2026 Edition

# Global Solar Report

## Insights from 373GW of Data

# Contents

# Introduction

Welcome to the 2026 edition of the Global Solar Report. Each year, Raptor Maps analyzes data on an array of topics – from asset performance and downtime risk to labor availability and operational best practices – in order to provide timely commentary on **challenges, opportunities, and trends** shaping the solar industry.

This year's Report is divided into three chapters. **Chapter 1** looks at the state of solar performance, with a focus on DC health. How has DC power loss evolved over time? How does performance change as sites age? What factors are driving these changes? **Chapter 2** looks at burgeoning data on the effects of robotics on DC health. Specifically, with autonomously operating docked drones that live on site 24/7, how is the adoption of these technologies changing how owners and operators gather data on their assets, and what impact is that having on power production? Lastly, **Chapter 3** goes beyond DC health and explores an array of data on other critical components of a solar farm, like substations, trackers, and behind-the-panel wiring. This data offers unique insights into the types, and magnitudes of risk that solar assets face, and how owners and operators are changing their approaches to managing that risk. This chapter also contains a guest article looking at insurance claims data on solar farms, which is contributed by kWh Analytics, a leading climate insurance underwriter.

# Executive Summary

The solar industry continued to grow at a rapid pace in 2025. Globally, 380 GWdc of solar assets were brought online in just the first half of 2025, a 64% increase over the same period in 2024 [1]. It is estimated that global installed solar capacity will surpass 3 TW in 2026, enough to power the entirety of the United States and Europe during peak daylight hours. This growth is also expected to continue in coming years, with **global renewable energy output projected to double by 2030**. Solar PV is expected to account for almost 80% of this new growth [2].

These strong growth projections come at a time in which solar is experiencing domestic political headwinds. This contradiction highlights the fact that even without government subsidies, solar is established as a cost-competitive, if not cost-superior, energy investment. A recent report on the levelized cost of energy (LCOE) illustrated this sentiment, stating that solar was “the lowest-cost and quickest-to-deploy generation” option, even without tax subsidies [3].

The rise of artificial intelligence (AI) and the related data center build-out by hyperscalers have been the leading story behind the growing electricity demand in the United States. According to a Wood Mackenzie Report, as of June, 2025, utilities in the US had already committed to supplying 64 GW of new capacity just from data center needs – a 12% increase in US electricity capacity [4]. That said, demand from data centers is just one of four main drivers of the growth in demand, along with industrial manufacturing, transportation electrification, and building electrification.

However, despite this projected growth, the solar industry faces bottlenecks. **Labor supply continues to significantly lag behind capacity growth**. Over the past 5 years in the US, solar jobs grew by 12% while installed capacity grew by 286%. As a result, solar technicians today are responsible for 70% more MW than they were in 2019, on average [5].

At the same time as labor is becoming more constrained, **severe weather conditions continue to acutely threaten solar assets**. In the United States, over 99% of solar farms are situated in an area in which there is a 10% chance of seeing hail bigger than 2 inches in close proximity to the site [6].

Collectively, the effect of these trends is that **underperformance is still a major challenge in the industry**, which is concerning given that solar farms are becoming a larger proportion of the energy mix annually. This year, the average power loss across solar assets in our data set was 5.08%, which is a slight improvement over last year (average power loss in 2024 was 5.51%), but still more than double what it was 5 years ago.

[1] Ember, “Global Solar Installations Surge 64% in First Half of 2025,” September 19, 2024, https://ember-energy.org/latest-updates/global-solar-installations-surge-64-in-first-half-of-2025/
[2] International Energy Agency. Renewables 2025: Analysis and Forecasts to 2030. Paris: IEA, 2025. https://iea.blob.core.windows.net/assets/76ad6eac-2aa6-4c55-9a55-b8dc0dba9f9e/Renewables2025.pdf.
[3[ Lazard. “Lazard Releases 2025 Levelized Cost of Energy+ Report.” June 16, 2025. [2] International Energy Agency. Renewables 2025: Analysis and Forecasts to 2030. Paris: IEA, 2025. https://iea.blob.core.windows.net/assets/76ad6eac-2aa6-4c55-9a55-b8dc0dba9f9e/Renewables2025.pdf..
[4] Seiple, Chris, and Ben Hertz-Shargel. “US Power Struggle: How Data Centre Demand Is Challenging the Electricity Market Model.” Wood Mackenzie, June 2025. https://www.woodmac.com/news/opinion/largest-data-centers-in-the-us-the-top-10-questions-on-data-centers-answered/
[5] Interstate Renewable Energy Council. “15th Annual National Solar Jobs Census 2024.” November 2025. [1] Ember, “Global Solar Installations Surge 64% in First Half of 2025,” September 19, 2024, https://ember-energy.org/latest-updates/global-solar-installations-surge-64-in-first-half-of-2025/.
[6] kWh Analytics. “kWh Analytics Reveals Top Risk Management Challenges for Renewable Energy and Battery Energy Storage Systems.” June 10, 2025.

# Executive Summary

This underperformance is something that affects solar farms from the moment they are commissioned. Though data shows that solar farms exhibit reduced performance as they age, **we observed 4.46% average power loss at commissioning**, highlighting how important active engagement and QA/QC are throughout the construction process.

Indeed, efforts are being made to combat these trends. We showed in our inaugural 2025 State of Solar Robotics Report that owners and operators are investing in robotics and automation, which is changing operational models for maintaining and managing solar assets. In that report, we noted that the majority of our survey respondents were already using at least one type of robot on their solar farm (drone, vegetation robot, construction robot, etc.), with 77% indicating that they planned to increase their investments in robotics in the next 3-5 years [7].

The contents of this report take that analysis further by looking not just at *what* robotic and automation tools are being used, but also at ***how*** **these technologies are being deployed on solar farms, and what effect they are having on performance, operational efficiency and risk management**. Below, we list three main takeaways from this analysis:

- **In 2025, average power loss was 5.08%**, which was a slight decrease year-over-year, but still stubbornly high relative to the running 5 year historical average from 2020-2024 of 3.5%. Notably, this power loss was prominent in assets of all ages, including brand new sites.

- In 2025, we analyzed 54 GW of data on sites that deployed docked drones for autonomous inspections, a 3.56x increase year-over-year. The results from this larger sample size of data were clear: **sites that deployed this technology performed better (3% avg. power loss) relative to the larger subset of sites (5.08%)**. We suspect that this increase in performance is, in part, driven through increased frequency of inspections, which yields more up-to-date data for prioritizing and driving performance-boosting actions. This thesis was supported by data: sites with autonomous drone capabilities inspected their sites almost 12 times as much as sites without the technology.

- **Raptor Maps analyzed 57.5 GW of non-aerial thermography solar data in 2025 (i.e. wiring, substations, environmental conditions, etc.), a 3.94x increase relative to 2024.** Through this analysis, we were able to provide unique insights into the frequency of substation issues and other risk factors that can spike costs and downtime. The data from this increase in advanced, non-aerial thermography inspections speaks to two trends that we are observing: (1) Asset owners are leveraging robotics technologies to reduce risks on their assets by implementing protocols to gather more frequent data on critical infrastructure and site conditions, and (2) Operators are putting more trust into maturing technological offerings to fully replace historically time consuming preventative maintenance work.

*[7] Raptor Maps Global Solar Report: 2025 Edition*

# About the Data

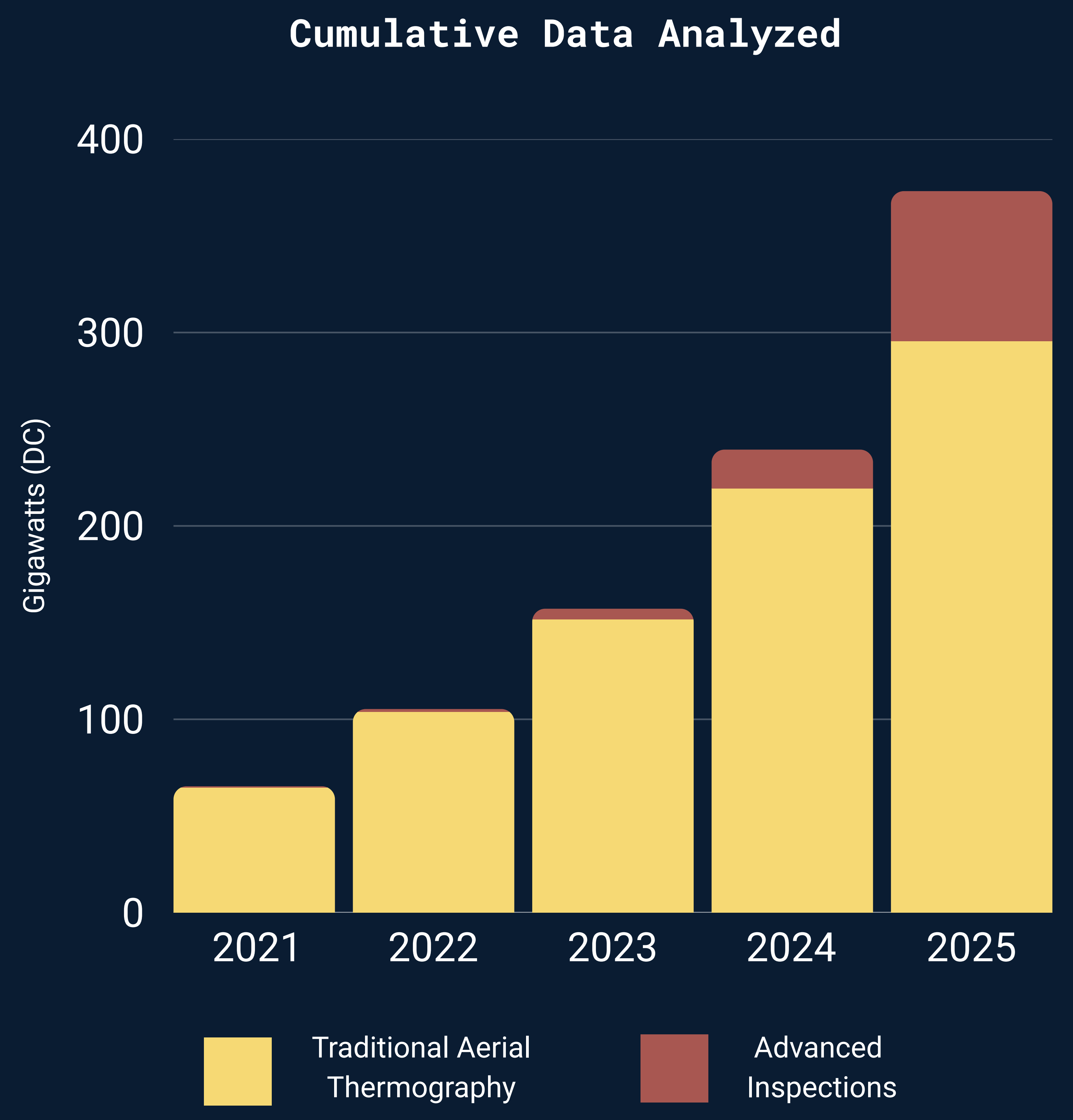
The data in this report comes from the Raptor Maps platform, which identifies and categorizes issues on solar assets that can cause power loss, safety hazards, unforeseen costs, and compliance challenges. These issues range from thermal defects on individual solar cells, to damaged connectors that can cause fires, to substation issues that can cause a shutdown and disrupt power delivery.

Cumulatively, this dataset contains analysis on 373 GWdc of assets. Of that data, roughly 80% come from aerial thermography inspections, with the other 20% from advanced inspections – a diverse category inclusive of many other components of a solar farm such as high-voltage infrastructure, wiring and connectors, and environmental conditions.

Each year since 2021, advanced inspections have become a greater proportion of the data we analyze. 2025 was a high water mark for this trend, where advanced inspections accounted for 43% of all of the data that we analyzed (see page 20 for a full breakdown of inspections in this category).

To calculate power loss throughout the report, a consistent loss factor is applied to each category of anomaly, with severity of that anomaly accounted for.

We are also observing a significant rise in the number of inspections (full-site and targeted partial) conducted per site. As a result, we updated how we calculate average system power loss to account for this operational change, and retroactively applied this methodology to previous years' data for like-for-like comparisons.



