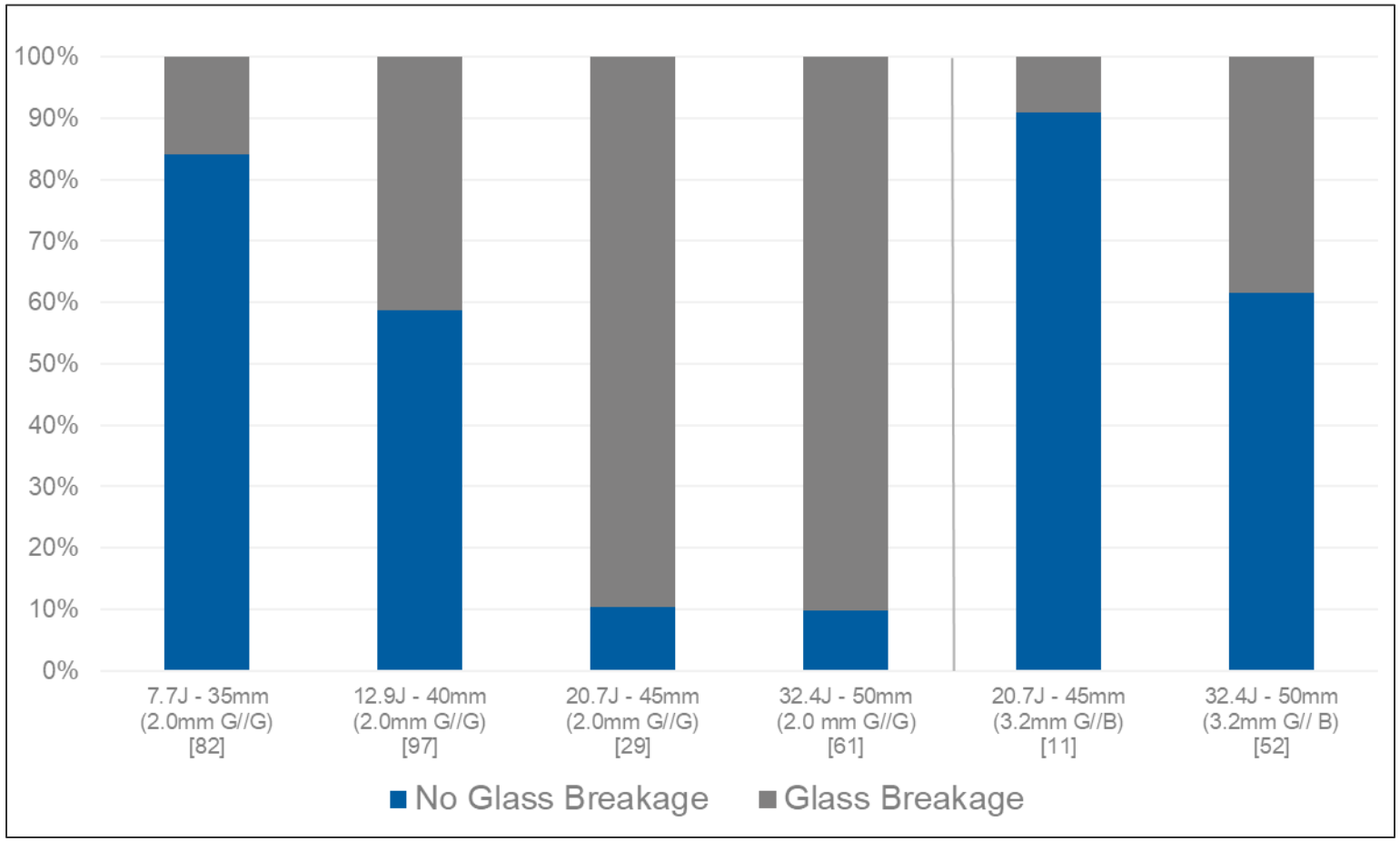
TC50 + HF10

Characterization

- Breakage occurred during SML (start of first upward pressure cycle)
- Frame adhesive failed, allowing laminate to pull out of frame channel

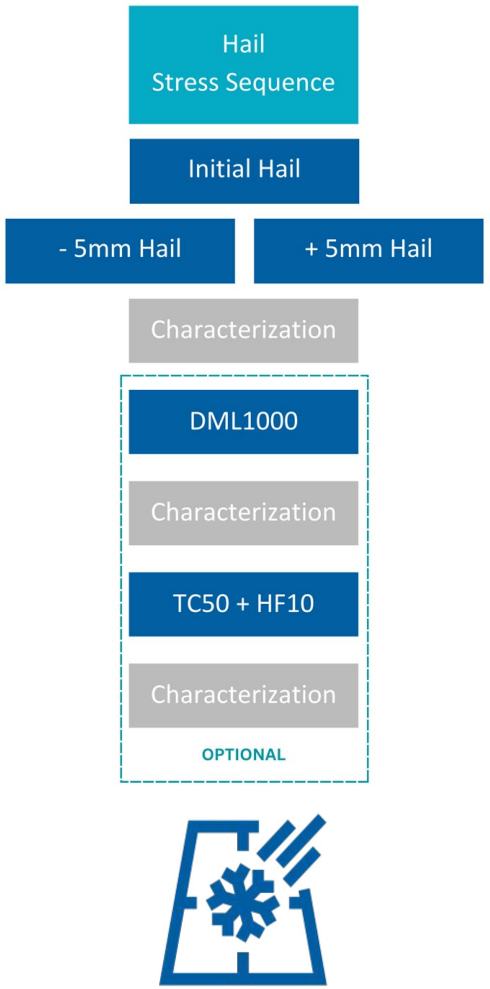
Hail Stress Sequence Trends – Breakage Rates

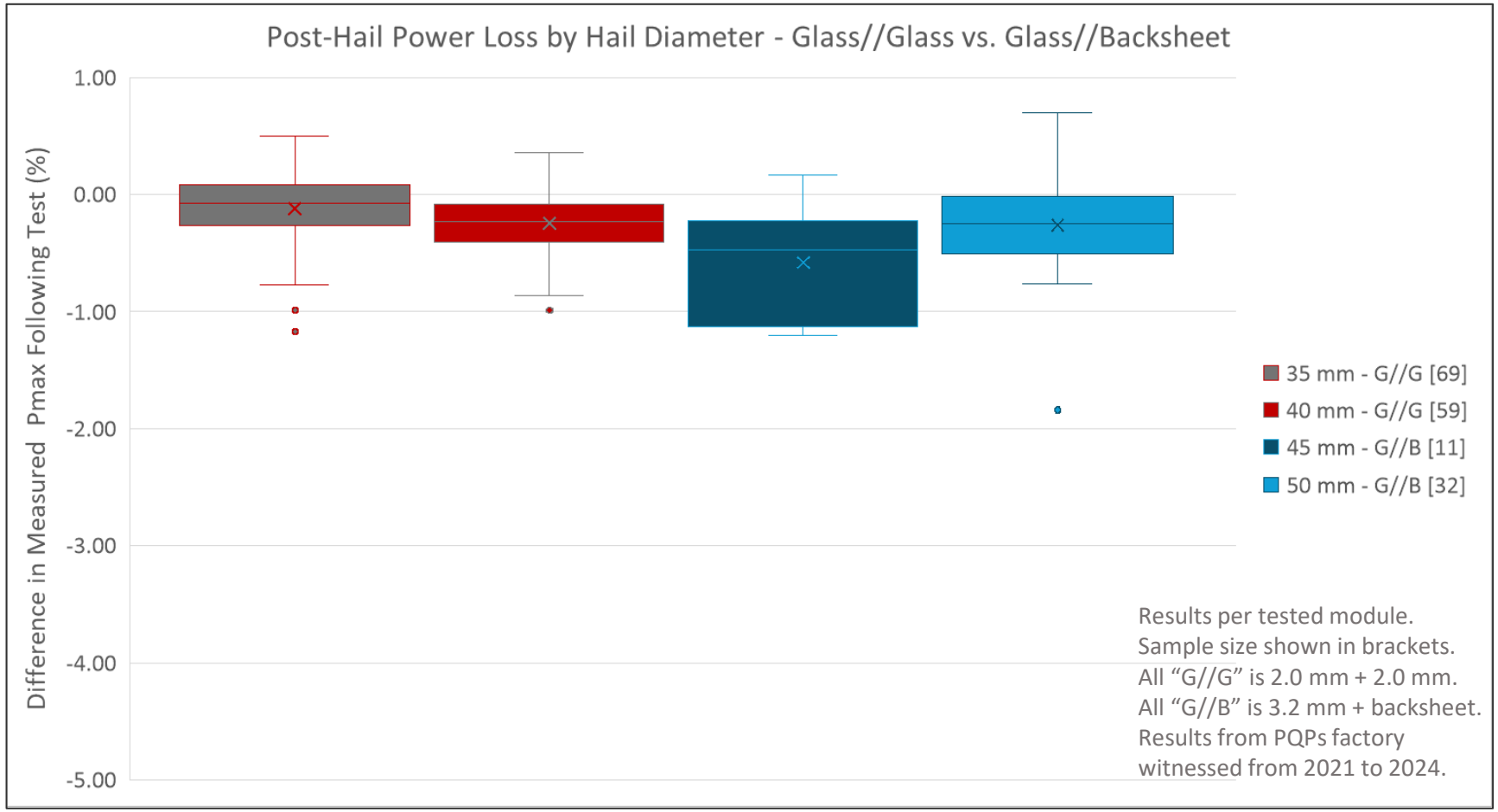




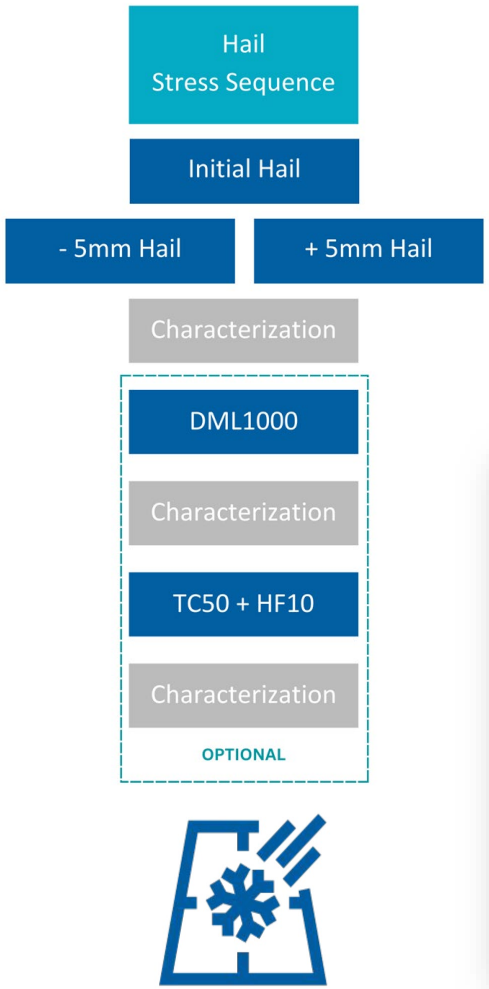
Results per tested module.
Sample size shown in brackets.
Results from PQPs factory witnessed from 2021 to 2024.