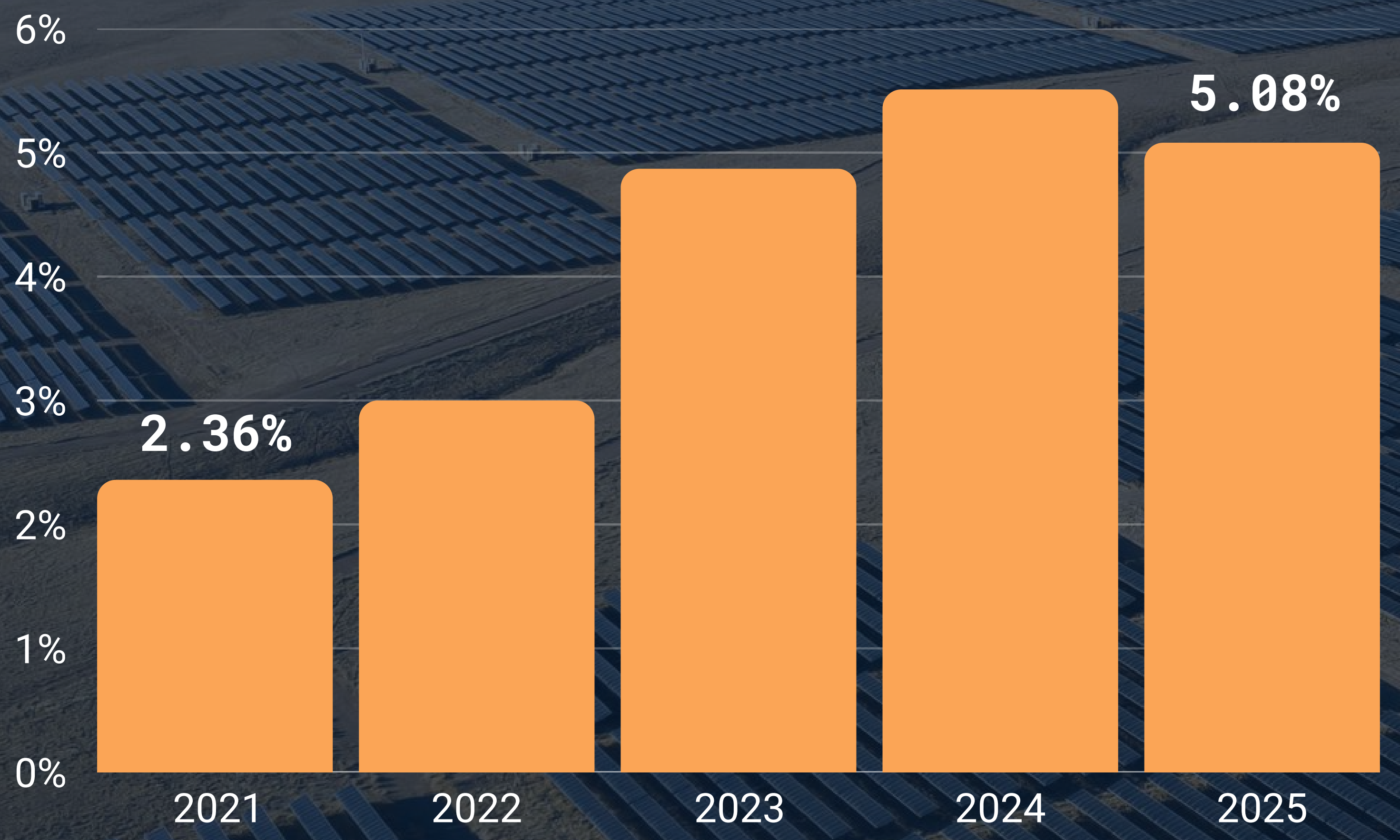
## Chapter 1

# ASSET HEALTH DISPATCH

At 5.08%, average equipment-driven power loss remained persistently high in 2025 – almost double the trailing 5 year average. This chapter looks at what is driving this underperformance, why it is so high relative to previous years, and trends across regions, site sizes, and site ages.

# 2025 Average Power Loss Still 2x Compared to 5 Years Ago

### Average System Power Loss % of Total Capacity




Average power loss declined slightly in 2025. This was, in part, driven by reduced inverter-caused power loss observed in our inspections, perhaps as a result of high focus on inverter maintenance and repair. However, the prevalence of other DC issues increased in 2025, including string, combiner, and tracker issues (see page 10). DC power loss affects the financial performance of assets. A site experiencing the 2025 average power loss could be losing up to $5070 per MW of annualized revenue.

### With Maturing Technology, Why is Power Loss so Persistently High?

The steady rise in average equipment-driven power loss, which, at 5.08% in 2025 is more than double what it was five years earlier, on its face, might seem counterintuitive. One might expect that as technology matures – for example, solar cells today are more efficient than they ever have been – that average power loss on solar assets would be declining, as opposed to increasing. So what might be causing this inverse relationship that we are observing in the data? While there is not one main cause, various factors are likely contributing to this trend:

1. **Mechanical Complexity:** Over the past few years, solar technology and infrastructure has gotten more complex. These changes have given assets higher energy harvesting potential, but also create opportunities for components to break, and are more items for operational teams to maintain. For example, the industry has, over time, shifted from static, fixed-tilt racking to active tracking systems. While trackers increase energy harvest, they introduce additional failure points – motors, sensors, and controllers – that require ongoing calibration and repair.

2. **Labor Availability:** Workforce limitations also play a role in increasing power loss. As we show on the following page, the rapid expansion of solar capacity has outpaced the growth of the solar workforce. This creates a scenario where O&M teams are being stretched thin. Today, an average technician is responsible for 70% more MW than they were 5 years ago.

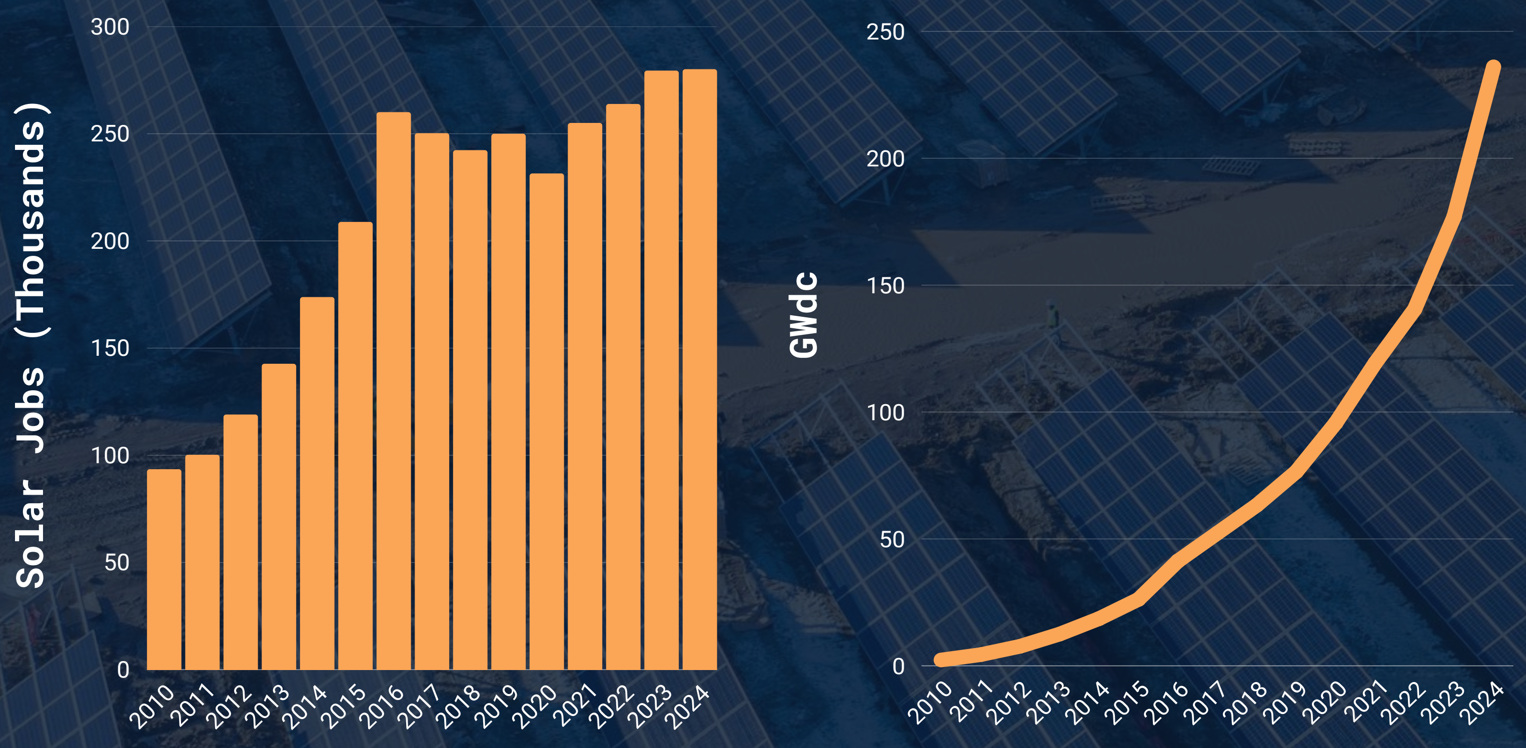
3. **Manufacturing Quality:** The rapid scaling of global production has introduced new variables into equipment reliability. According to recent industry audits, module non-conformance rates reached a decade-high of 3.36% in 2025 [9]. This spike can be attributed, in part, to a handful of new manufacturing facilities coming online to meet growing demand, in addition to newer cell technologies being mass produced for the first time.



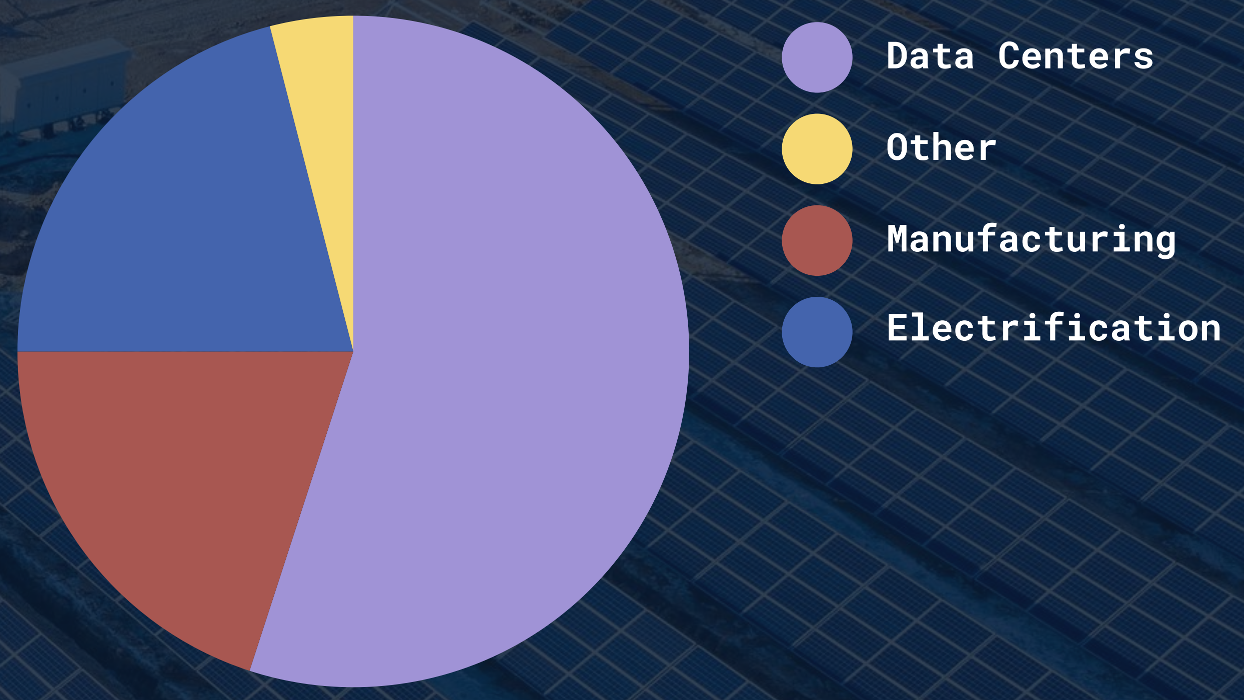
[8] Luo, Wei, Yong Sheng Khoo, Peter Hacke, Volker Naumann, Dominik Lausch, Steven P. Harvey, Jai Prakash Singh, Jing Chai, Yan Wang, Armin G. Aberle, and Seeram Ramakrishna. "Potential-Induced Degradation in Photovoltaic Modules: A Critical Review." Energy & Environmental Science 10, no. 1 (2017): 43–68. https://doi.org/10.1039/c6ee02271e.
[9] Kiwa PI Berlin. The 2025 PV Module Manufacturing Quality Report. Kiwa, 2025. https://www.kiwa.com/us/en-us/about-kiwa/entities/kiwa-pi-berlin-usa/2025pvqualityreport/.

# Efficiency in Solar Production and Operations Will Be Critical for Grid Reliability through 2030

## US Solar Jobs Growth vs. Capacity Growth (2010-2024)




## Drivers of US Power Demand Growth Through 2030



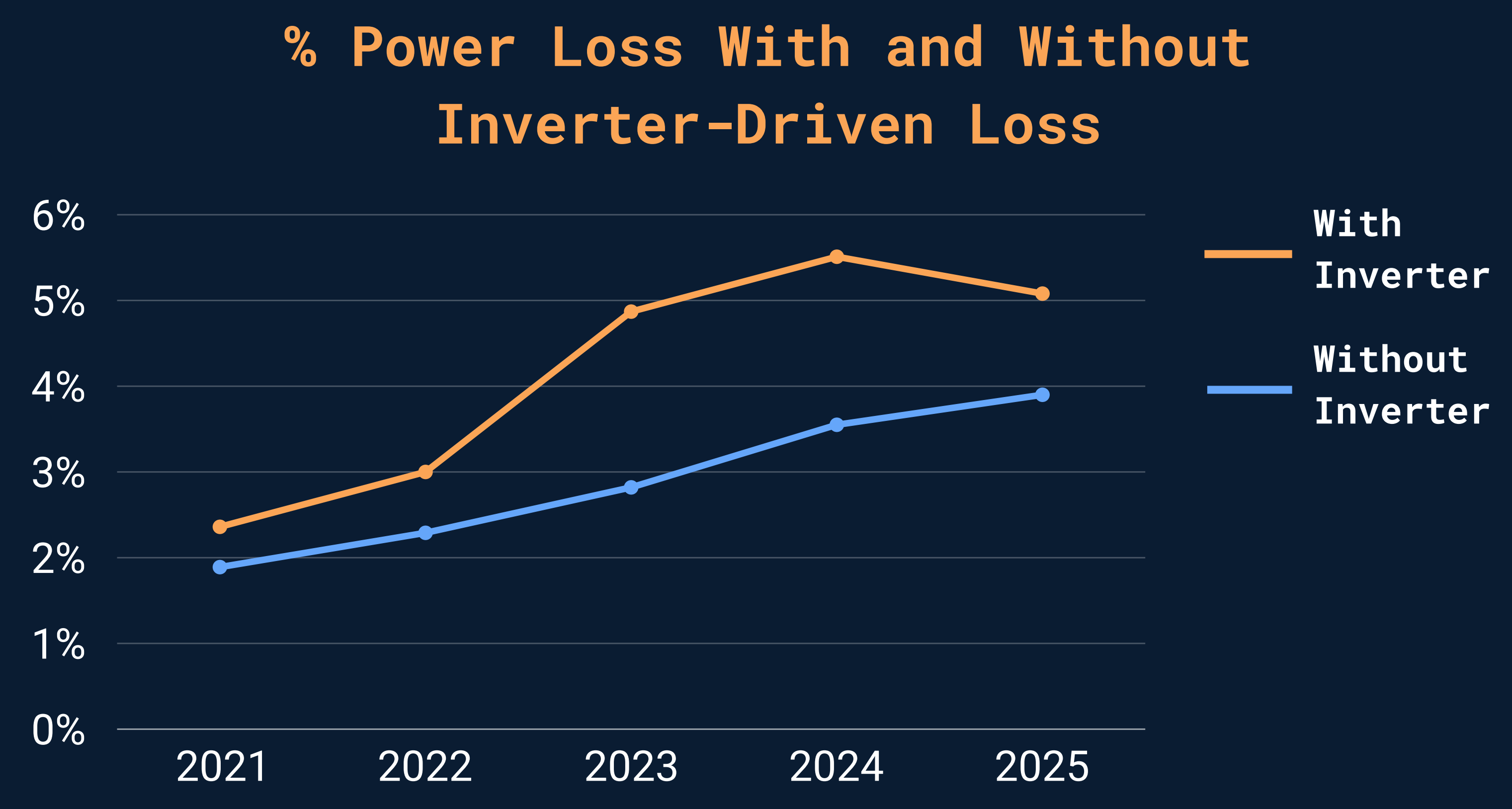

While it was encouraging to see power loss taper slightly in 2025, it is still elevated, especially given how much solar power will be relied upon to fuel the buildout of the electric grid at a time where demand is growing at the most rapid rate since the 1960s and the adoption of residential air conditioning. Through 2030, electricity demand in the United States is projected to increase by ~166 GW, a 20% increase relative to peak demand in 2025. This increase comes after two decades of relatively flat demand, and is being largely driven by an explosion in data centers (accounting for ~55% of the projected demand growth), electrification of manufacturing processes and energy production (~20%), and electrification of cars, and building heating (~21%) [10].The decoupling of cumulative solar capacity and total workforce since 2010 also highlights a surge in sector productivity. Installed capacity grew by 2.86x between 2019 and 2024 alone, while jobs increased by only 12%. This efficiency can, in part, be attributed to the adoption of advanced O&M technologies that allow teams to manage increasingly large and more complex portfolios. However, this trend must continue if solar is going to continue to grow into a reliable, grid scale energy resource that can meet growing demand.

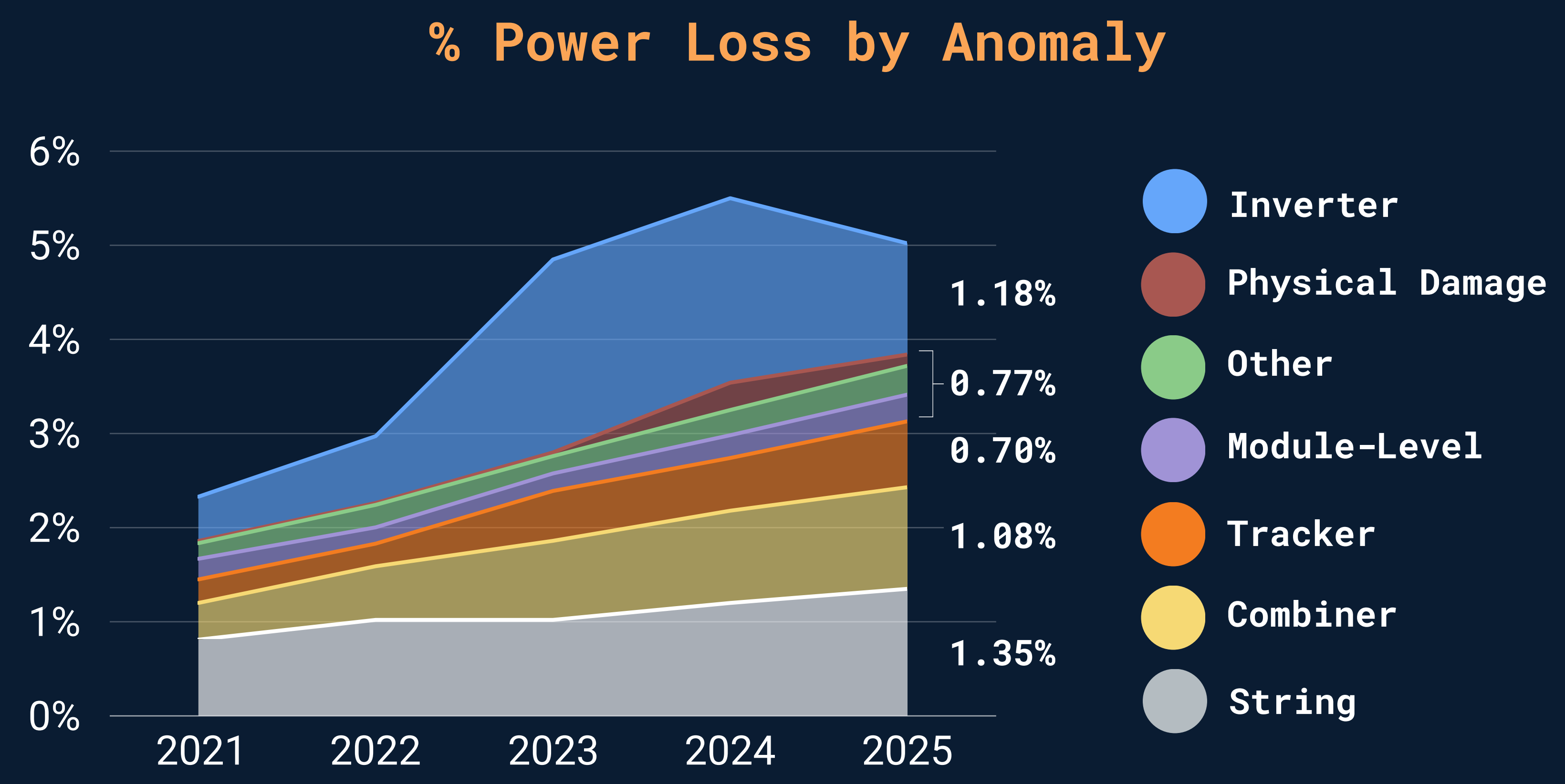
[10] Grid Strategies LLC. Power Demand Forecasts Revised Up for Third Year Running: 2025 National Load Growth Report. Grid Strategies LLC, 2025. https://gridstrategiesllc.com/wp-content/uploads/Grid-Strategies-National-Load-Growth-Report-2025.pdf

# Power Loss was Driven by an Array of Equipment Issues

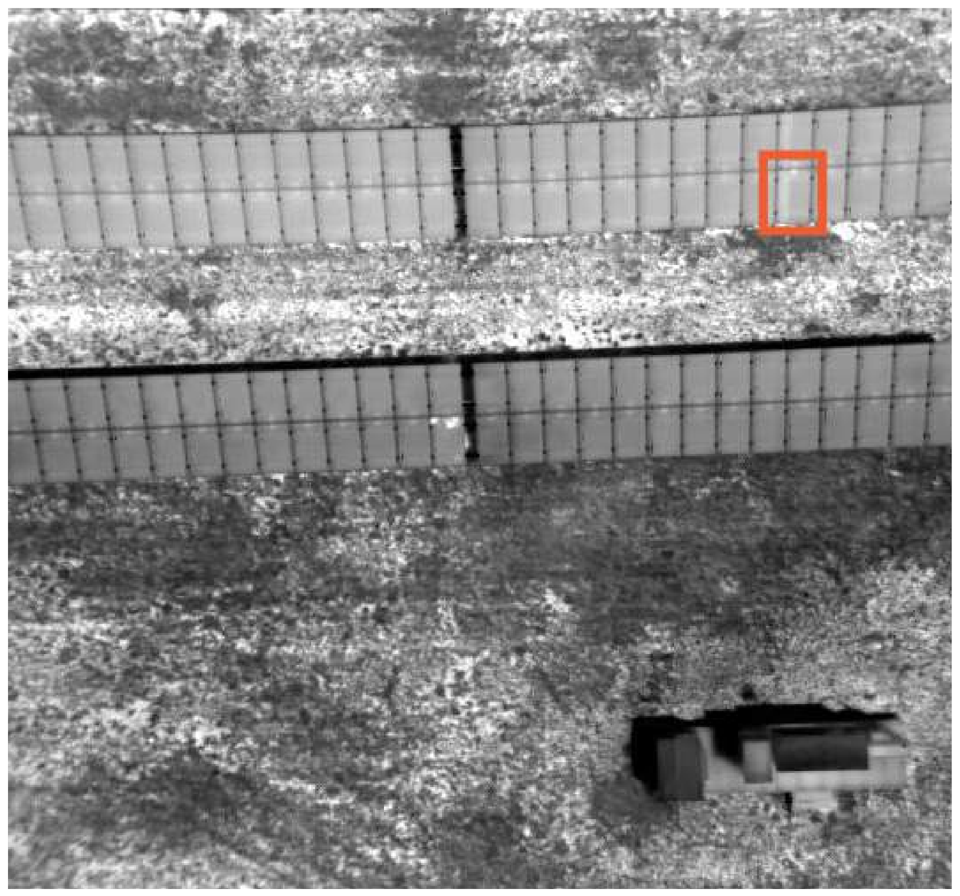
While inverters have historically represented the largest driver of DC capacity loss on solar farms, the data in 2025 revealed an interesting pivot: power loss from inverter faults decreased almost 40% compared to the previous year, now accounting for less than a quarter of total observed equipment-driven losses. In contrast, the industry is seeing a sustained rise in string (+12.50% YoY) and combiner (+10.20% YoY) faults, which now account for 26.89% and 21.51% of observed power loss, respectively. Average power loss from tracker issues saw the most aggressive increase, jumping 25% year-over-year and now contributing nearly 14% of the total loss profile. These shifting proportions highlight the ongoing challenge of managing these more silent DC health killers, signalling that they may require more operational attention than they have been previously given.