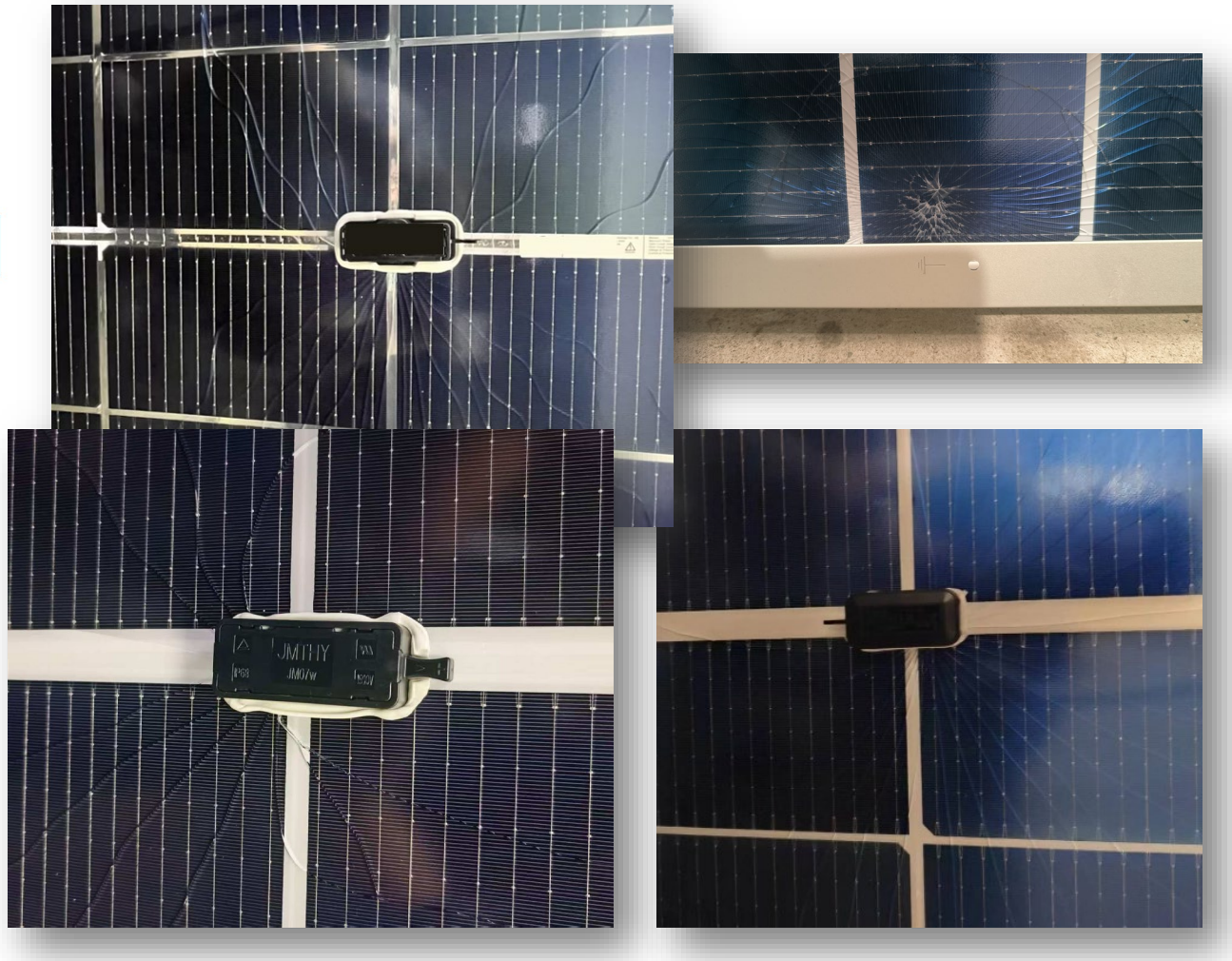
Hail Stress Sequence Trends – Power Loss





Hail Stress Sequence – Rear Glass Breakage





- As reported in the 2024 Scorecard: Only the rear-side glass broke on 40% of the G//G modules that experienced glass breakage.
- When this occurs, it's often during the 11th hail shot (which is aimed over the junction box).

Trina's MSS and HSS Results

TOP PERFORMER 2024 kiwa PVEL PV MODULE RELIABILITY SCORECARD

MANUFACTURER	MODEL TYPE								MODULE DESIGN	CELL TECHNOLOGY
Trinasolar	TSM-xxxDEG19C.20	✓	✓	✓	40	✓			bifacial - glass//glass	p-type PERC
Trinasolar	TSM-xxxNE09RC.05			✓	45	✓	✓		bifacial - glass//backsheet	n-type TOPCon
Trinasolar	TSM-xxxNEG21C.20	✓	✓	✓	40	✓	✓	✓	bifacial - glass//glass	n-type TOPCon

Learn more at: www.scorecard.pvel.com/Trina

Kiwa PVEL's Premium Partner Program

- Module purchasing companies can subscribe to the Premium Partner Program to receive a quarterly Dashboard of **Kiwa PVEL's Product Qualification Program (PQP)** test results. This allows for easy Approved Vendor List (AVL) management and identification of potential new suppliers.
- PQP results from over 45 module manufacturers are included in the Dashboard, with nearly 30 manufacturers sharing their non-anonymized results. Nearly 200 BOMs are included, with over 60% of BOMs non-anonymized.

Manufacturer	Module Model & Datasheet	PVEL Project #	BOM #	Factory Location	Wafer Edge Length (mm)	PQP Pass / Fail	Wet Leakage Result	Visual Inspection Result	TC 600	DH 2000/Post-BO	MSS	P.I.D. 192 (Negative Bias)	P.I.D. 192 (Positive Bias)	LID (>60 kWh/m2)	LETID (post-486h)
Manufacturer B	BBB-BB-BBB	2222	2	China	182	Pass	Pass	Pass	-2.15%	Test not required	Test not required	Test not required	Test not required	Test not required	-3.48%
Manufacturer B	BBB-BB-BBB	2222	3	China	182	Test not required	Pass	Pass	Test not required	Test not required	Test not required	Test not required	Test not required	Test not required	-3.57%
Manufacturer C	CCC-CC-CCC	3333	1	China	166	Pending	Pass	Pass	Pending	-0.09%	Test not required	-0.20%	Test not required	NOD	-3.53%
Manufacturer C	CCC-CC-CCC	3333	1	China	182	Pending	Pass	Pass	Pending	Pending	Test not required	Pending	Test not required	Pending	-3.35%
Manufacturer D	DDD-DD-DDD	4444	1	China	158.75	Pending	Pass	Pass	Pending	Pending	-2.97%	Pending	-1.04%	-0.27%	-0.50%
Manufacturer D	DDD-DD-DDD	4444	2	China	166	Pass	Pass	Pass	-1.11%	-0.28%	Test not required	-0.58%	Test not required	NOD	-0.57%
Manufacturer D	DDD-DD-DDD	4444	3	China	158.75	Pass	Pass	Pass	NOD	NOD	-0.50%	-0.08%	Test not required	-1.02%	-1.34%
Manufacturer D	DDD-DD-DDD	4444	1	China	182	Pending	Pass	Pass	Pending	-1.19%	Test not required	-1.95%	-1.29%	-0.24%	-1.23%
Manufacturer E	EEE-EE-EEE	5555	1	China	158.75	Pass	Pass	Pass	-2.16%	-0.28%	Test not required	-0.12%	Test not required	-0.85%	-1.01%
Manufacturer F	FFF-FF-FFF	6666	1	Turkey	158.75	Pass	Pass	Pass	-3.76%	-0.75%	-1.47%	-4.03%	Test not required	-0.11%	-1.65%
Manufacturer F	FFF-FF-FFF	6666	1	Turkey	182	Pending	Pass	Pass	Pending	Test not required	Test not required	Test not required	-0.99%	Test not required	-1.02%
Manufacturer F	FFF-FF-FFF	6666	2	Turkey	182	Pending	Pass	Pass	Test not required	-1.43%	Test not required	-2.27%	-0.85%	NOD	-1.13%
Manufacturer G	GGG-GG-GGG	7777	1	China	158.75	Pass	Pass	Pass	Test not required	Test not required	Test not required	-1.84%	Pending	-0.32%	-0.94%
Manufacturer G	GGG-GG-GGG	7777	2	China	158.75	Pass	Pass	Pass	Test not required	Test not required	Test not required	-1.17%	Test not required	Test not required	-1.60%
Manufacturer G	GGG-GG-GGG	7777	1	China	158.75	Fail	Pass	Fail PID-192	-1.72%	-2.07%	Test not required	-3.86%	Test not required	NOD	-2.09%

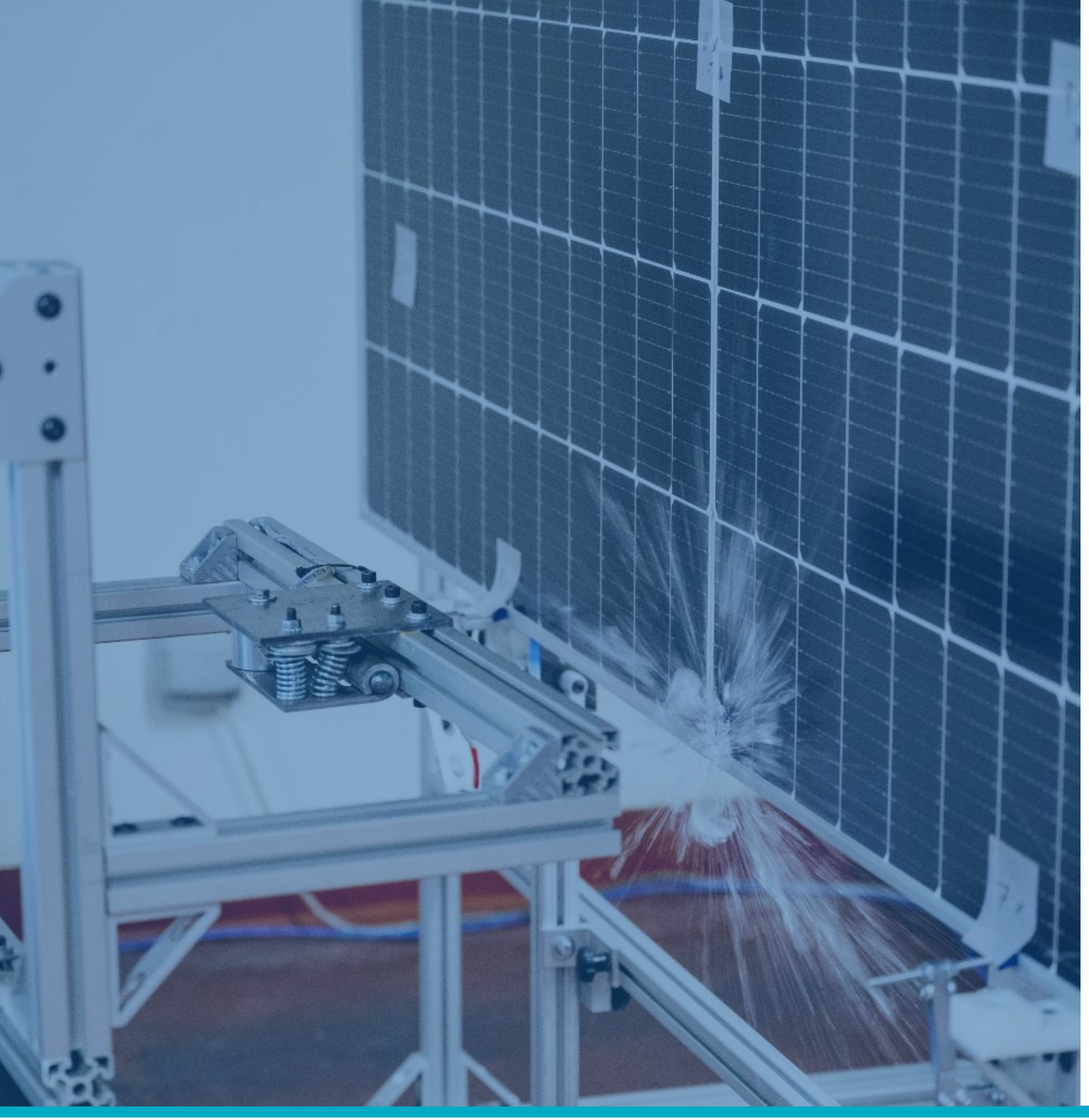
- A selection of the current Premium Partners:

anza, equinor, kWh analytics, ADAPTURE RENEWABLES, susten BY mahindra, L&T, DESRI, Ørsted, sembcorp, SUNRUN, SUSI PARTNERS, NEXTera ENERGY, APEX CLEAN ENERGY

And more!