At a more granular level, we continue to observe a steady rise in smaller module level defects, which increased 17.36% YoY. While these smaller anomalies result in less immediate revenue loss than inverter or combiner issues, their rising prevalence is noteworthy, as these module level defects can deteriorate over time and become fire risks, which, as we discuss in Chapter 3, are showing up with surprisingly high frequency in our data set.

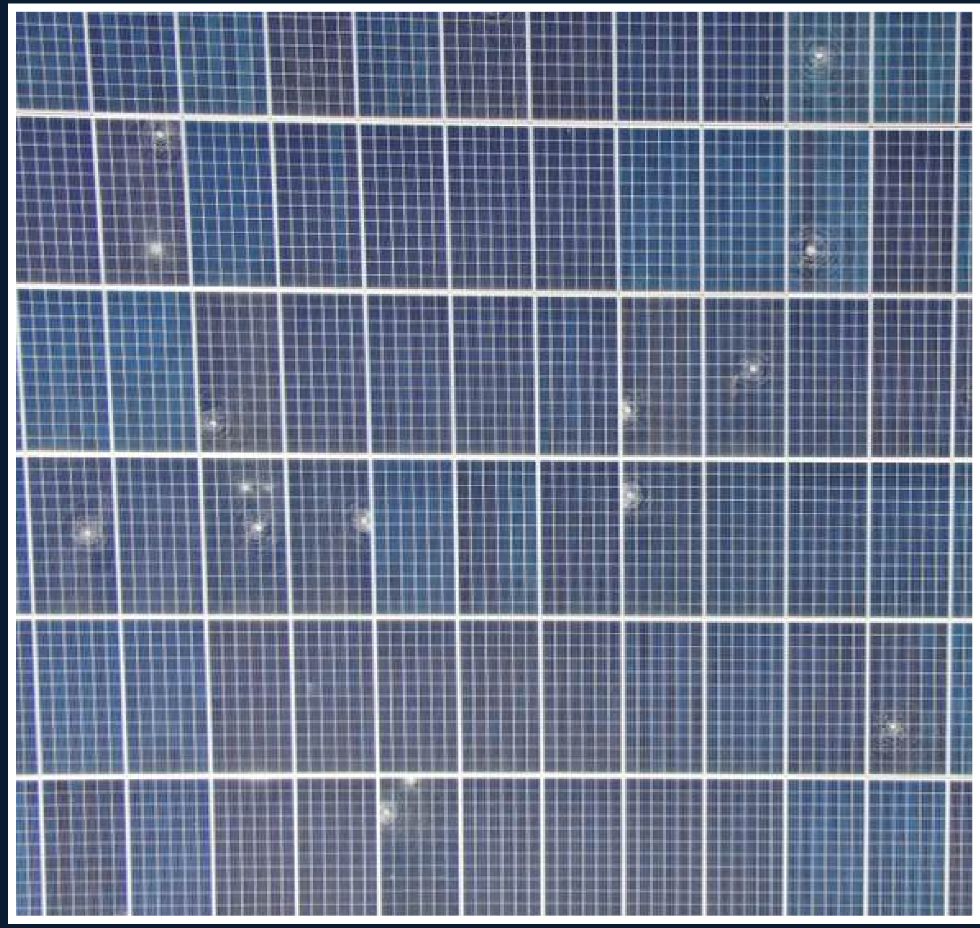


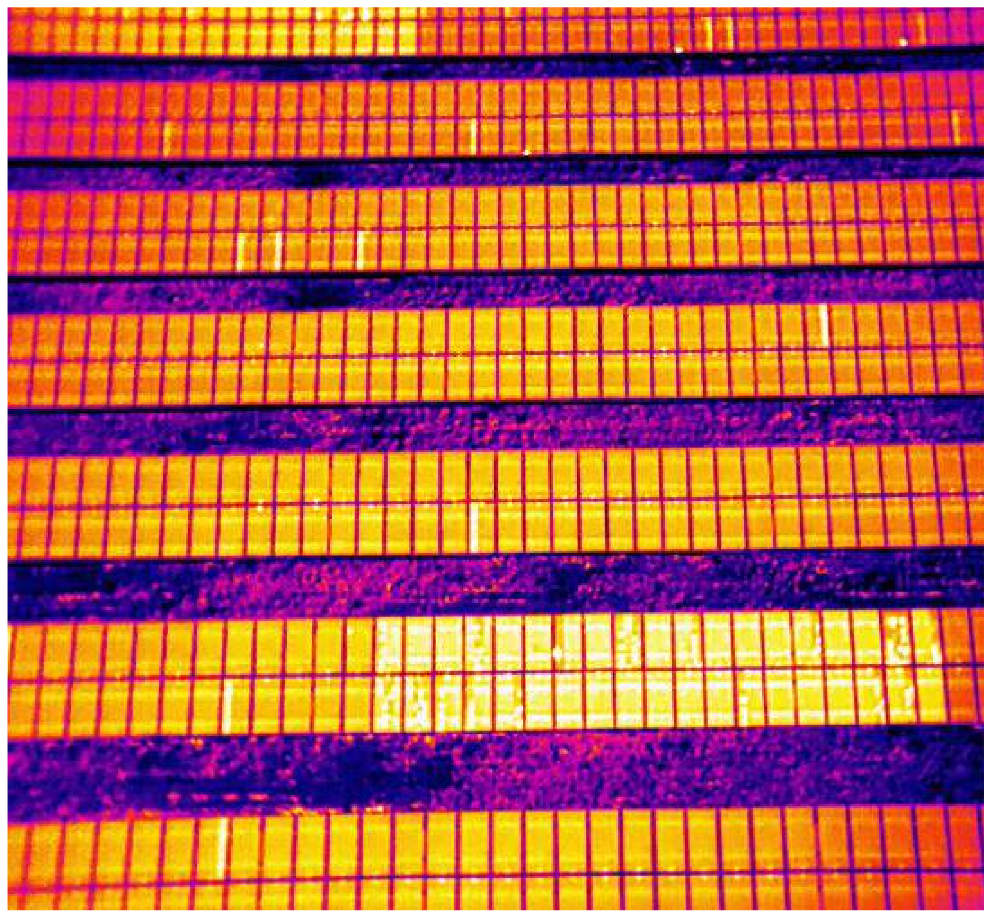
# Example of Power Loss & Equipment Damage