- Learn more at: www.kiwa.com/pvel/ppp

kiwa PVEL



kiwa PVEL

We Create Trust

Contact us
Kiwa PVEL
pvel@kiwa.com
www.kiwa.com/pvel

Safeguard solar assets with

Hail-Resistant PV Modules

Loss estimates comparing 3.2 mm front glass/polymer back sheet modules with 2 mm/2mm dual glass modules

Jon Previtali

Senior principal engineer
& hail advisory services lead

Jon.previtali@vde.com

VDE

About **VDE Americas'** engineering advisory services

VDE Americas provides **technical advisory and risk mitigation services** to owners, financiers, project developers, operators, equipment providers, and insurance companies working on **solar, energy storage, and solar-plus-storage** system transactions.

Cumulatively, we have served as a technical advisor for more than 10 GW of operating solar assets and more than 4.5 GW of BESS capacity.

We are the **world's leading expert on hail risk assessment for utility scale solar farms.**

Our parent company is one of the largest technology organizations in Europe.

High-level overview of VDE Americas' **hail risk advisory products**

Probable maximum loss (PML) reports

- P50 and downside PML risk estimates with average annual loss (AAL) estimates to support insurance coverage and quotes

Pro-forma risk exposure (PRE) reports

- P50 and downside risk estimates within typical (or user-specified) financial hold periods and outside insurance

Hail defense operationalization support

- Review/improve hail monitoring, alerting, and stow protocols
- Hail monitoring and stow specifications for project contracts

Post-event forensic investigations

- Process radar- and ground-observed data, review mitigation efficacy, assess module hail resilience vs. warranty, compare actual to modeled loss, and provide summary report

ArcGIS-based hail risk maps of the CONUS

- Naturally occurring hail return interval (meteorological risk)
- Technology-specific PML and AAL (financial risk) contour maps

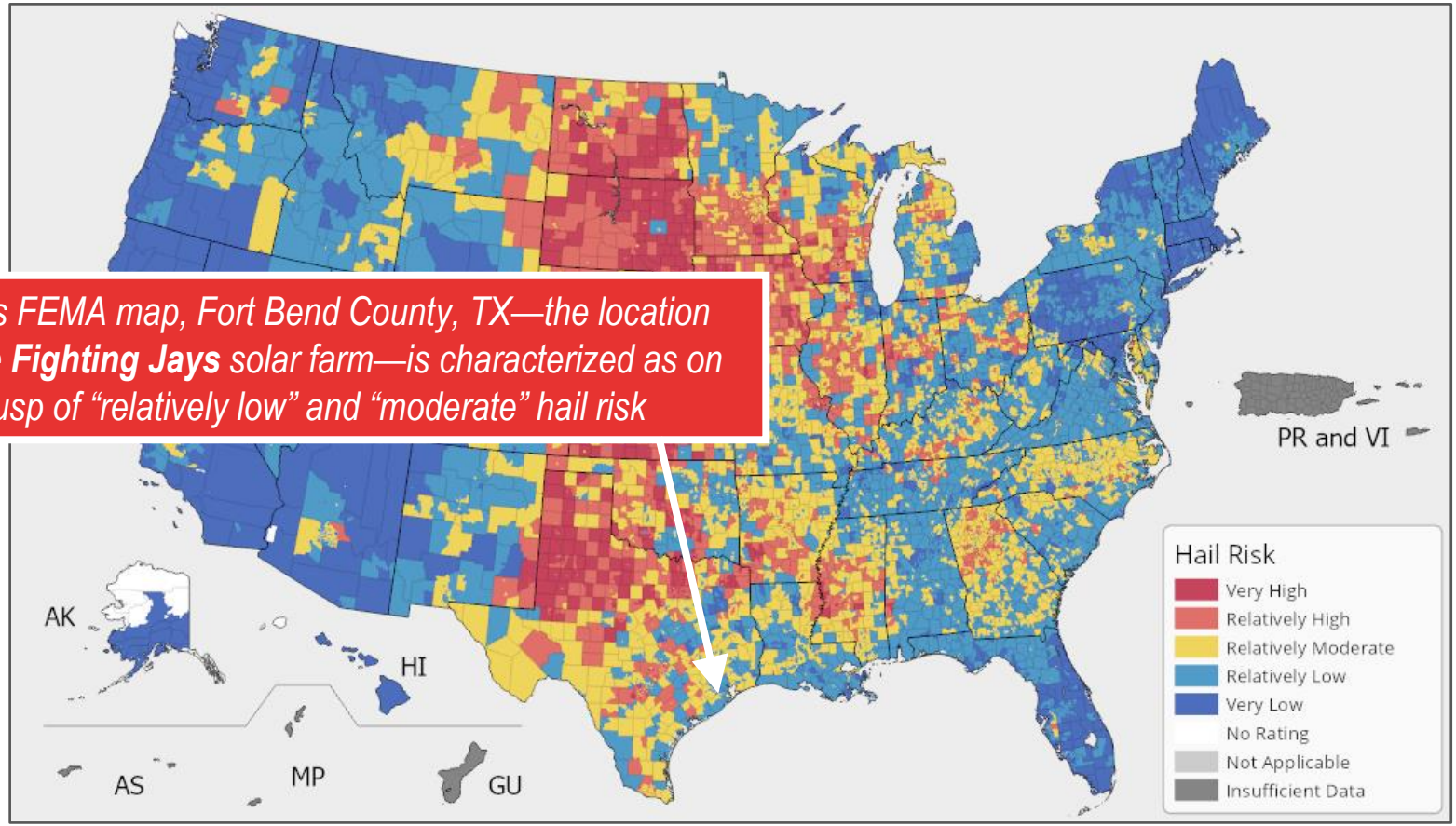
Small number of **severe hail events** have caused large financial losses

Notable hail loss events

- Midway Solar (2019)
  - >$70M insured losses
  - Source: Insurance Insider magazine
- Texas Hail Season (2022)
  - >$300M cumulatively (three events)
  - Source: GCube Q4 2023 report
- Fighting Jays Solar (2024)
  - $50M claim estimate
  - Source: Insurance Insider magazine

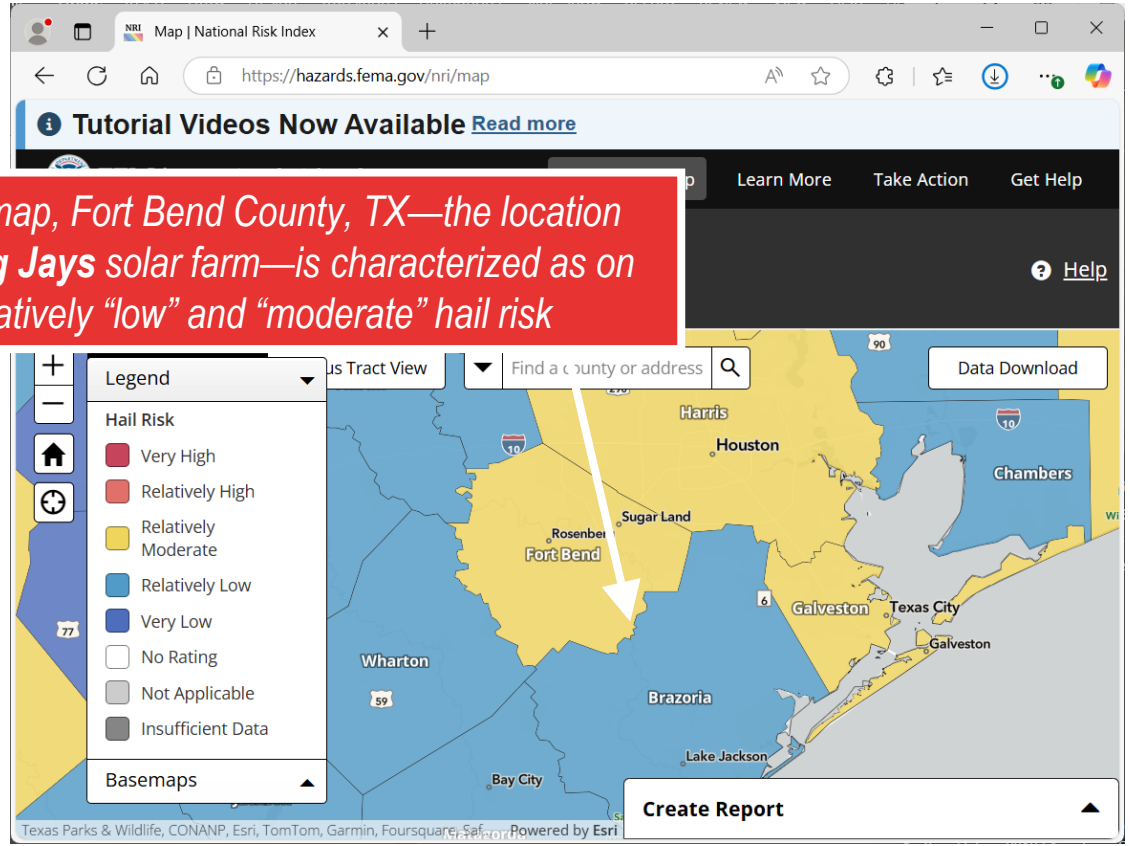
Hail accounts for less than 2% of solar insurance claims by volume—but more than 50% of total dollar losses.