Diode Anomaly

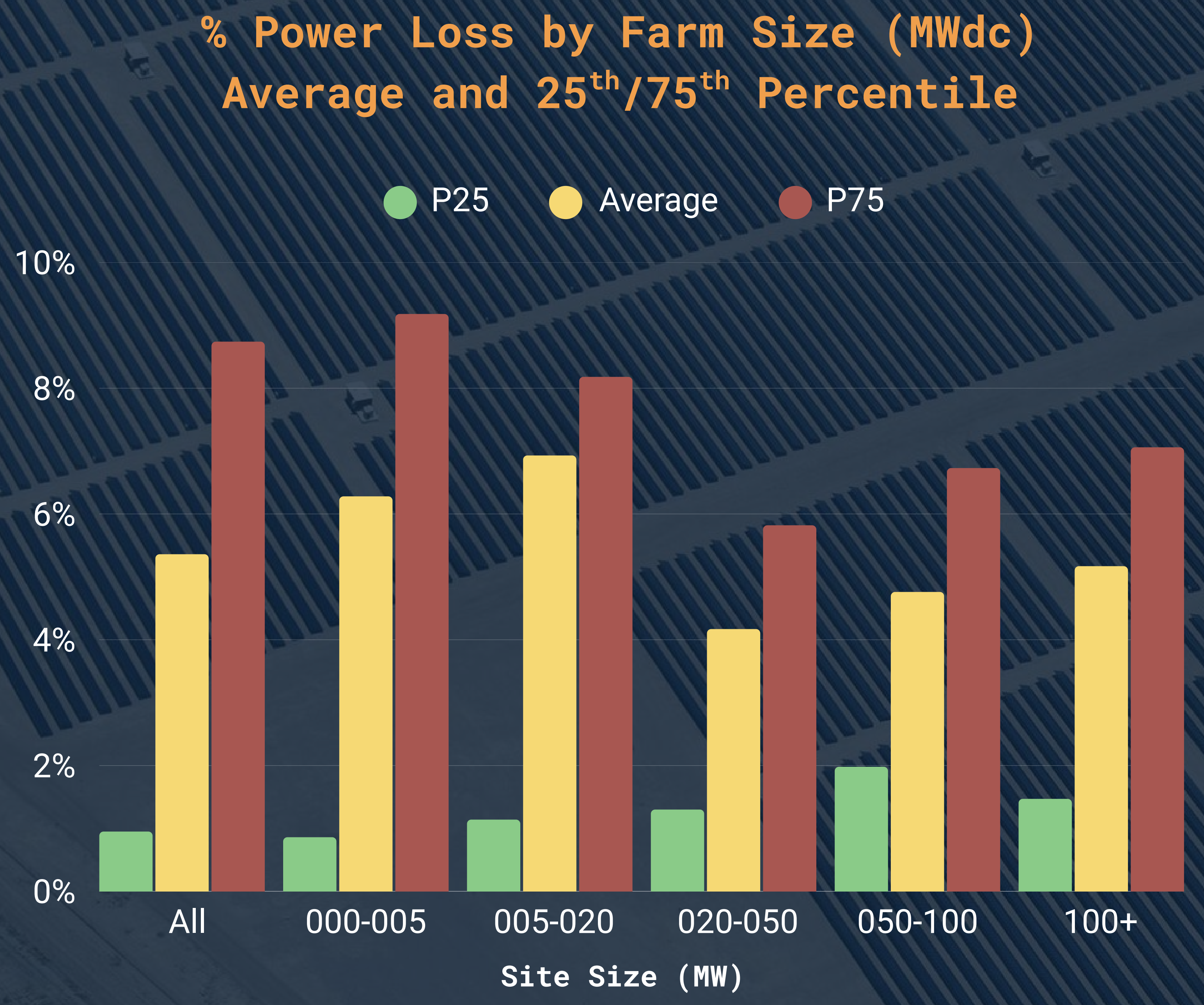


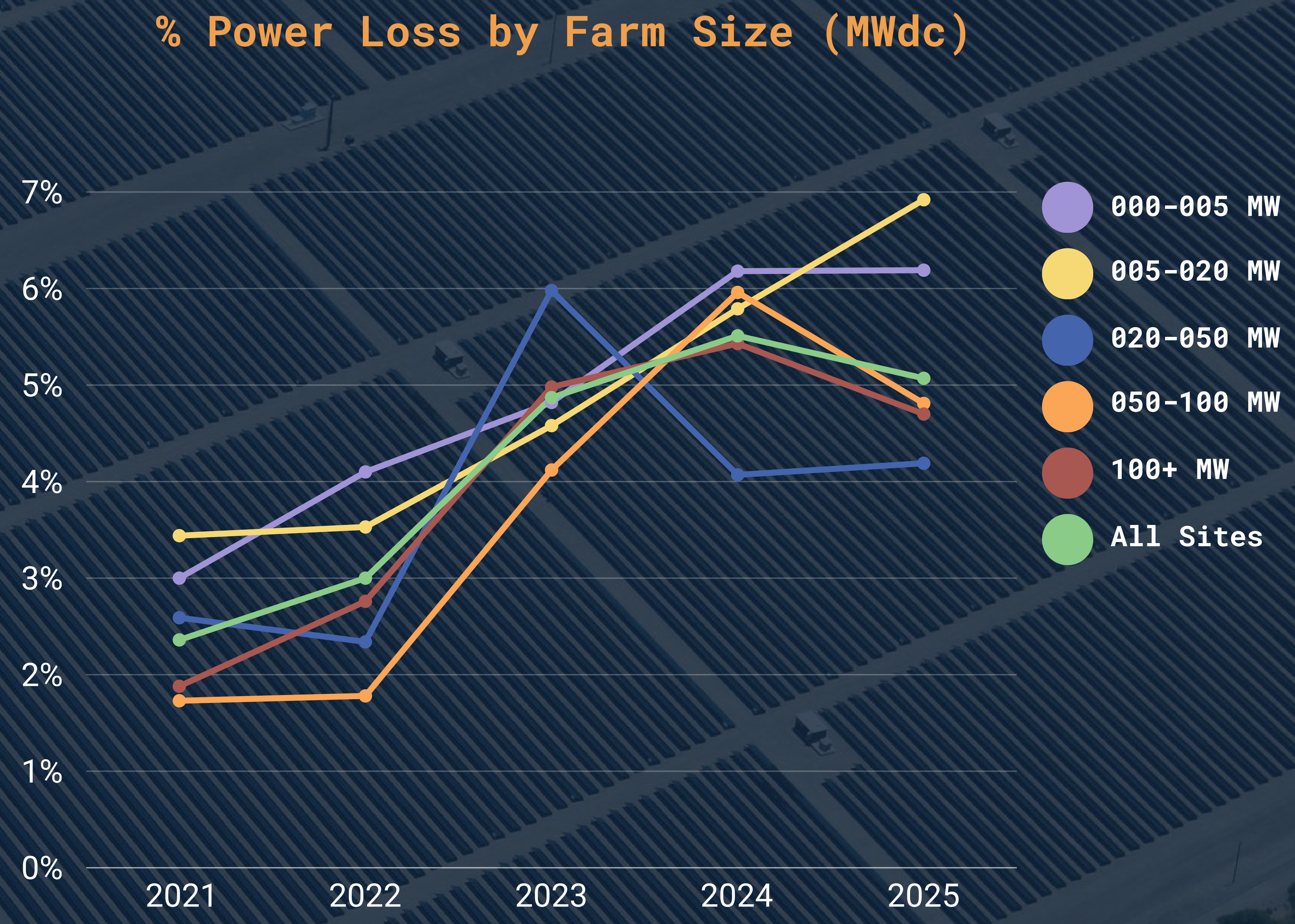
Cracking



String Anomalies

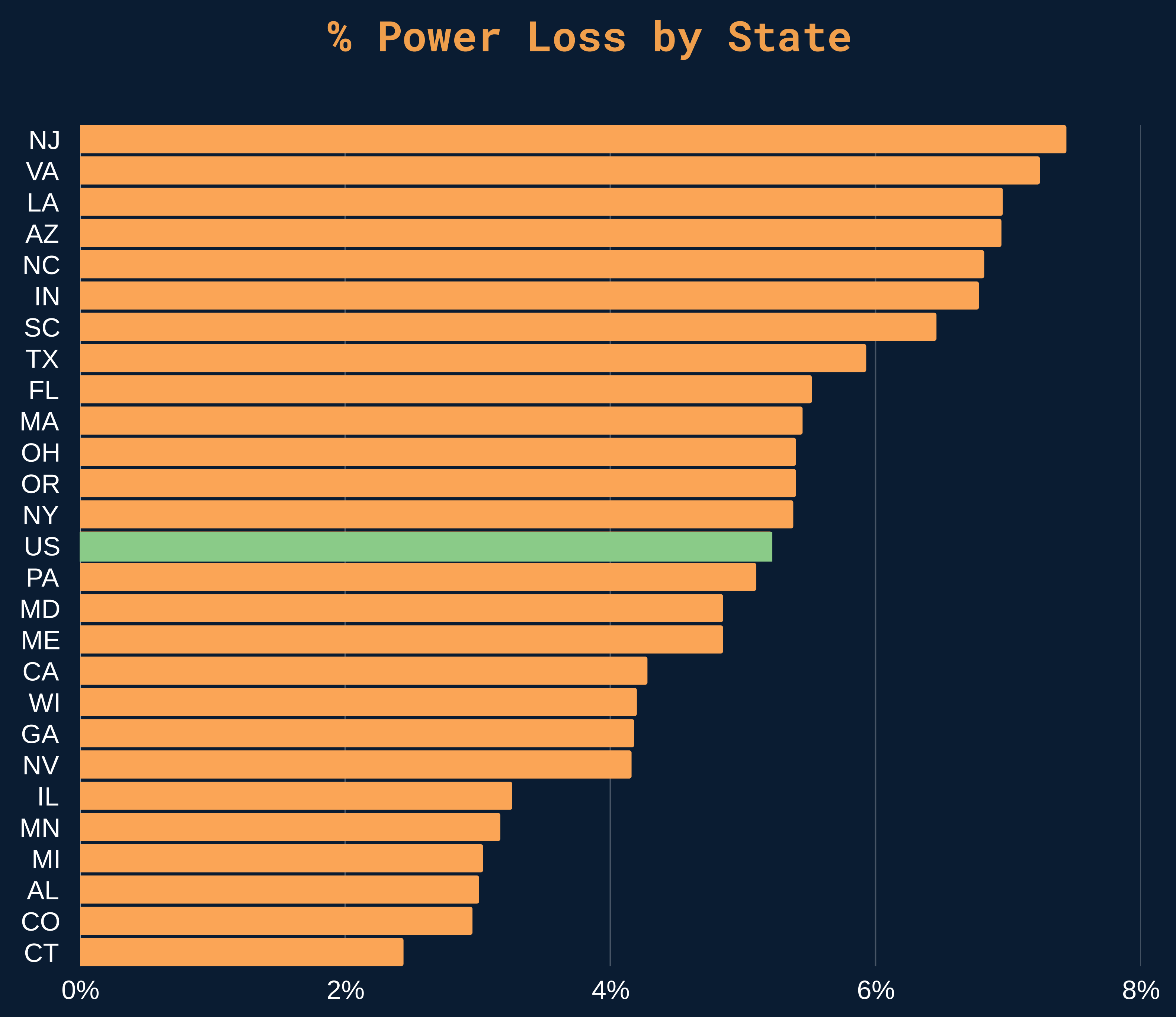
# Power Loss is a Challenge Across All Site Sizes

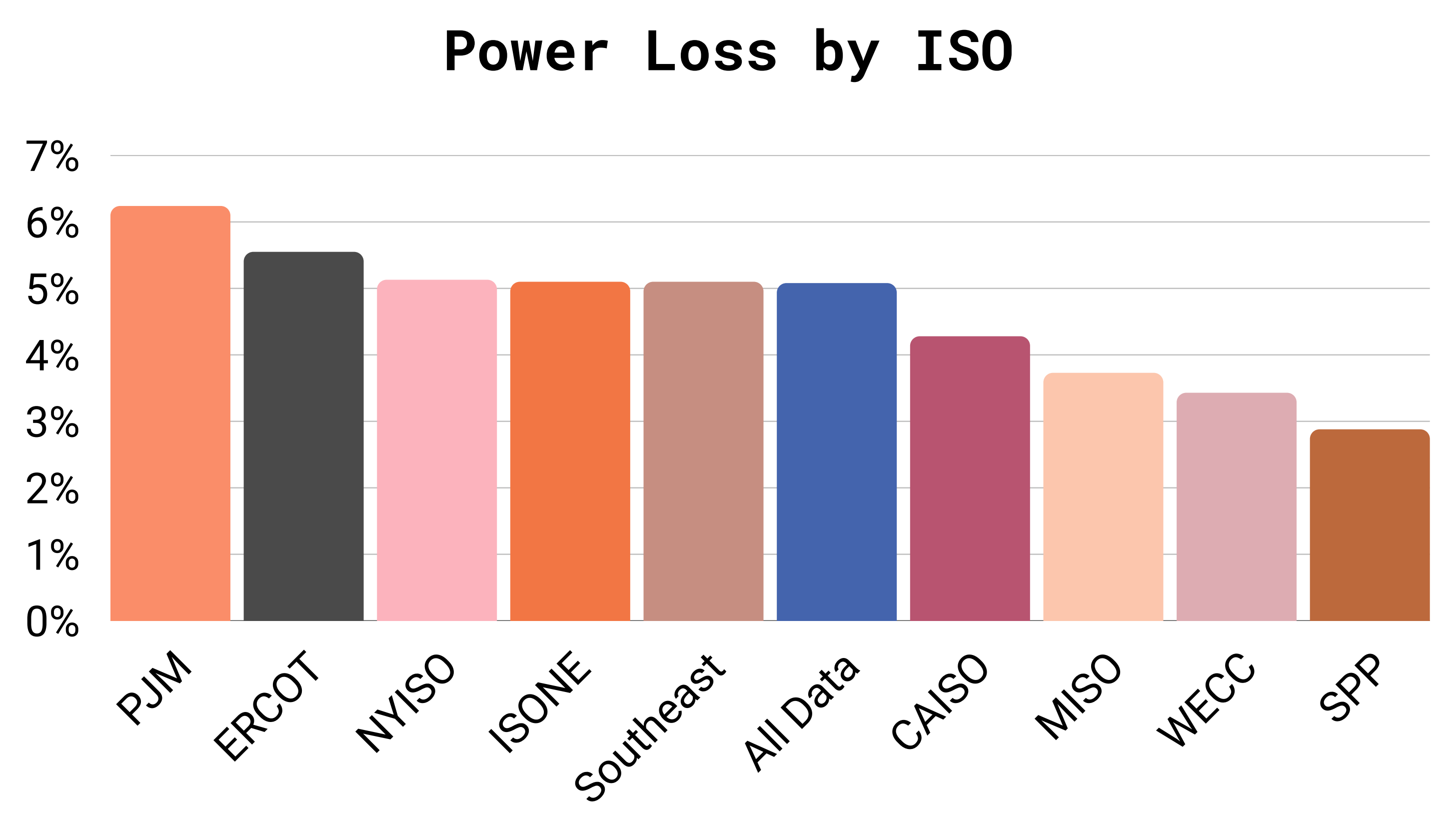


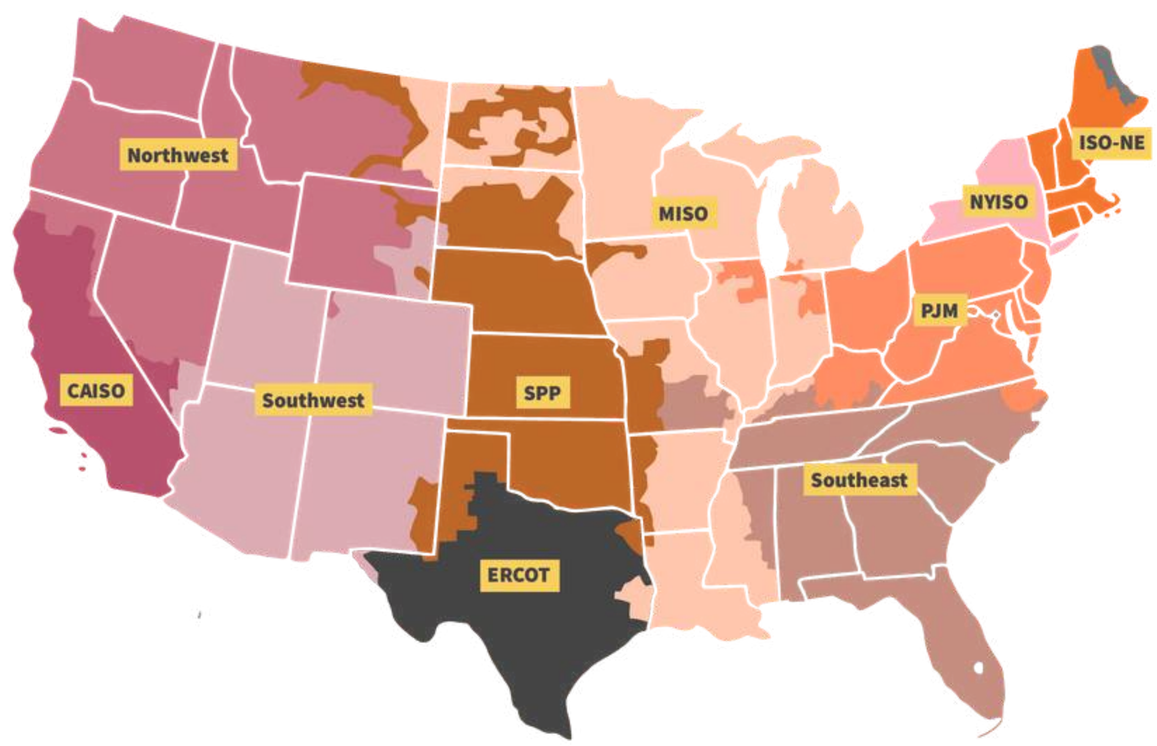

Despite different operational models, we observe steady increases in underperformance over time for all site sizes. It does appear, however, that larger sites (>20MW) perform slightly better than smaller ones (<20MW), perhaps indicating differences in operational efficiencies on newer, larger, and more resourced sites.