Population bias is pervasive in traditional hail risk maps and data



Source: FEMA

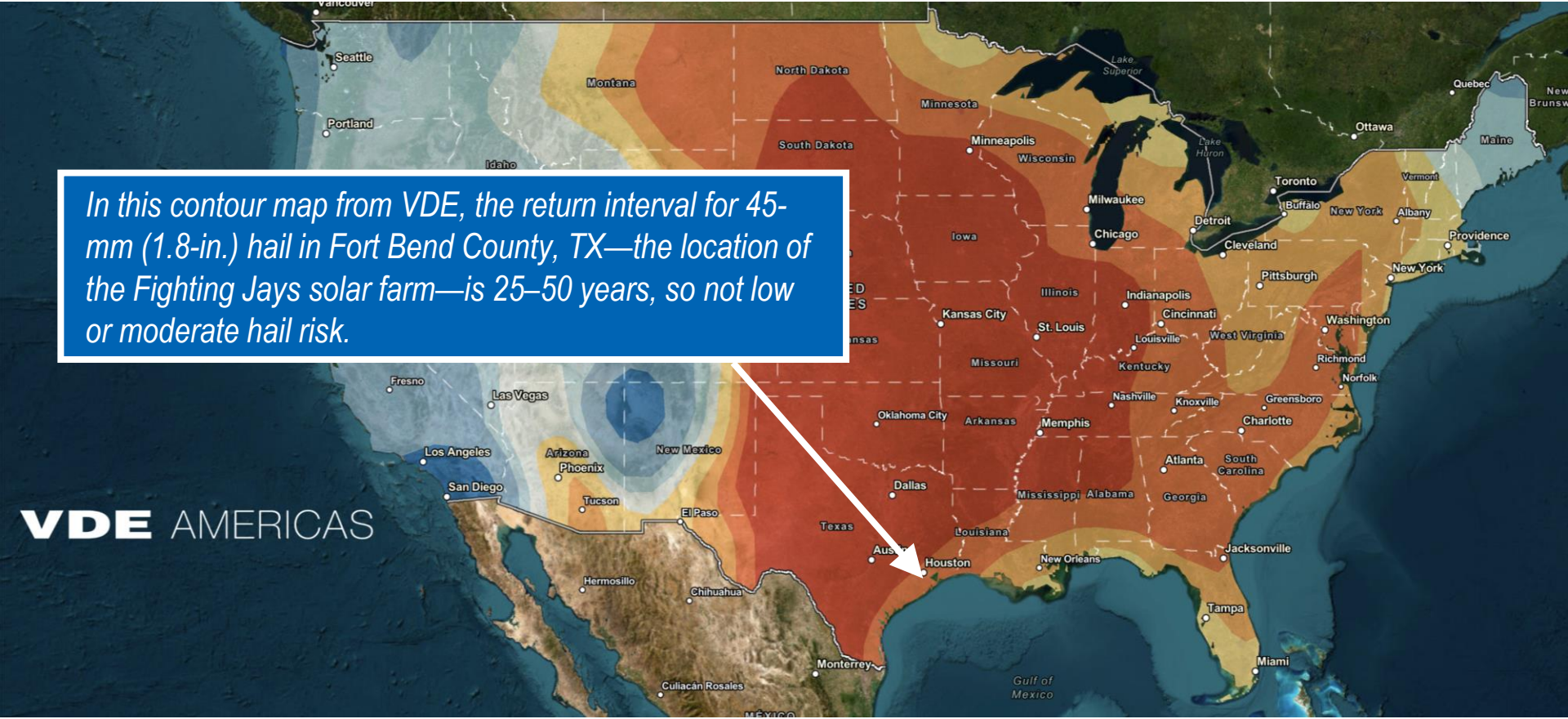
Population bias is pervasive in traditional hail risk maps and data



*In this FEMA map, Fort Bend County, TX—the location of the **Fighting Jays** solar farm—is characterized as on the cusp of relatively "low" and "moderate" hail risk*

Source: FEMA

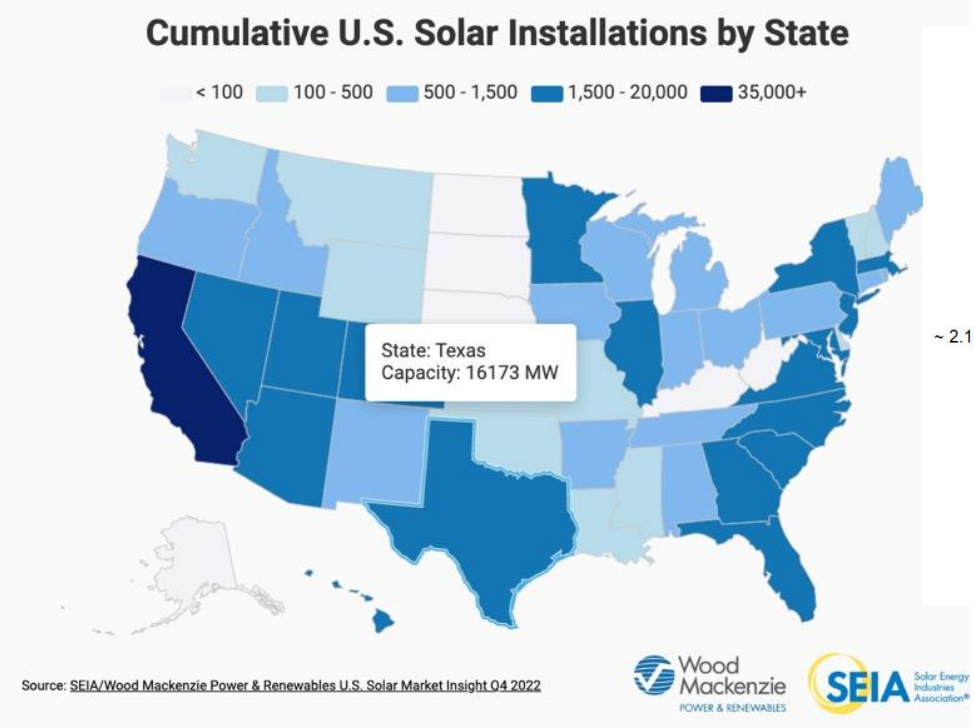
VDE Americas' **hail return interval** contour maps eliminate population bias

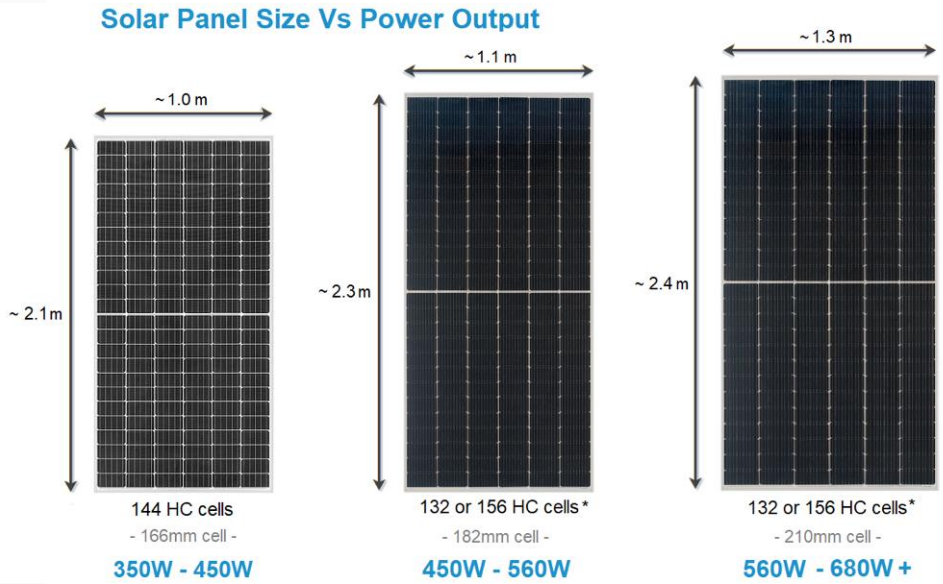


Source: VDE Americas

Factors that impact hail resilience or vulnerability

Hail risk is increasing due to ‘**perfect storm**’ of market & technology trends





PV module construction details and Hail Resiliency Curves

Glass characteristics

- Thickness and heat strengthening

Module size

- Potential impact area

Module packaging

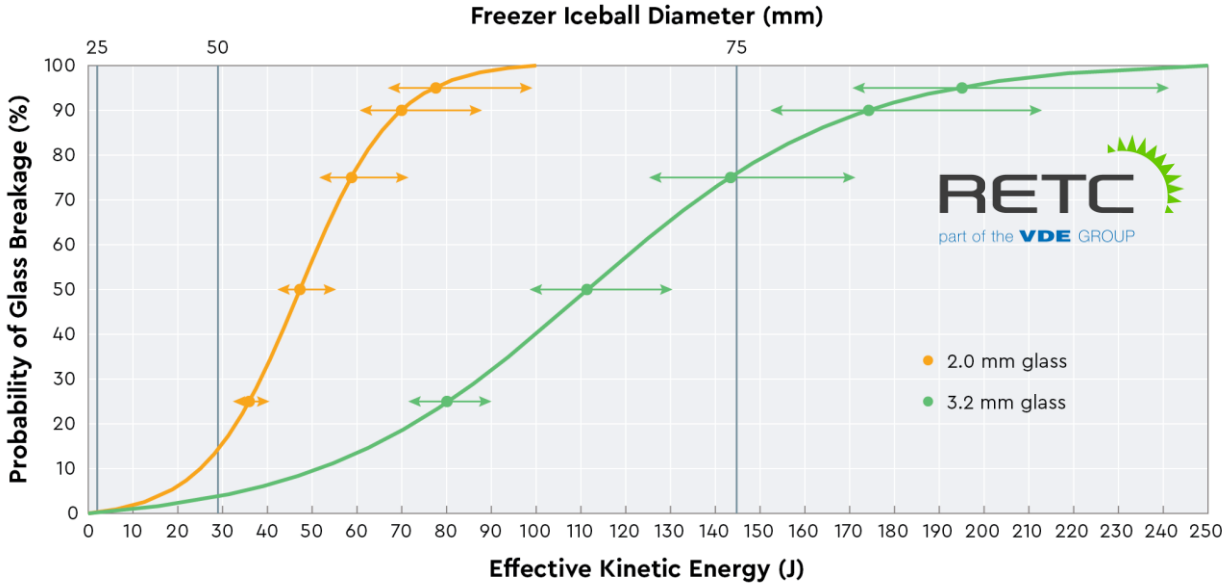
- Symmetric vs. asymmetric
- Glass-on-glass vs. glass-on-backsheet

Cell technology

- Crystalline silicon vs. thin film

Frame details

- Framed or frameless



Source: RETC article and data published in kWh analytics' *Solar Risk Assessment 2023*.

Freezer iceball (FIB) A laboratory-manufactured hailstone proxy with standardized physical characteristics created for the explicit purpose of conducting ballistic-impact testing to published engineering standards, such as PV module testing in accordance with IEC 61215.

Single-axis tracker defensive hail stow capabilities and response times

Maximum tilt angle

- Defensive hail stow position

Wind resilience

- Based on wind speed and direction

Response capabilities

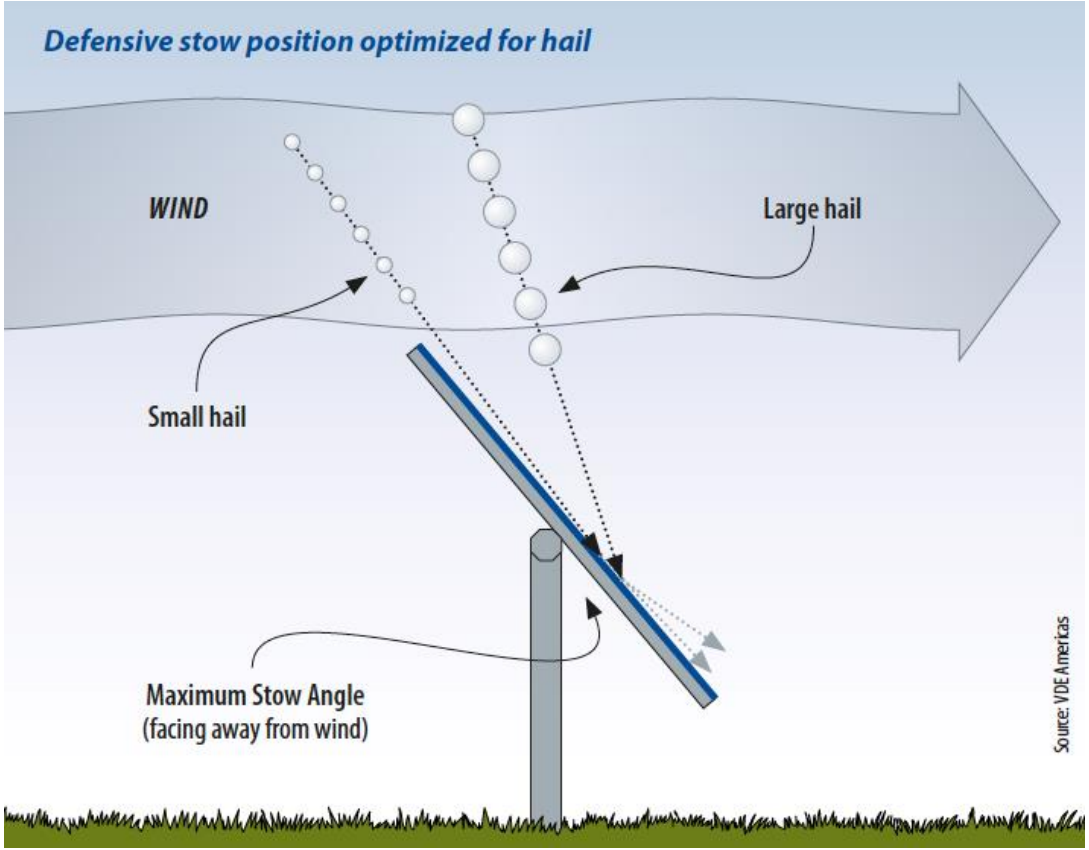
- Time required to execute hail stow

Reliability and availability

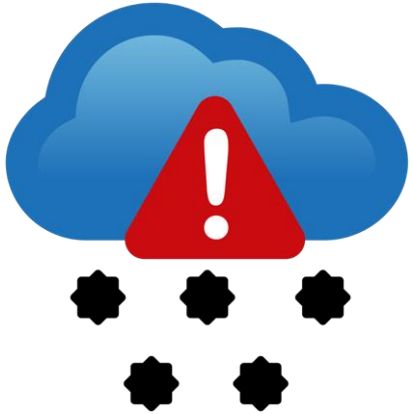
- Tracker on target percentage

Hail stow confidence

- Will passive or automatic wind stow protocols override defensive hail stow?



Remote operations center's **alert, command, and control** capabilities



Regional and project-specific weather alert provider sends **severe hail alert**

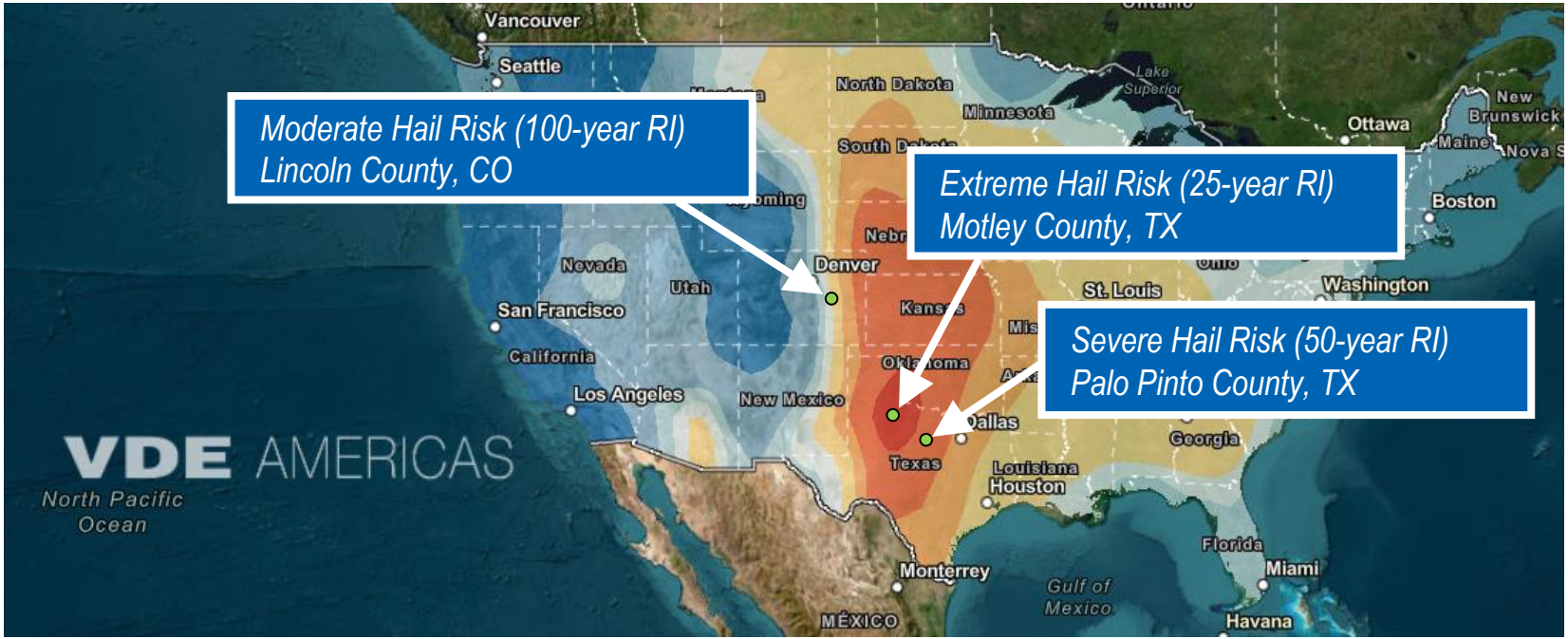
Hail stow command sent from remote operations center – **preemptive (regional) and immediate (project-specific).**

Trackers rotate modules to the **defensive hail stow position**

Automating tracker defensive hail stow based on real-time weather alerts reduces project risk but does not obviate the need for manual oversight.

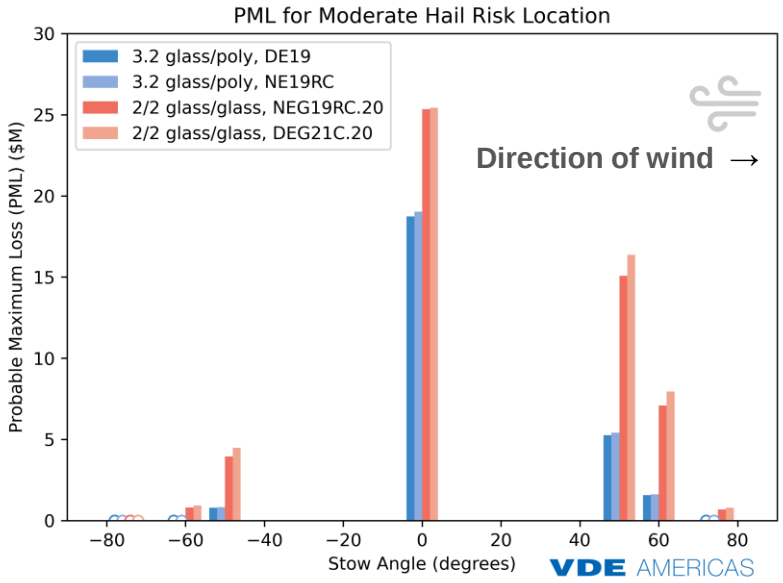
Review of Trina’s Hail-Resistant Modules

Three representative hail risk locations on a 55 mm hail Return Interval (RI) map used to model a 100 MWdc project with a $0.51/W module replacement cost and $25/MWh revenue rate.



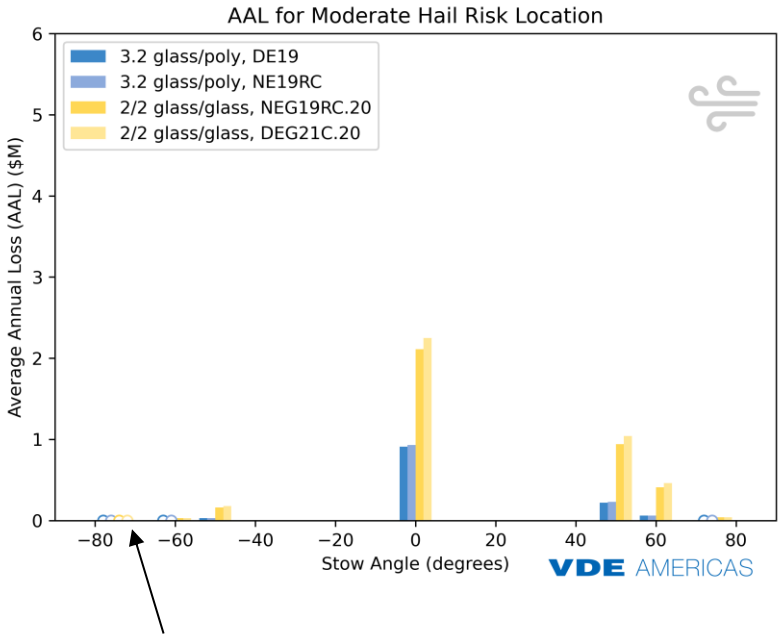
Source: VDE Americas

PML (Probable Maximum Loss) & AAL (Average Annual Loss) Estimates – Moderate Risk