# Power Loss Affects Sites Across All Regions




## Map of ISOs

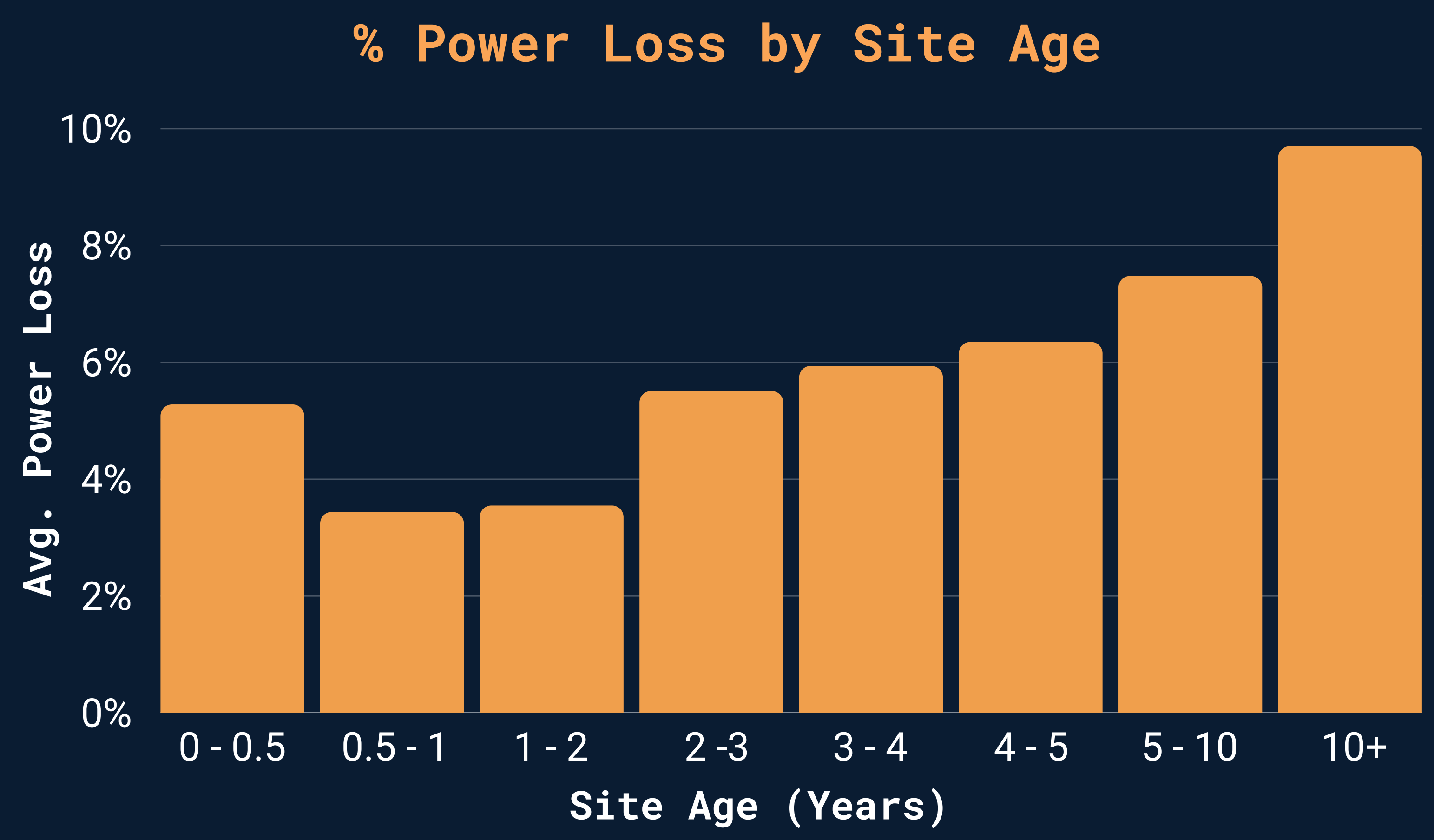


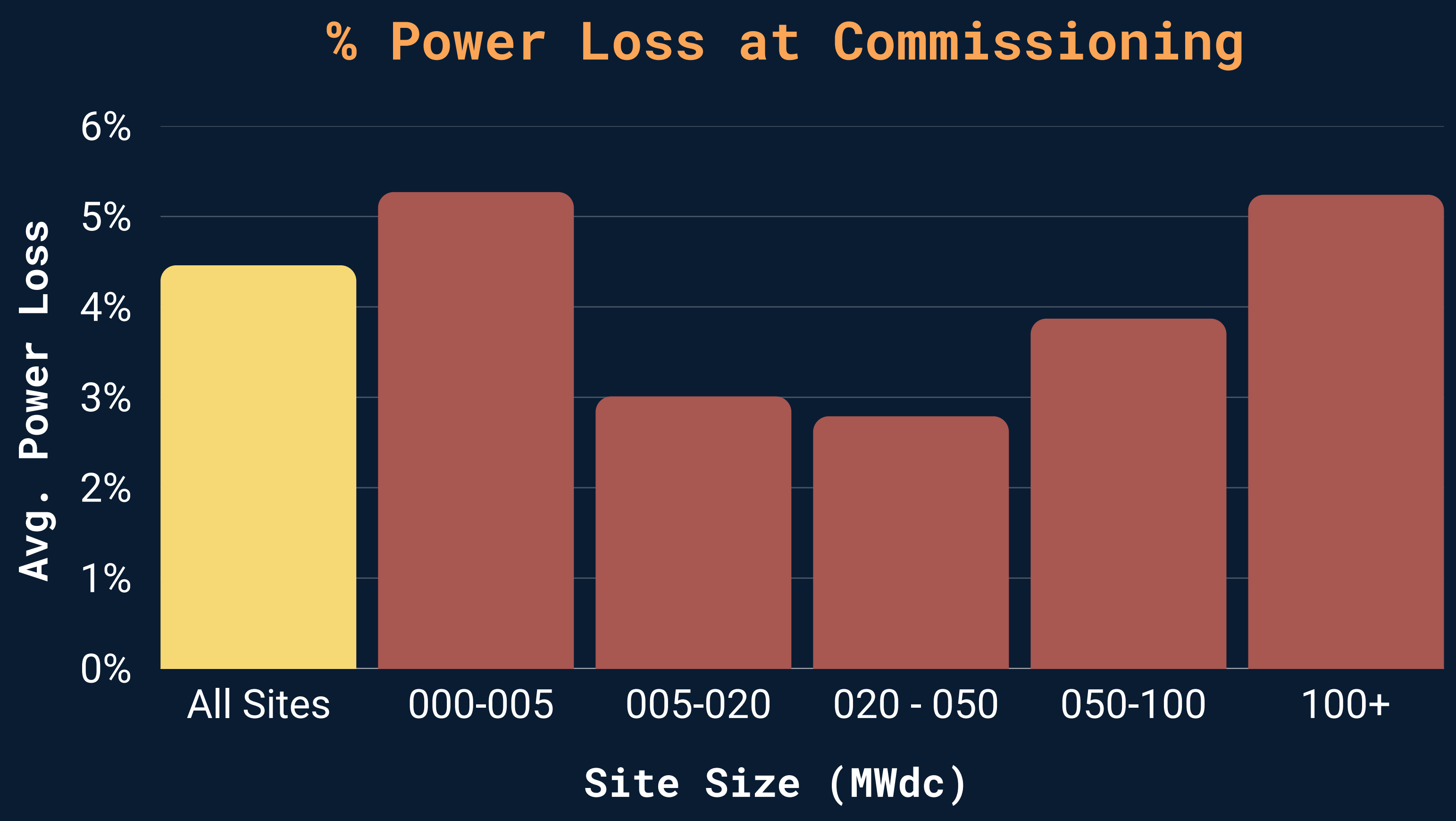

*Northwest and Southwest are combined as WECC for this analysis*

# Power Loss is an Issue at Commissioning, and Worsens Over Time

This year, we also analyzed how underperformance is correlated with the age of a site. Although it was unsurprising to see power loss increasing as sites get older, it was also fascinating to see the upwards trend in the data, with average power loss increasing 55% between years 2 and 3 of operations. Notably, EPC warranty periods often lapse after 1 to 2 years, which may indicate a relation between heightened resourcing availability and decreased power loss. Looking further out in the future, on average, we see loss almost triple between the site's most stable, productive period (years 1 and 2) and year 10.

We also noticed that sites were afflicted with power loss almost instantly. When we conducted commissioning inspections, average power loss was already 4.46%, or roughly up to $4,450 per MWdc of annual revenue leakage if unresolved. This suggests that more collaboration with the EPC must take place during the capacity testing process in order to get ahead of this capacity loss before sites are fully commissioned.



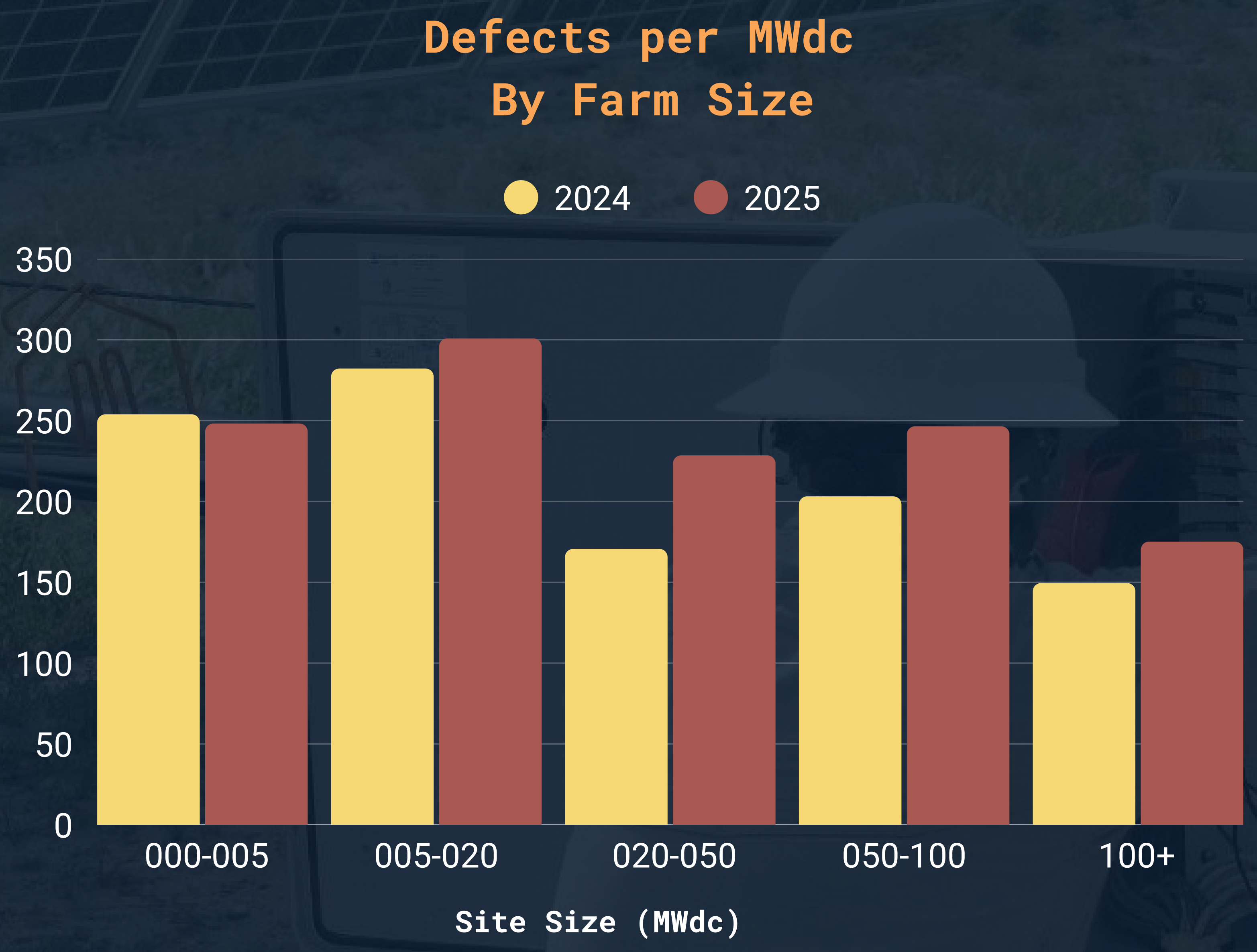



## Chapter 2

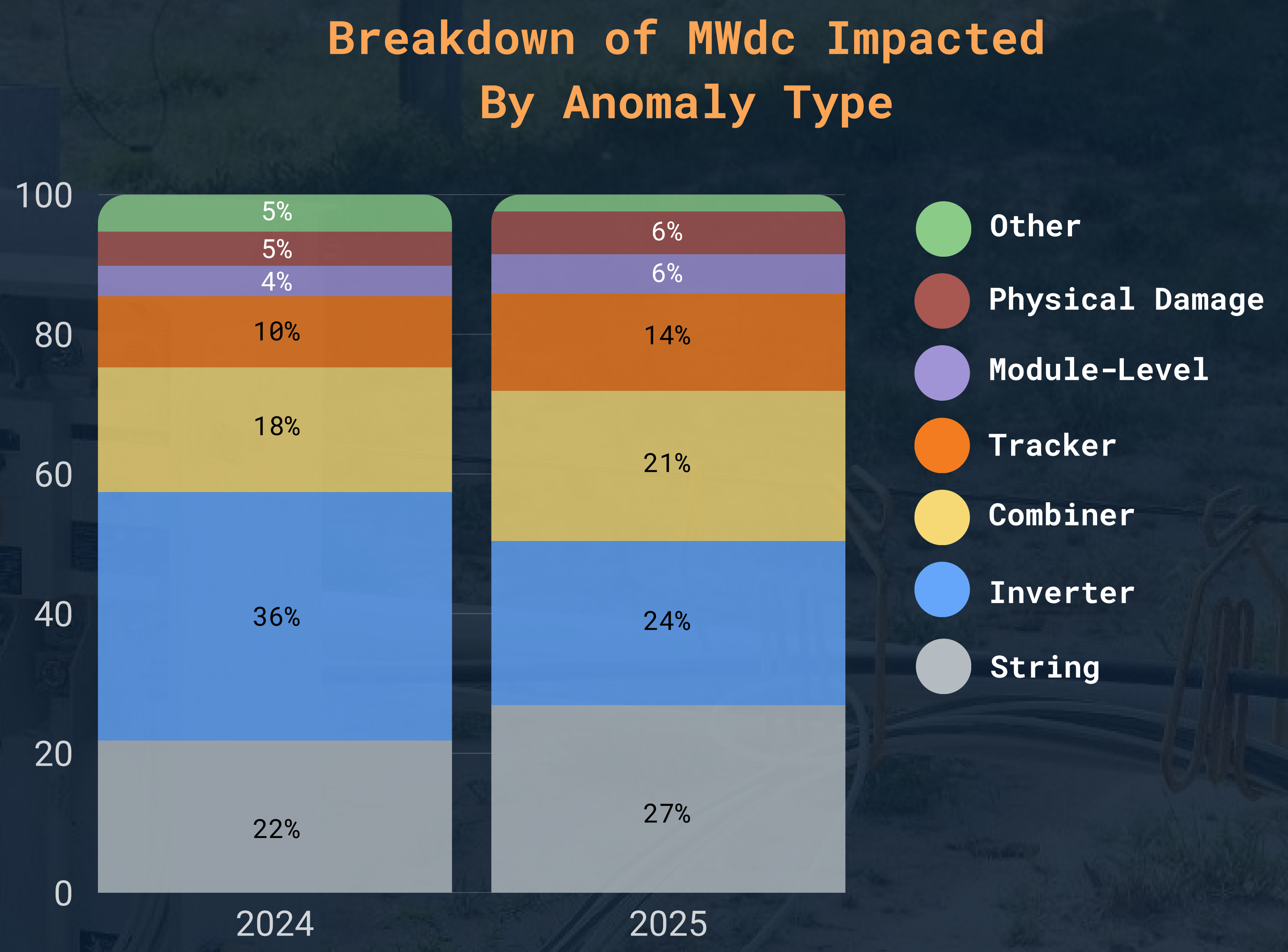
# OPTIMIZING PERFORMANCE WITH ROBOTICS

In 2025, Raptor Maps grew the cumulative deployment of our docked drone solution to 17GWdc of solar assets. The burgeoning dataset produced from this expanded deployment revealed a noticeable shift in both operational behavior and performance. Operationally, we saw sites with the technology conduct more frequent, targeted, and varied inspections. We also observed significant outperformance on sites with the technology relative to sites without it.

# Issues Consistently Arise on Solar Farms




One of the trends that stood out this year was that the prevalence of issues on solar farms went up in 2025 for sites of almost all sizes. While not all defects require immediate attention, the rise in these anomalies underscores an important takeaway from this year's report: to optimize DC performance, more frequent data is needed on DC health in order to capture issues in a more timely manner as they arise.



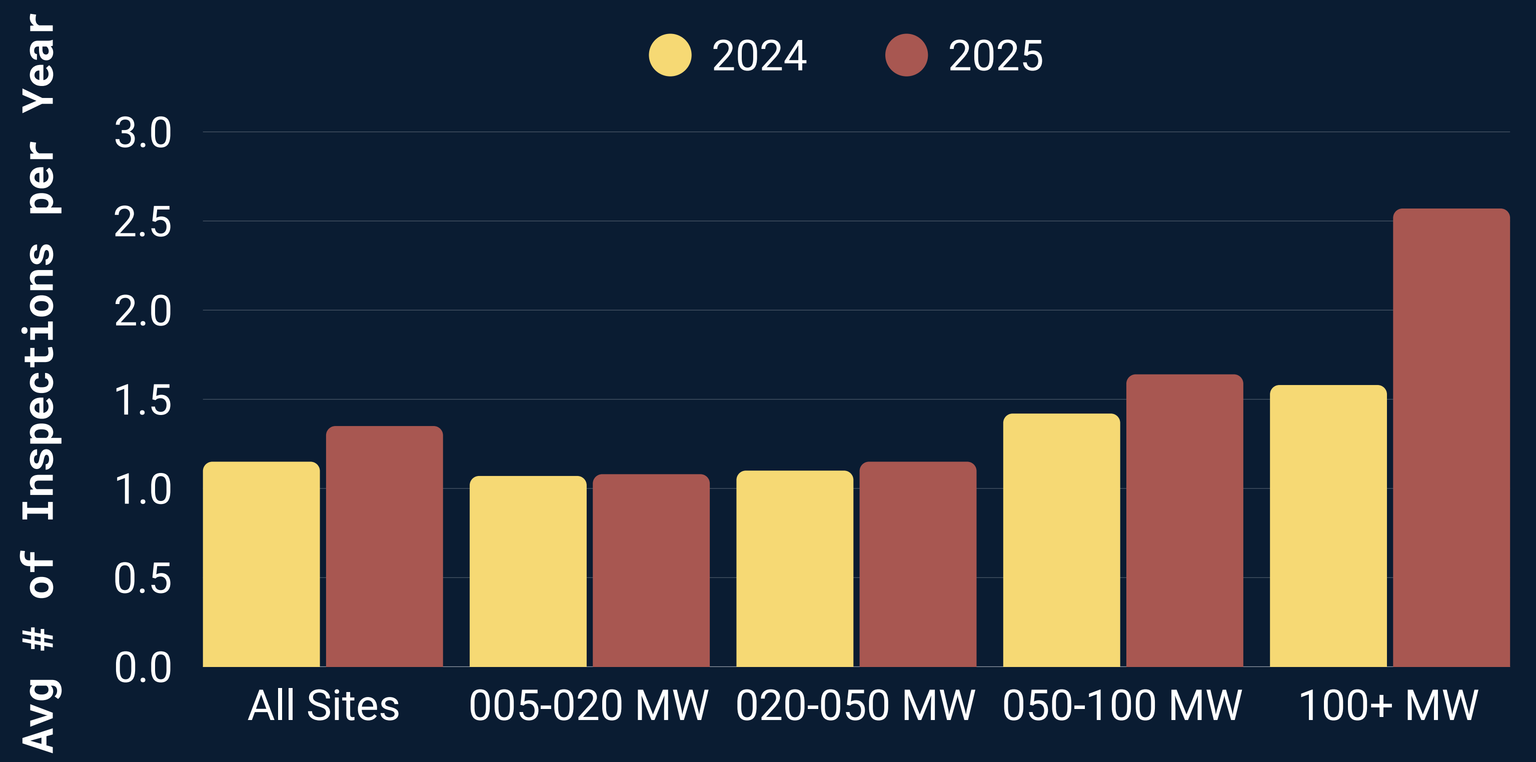

While inverter-driven losses have declined in our data set, we see a rising 'thousand cuts' trend where string, combiner, and tracker issues now account for a 25% larger share of total MW impact than last year. This shift from more centralized to more distributed power loss also speaks to the importance of more frequent data, as proactive identification of these anomalies is now becoming essential to prevent them from compounding into larger production gaps.

# To Respond to Increasing Issues, Sites are Inspecting More Frequently

The average solar asset completed in 2025 was three times bigger than the historical average [11]. As solar sites grow in size and complexity, our data is showing that more issues arise, more frequently. Perhaps as a result of this, we see a clear pattern: sites of all sizes getting inspected more frequently – a trend that is especially pronounced in larger sites.

Sites in our data set that have docked drones, however, are inspecting the most frequently. This is largely due to the operational ease and lower marginal cost of gathering data when docked drone technology is permanently deployed on a site. Operationally, sites with docked drones are increasing the frequency of partial, circuit-block-specific inspections. This is a distinct change in approach from the status quo for aerial thermography inspections, which traditionally happen once or twice a year and gather data across an entire site all at once. This trend suggests that some teams are beginning to believe that more frequent, targeted inspections produce more actionable data for prioritizing timely issue remediation and resolution.

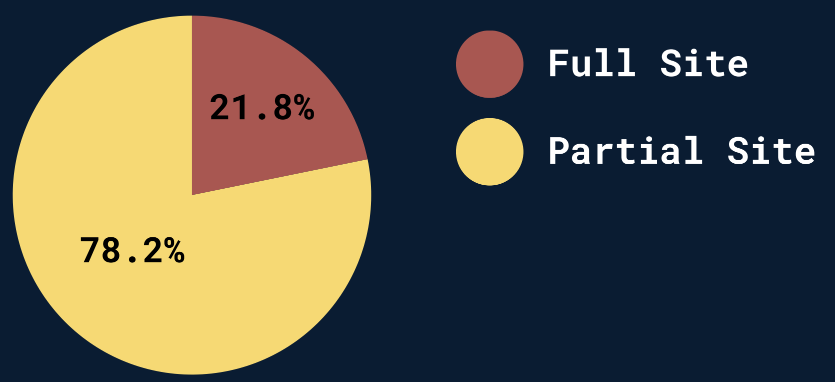
[11] Solar Energy Industries Association (SEIA). “Major Projects List.” 2025.




## Inspection Type Partial vs. Full

**11.8x**

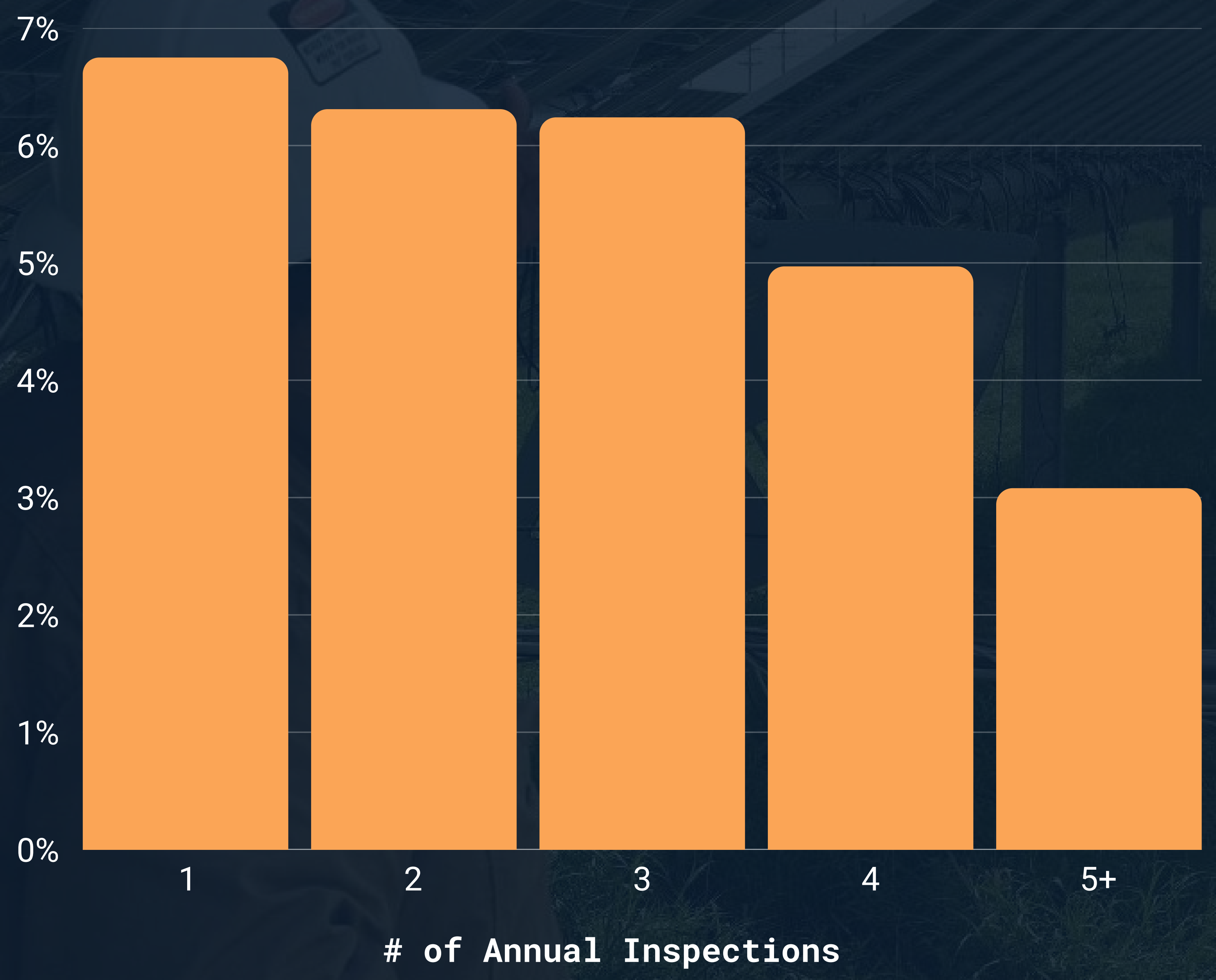
How much more frequently sites with docked drones inspected their sites, on average, in 2025