Tilted away from wind

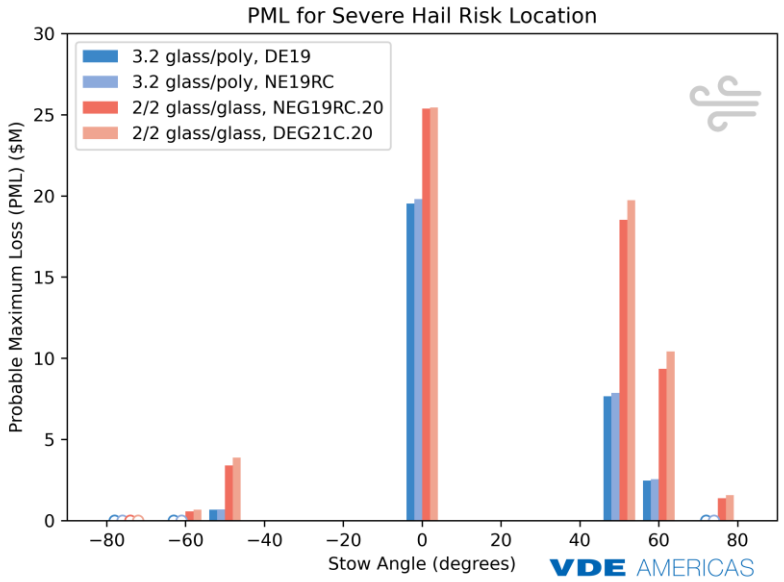
Tilted into wind



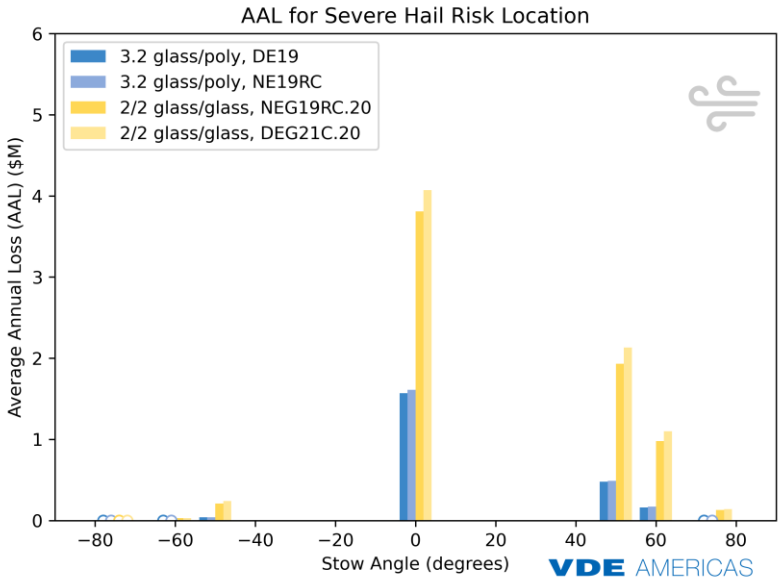
Bubbles indicate zero results in model

Case Study Project: 100 MWdc with a $0.51/W module replacement cost

PML (Probable Maximum Loss) & AAL (Average Annual Loss) Estimates – Severe Risk



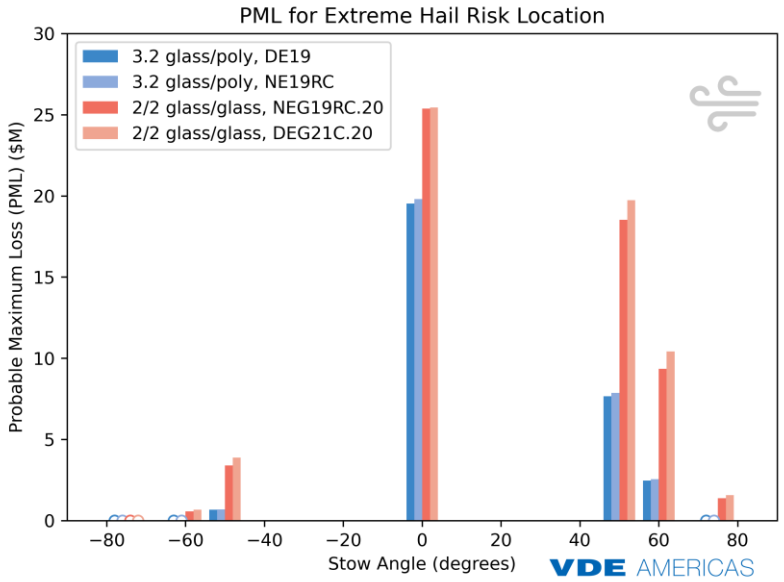
Tilted away from wind



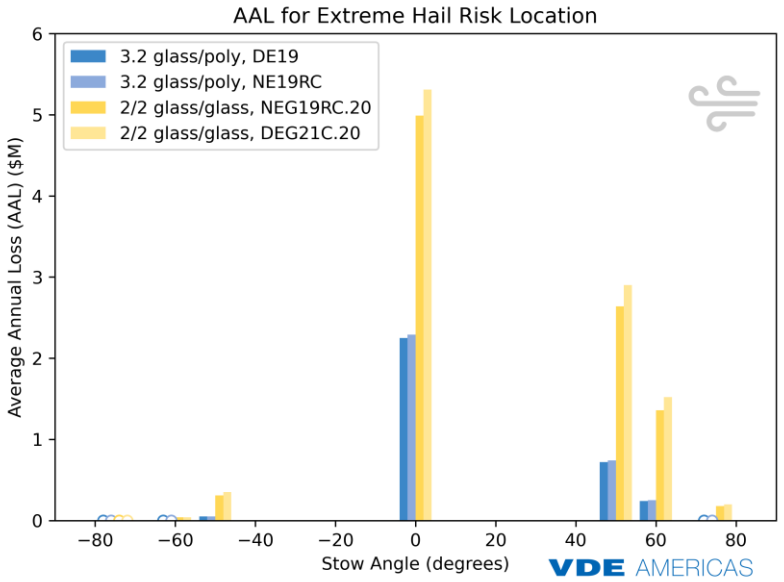
Tilted into wind

Case Study Project: 100 MWdc with a $0.51/W module replacement cost

PML (Probable Maximum Loss) & AAL (Average Annual Loss) Estimates – Extreme Risk



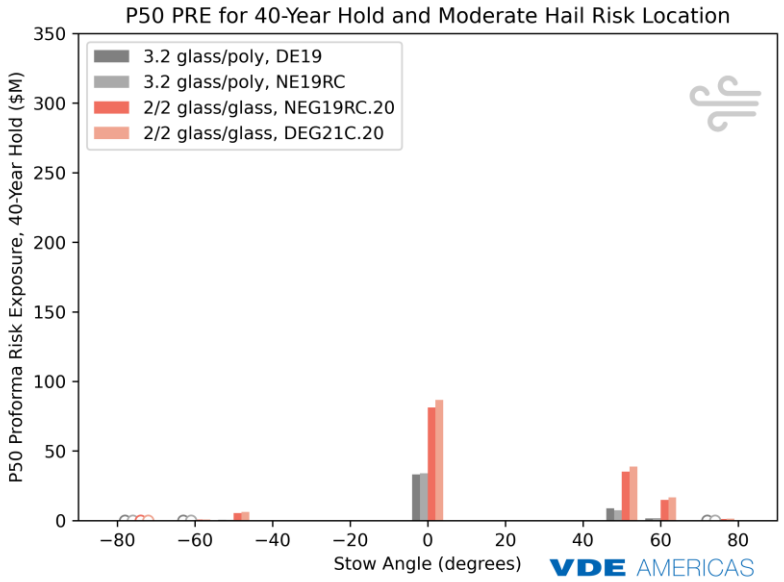
Same as Severe Location because of low probability of PML events.

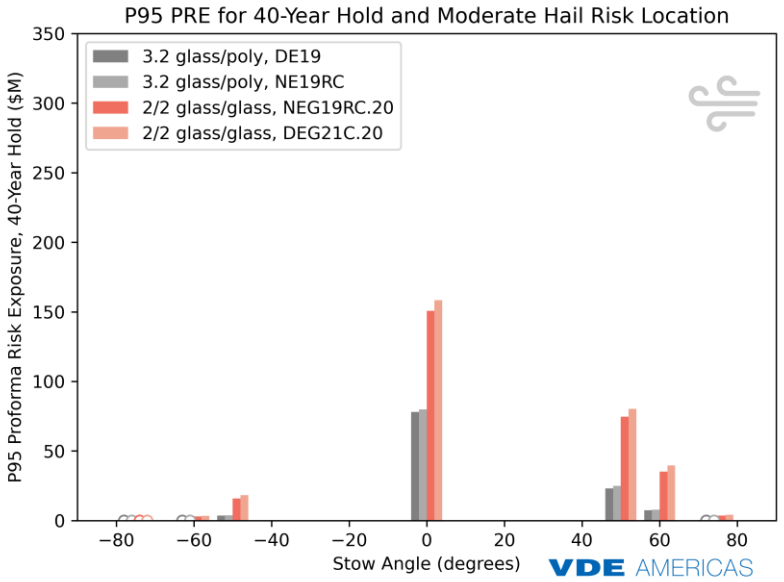


Worse than Severe Location because of higher frequency of hailstorms.

Case Study Project: 100 MWdc with a $0.51/W module replacement cost

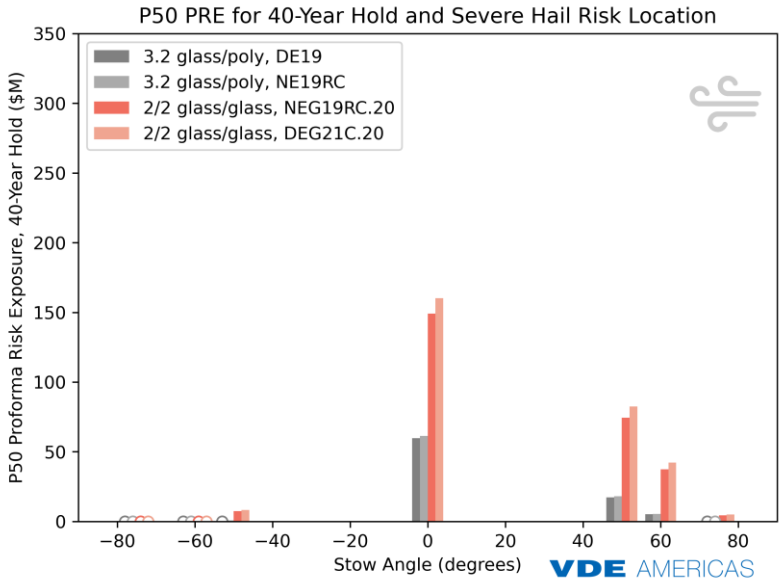
40-yr P-50 and P-95 Downside Proforma Risk Exposure (PRE) – Moderate Risk

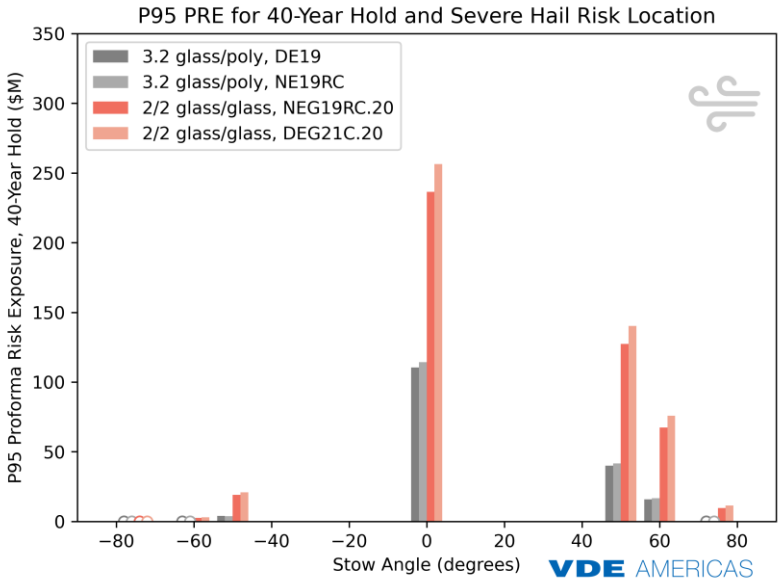




Case Study Project: 100 MWdc with a $0.51/W module replacement cost

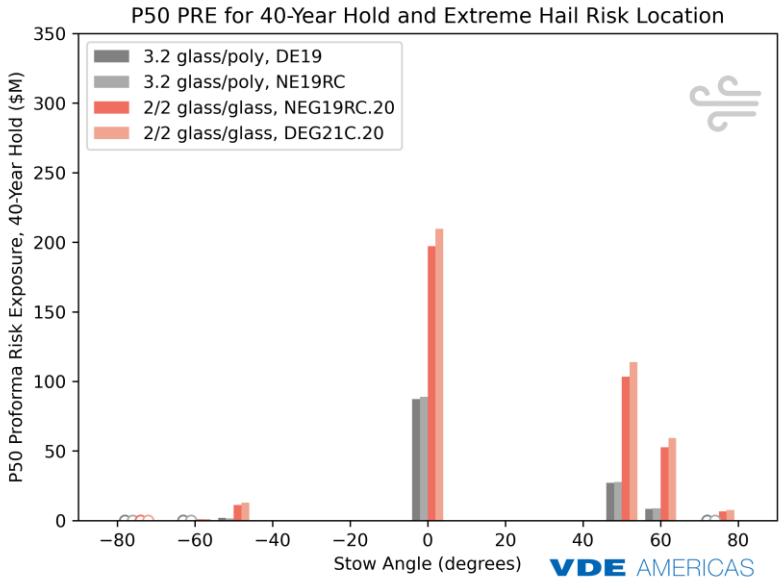
40-yr P-50 and P-95 Downside Proforma Risk Exposure (PRE) – Severe Risk

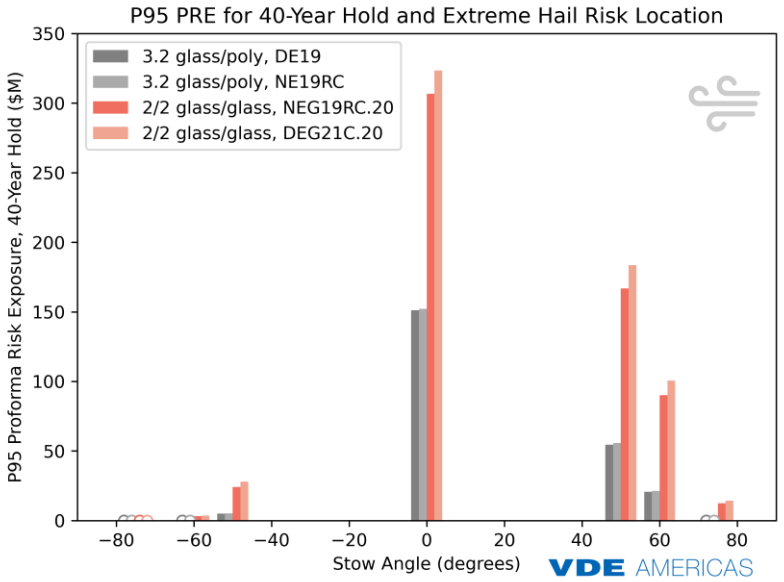




Case Study Project: 100 MWdc with a $0.51/W module replacement cost

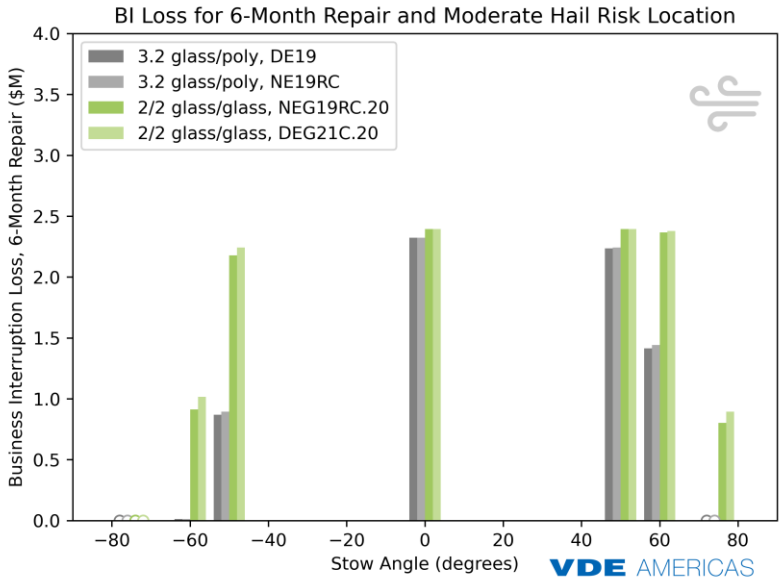
40-yr P-50 and P-95 Downside Proforma Risk Exposure (PRE) – Extreme Risk

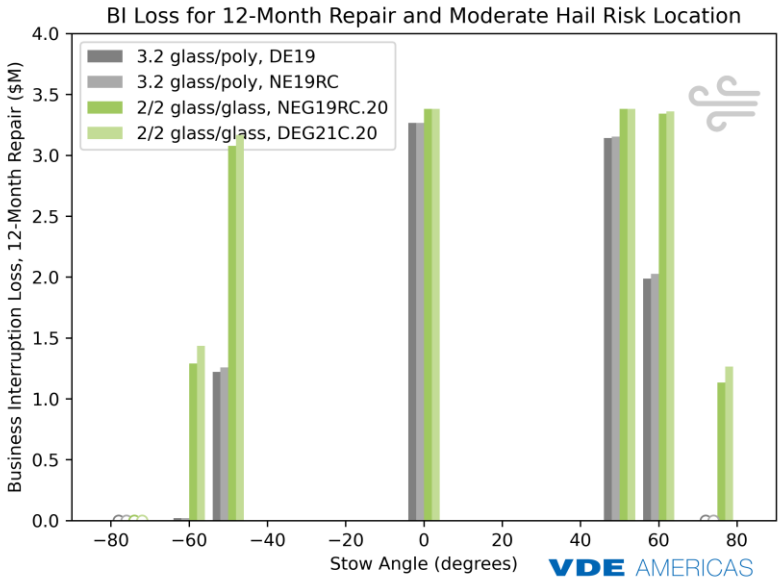




Case Study Project: 100 MWdc with a $0.51/W module replacement cost

Business Interruption Loss Estimates– Moderate Risk

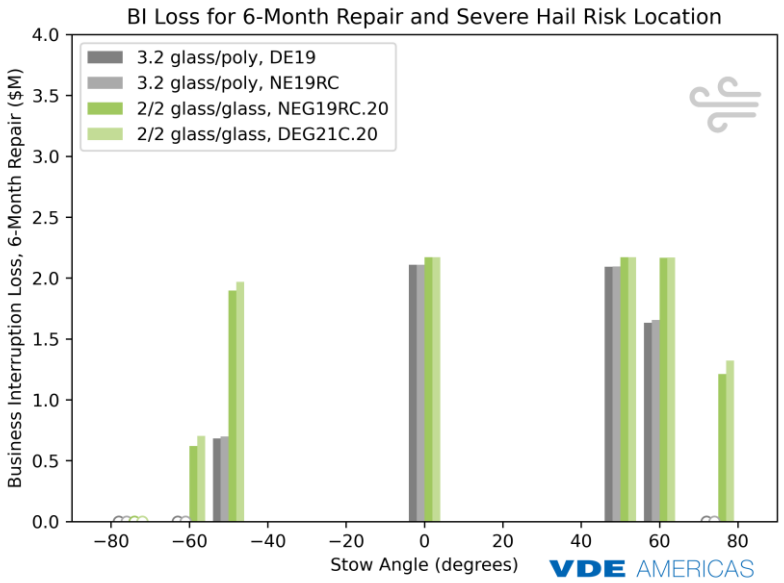


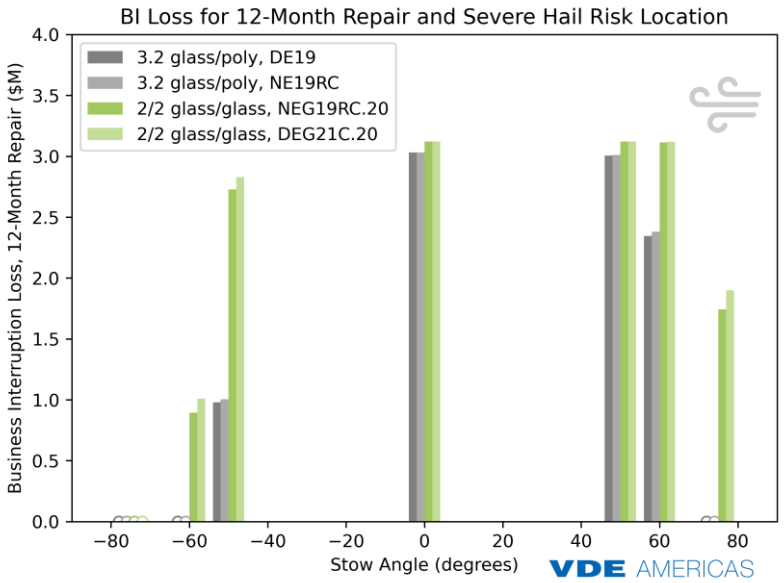


Case Study Project: 100 MWdc with a $0.51/W module replacement cost

Modules per string: 30
Module procurement period: 3 months
Repair duration period: 3 to 9 months
Average energy revenue rate: $25/MWh

Business Interruption Loss Estimates– Severe Risk



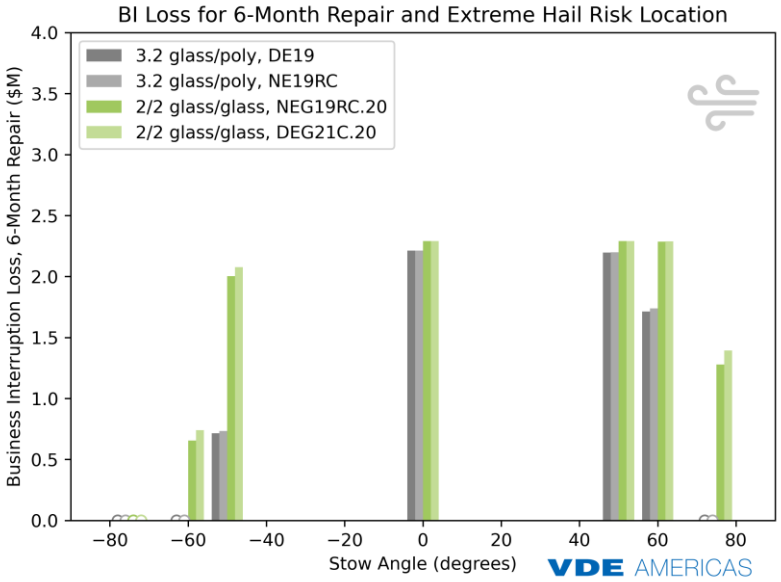


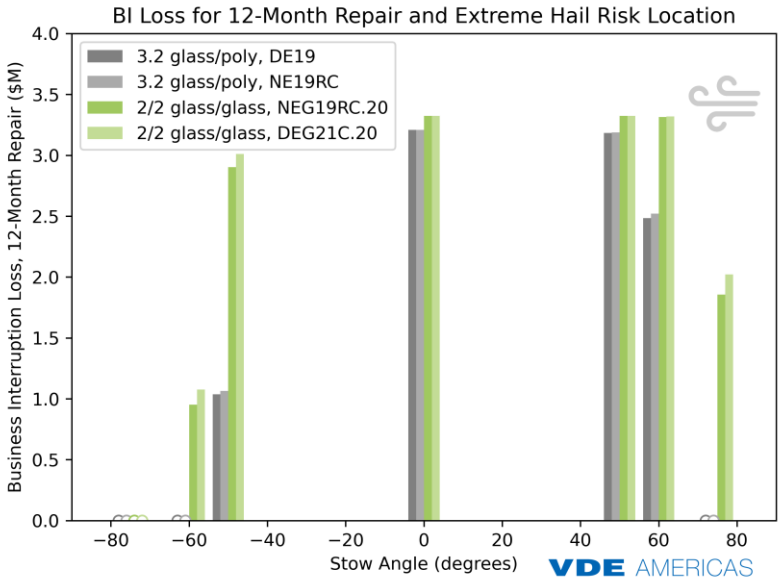
Less loss than Moderate Location because of ~5% higher solar irradiance in CO v. this location.

Case Study Project: 100 MWdc with a $0.51/W module replacement cost

Modules per string: 30
Module procurement period: 3 months
Repair duration period: 3 to 9 months
Average energy revenue rate: $25/MWh

Business Interruption Loss Estimates– Extreme Risk





Case Study Project: 100 MWdc with a $0.51/W module replacement cost.

Modules per string: 30
Module procurement period: 3 months
Repair duration period: 3 to 9 months
Average energy revenue rate: $25/MWh

In Conclusion: Summary of Savings with Trina 3.2mm front glass/polymer back sheet Hail-Resistant Modules Compared to 2mm/2mm dual glass modules

PML (Probable Maximum Loss)

- Flat (0°): 23% - 26%
- 50° tilt: 61% - 83%
- 60° tilt: 76% - 100%
- 75° tilt: 100%

AAL (Annual Average Loss)

- Flat (0°): 58% - 61%
- 50° tilt: 75% - 86%
- 60° tilt: 84% - 100%
- 75° tilt: 93% - 100%

PRE (Proforma Risk Exposure) 40-yr P50

- Flat (0°): 62% - 76%
- 50° tilt: 80% - 100%
- 60° tilt: 91% - 100%
- 75° tilt: n/a - 100%

PRE (Proforma Risk Exposure) 40-yr P95 Downside

- Flat (0°): 51% - 70%
- 50° tilt: 67% - 95%
- 60° tilt: 77% - 100%
- 75° tilt: n/a - 100%

BI (Business Interruption) 6 or 12 months

- Flat (0°): 3% - 4%
- 50° tilt: 4% - 7%
- 60° tilt: 25% - 41%
- 75° tilt: 100%

- Lower savings are for modules facing into the wind during a hailstorm while higher savings are for modules facing out of the wind.
- Wind direction cannot be reliably predicted when hail falls.

Please note

100% savings is modeled zero risk, but risk of hail damage is never completely zero.

n/a means modeled risk is zero for both module types, so there was no delta.

Null hail event study and hail forensics database

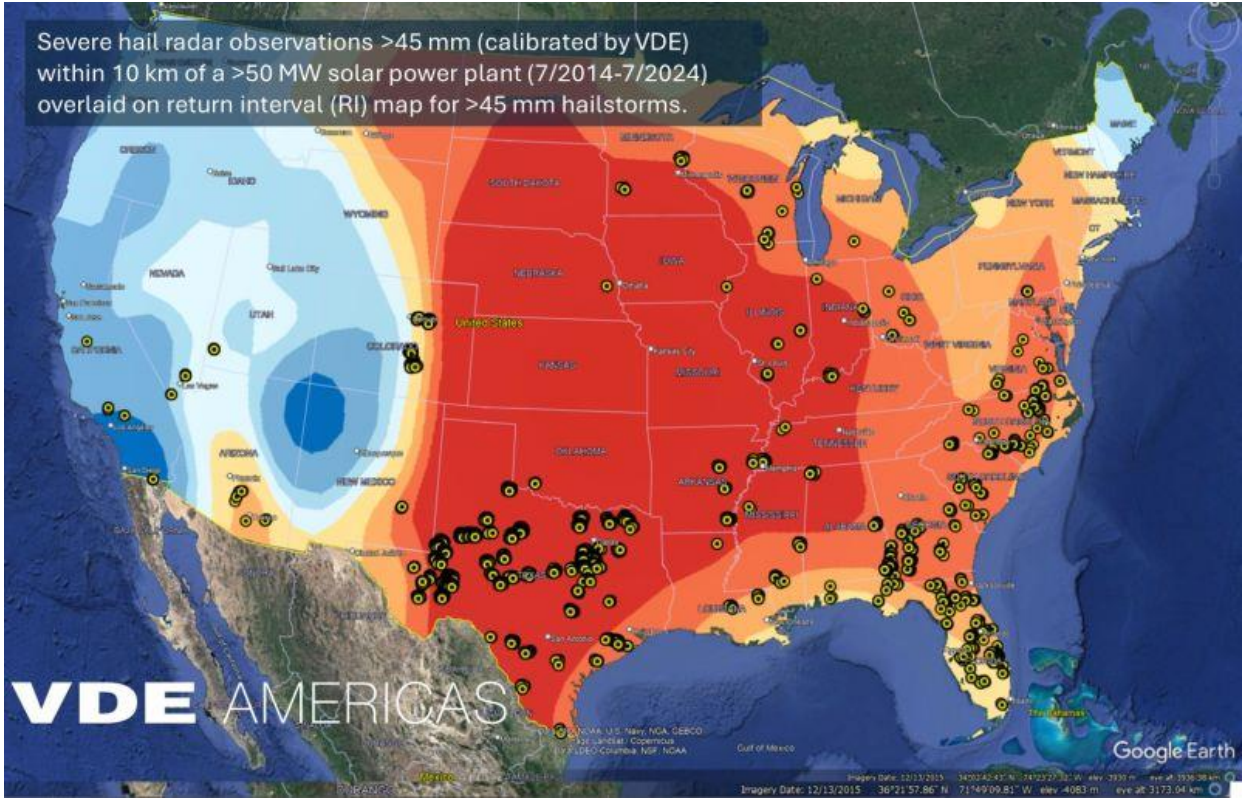
Public database

- Anonymized project data
- Hosted by NREL DuraMat Data Hub

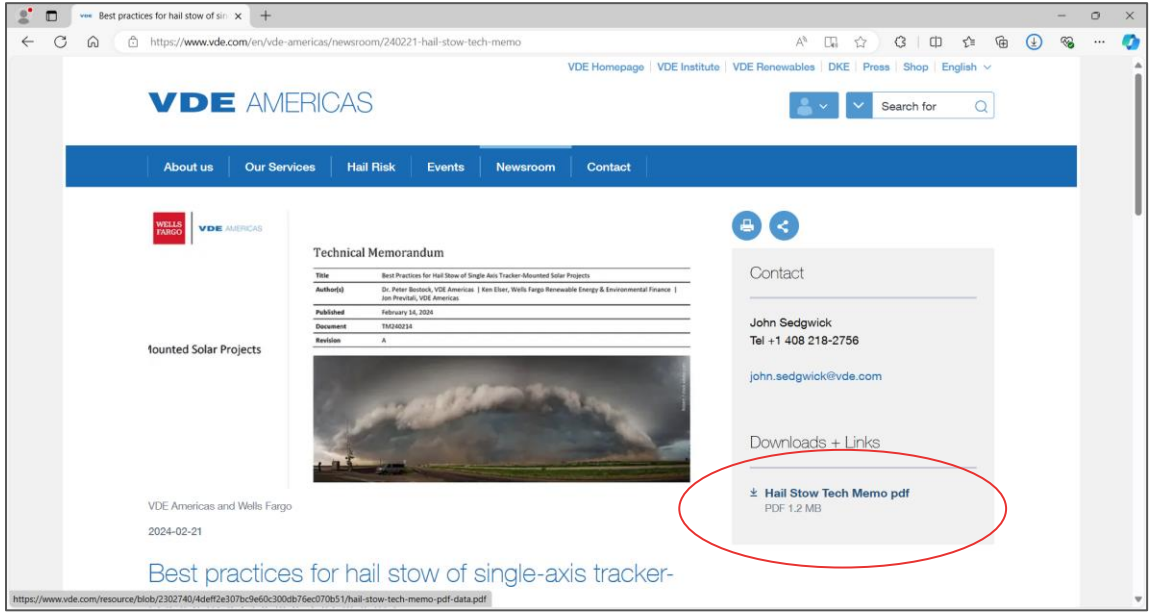
Project partners

- VDE Americas
- NREL
- SEIA
- FM Global
- CAC Specialty

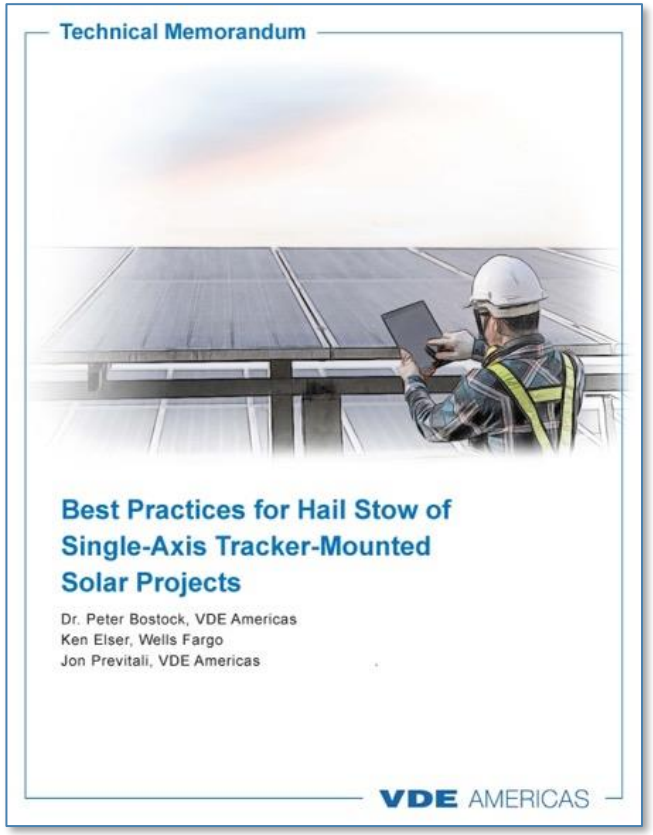
Please contact me (jon.previtali@vde.com) to contribute to the forensics database or null event study.



Hail stow best practices tech memo (by VDE America & Wells Fargo)



Scan QR code to **download & share** our FREE tech memo



We are protecting critical energy assets to ensure a worthwhile future.

Please join us.

For more information:

Jon Previtali
Senior principal engineer
& hail advisory services lead
Jon.previtali@vde.com

VDE

this webinar is powered by Trinasolar

pv magazine webinars

The benefits of hail and wind resistant solar modules

Q&A

10 December 2024

11:00 am – 12:00 pm | PDT, Los Angeles
2:00 pm – 3:00 pm | EDT, New York City
8:00 pm – 9:00 pm | CET, Berlin, Madrid

Anne Fischer
Senior Editor
pv magazine USA

Billy Christie
Director
of Engineering Center
Trinasolar

Jon Previtali
Senior
Principal Engineer
VDE Americas

Tristan Erion-Lorico
Vice President,
Sales and Marketing
Kiwa PVEL

pv magazine webinars

The latest news | print & online

10% off your subscription with **Webinars10**

Most-read online!

[Fossil fuel companies sued by all New England states, except one]

by Anne Fischer

[Ten reasons why small-scale, non-utility solar is important]

by Ryan Kennedy

SUNRISE ARABIA

CLEAN ENERGY CONFERENCE

Date
February 19, 2025

Place
Riyadh, Saudi Arabia

Register now and take advantage of the Early Bird discount!

this webinar is powered by Trinasolar

pv magazine webinars

Anne Fischer
Senior Editor
pv magazine USA

Thank you for joining today!