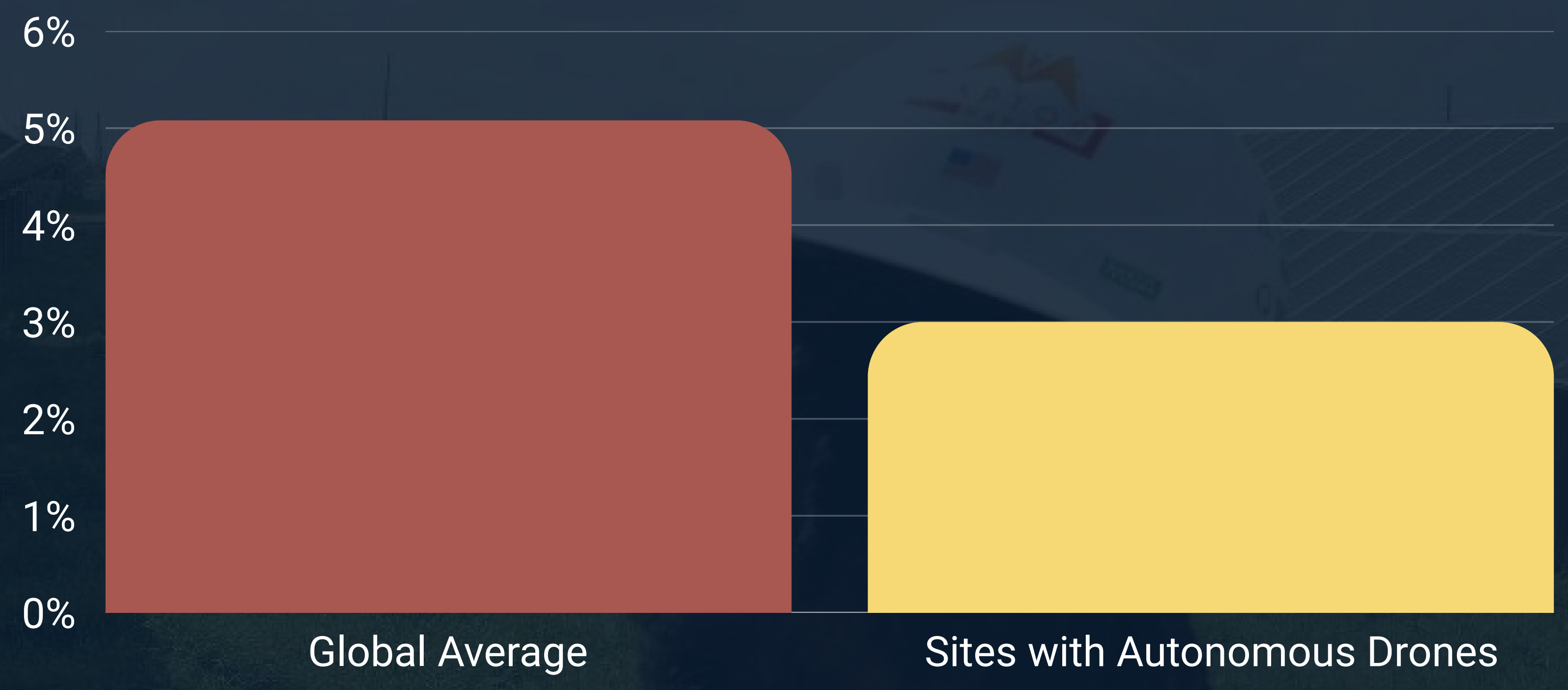

Sites with docked drones are performing more frequent targeted inspections vs. the full site

# Higher Performance from Sites with More Frequent Inspections

## Average % Power Loss
## By Number of Inspections Annually




## Average % Power Loss
## Global Average vs. Autonomous Drone Sites



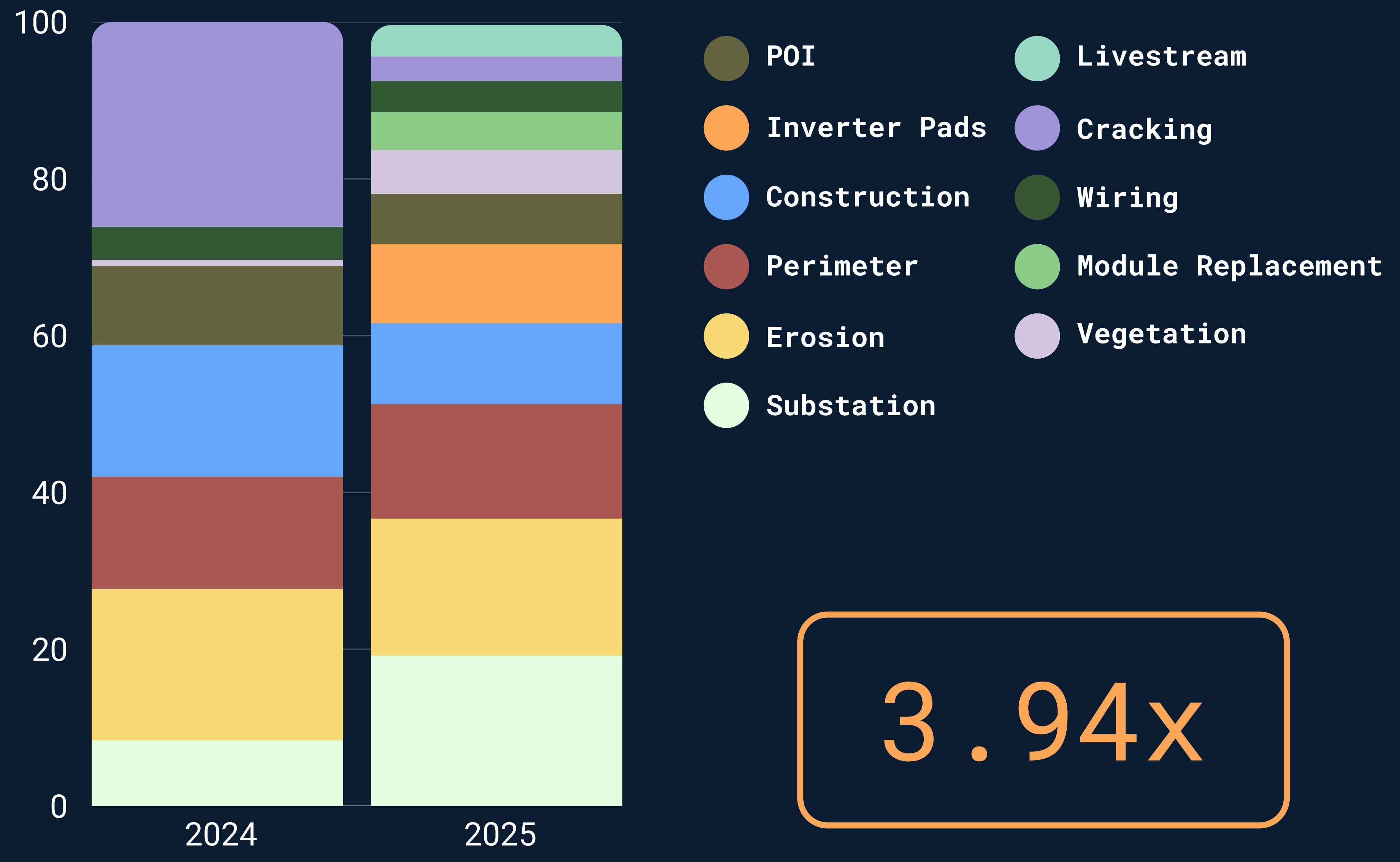

As we deployed our autonomous docked drone robotics solution across more solar assets, we began to track the correlation between the frequency of inspections and power loss. Sites that were inspected twice in 2025 showed a 7% improvement in average power loss when compared to sites that inspect only once, but the improvement becomes more stark at a quarterly cadence (+36%) and beyond (+119%). Most notably, when we assessed the average DC health of sites that utilized autonomous drone technology, we observed an average power loss of just 3%, compared to the data-set-wide average of 5.08%.

Chapter 3

# RISK MANAGEMENT AND INSURANCE

In 2025, Raptor Maps also analyzed 57.5 GW of data from advanced inspections, focusing on critical non-DC health-related components such as substations, back-of-panel wiring, and environmental conditions. This data provided asset owners with fresh insights into emerging risks and demonstrated how O&M teams are increasingly leveraging comprehensive site data to drive operational efficiency.

## Advanced Inspection Volume
## % of Total Inspections, Year over Year




**Total Analyzed by GWdc**

| 2024 | 2025 |
|---|---|
| 14.6GW | 57.5GW |

**3.94x**

**Increase in Non-Aerial Thermography Inspections in 2025, Relative to 2024**



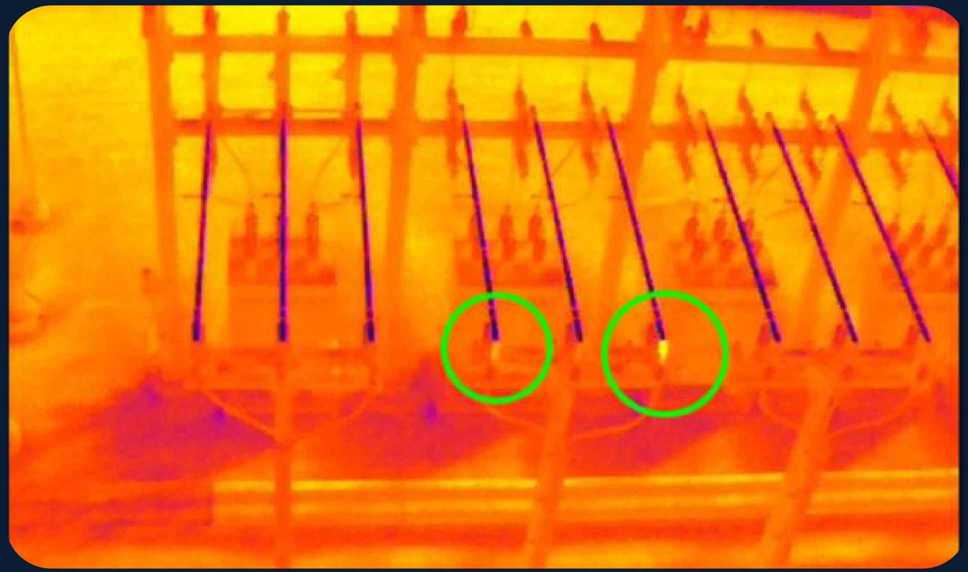
# Drone-Based Risk Management is on the Rise

In 2025, Raptor Maps analyzed 3.94x more data from advanced inspections than in 2024. The most popular of these inspections covered substations (19% of advanced inspections), erosion (18%), perimeter checks (15%), construction verification (10%), and inverter pad inspections (10%). The uptick in orders for these advanced inspections reflects two growing trends in the industry:

1. Assets face a diverse array of costly risks, ranging from electrical to environmental to legal and compliance. To optimize management protocols against these risks, asset owners are now seeking more varied and frequent inspections across a wider range of equipment and infrastructure.

2. Operators, on the other hand, are being squeezed for time. As solar capacity growth continues to outpace growth in the solar labor force, today's technicians are, on average, responsible for significantly more MW than they were 5 years ago. In response, they are increasingly automating preventative maintenance (PM) tasks by using robotic solutions, which replace historically time-intensive components of PM task lists.

# Examples of Risks Owners and Operators Must Manage



Substations are a critical single point of failure where one malfunction can result in the complete disruption of power delivery to the grid

Ensuring that tracker systems are operating properly, especially during hail season, is a critical risk management protocol

Damaged, improperly installed, or poorly manufactured connectors can cause electrical arcing, which can lead to fires

Erosion can threaten structural integrity and lead to third party lawsuits if sediment runs off into neighboring properties

# Where Solar Risk Quietly Accumulates

## Contributed by kWh Analytics

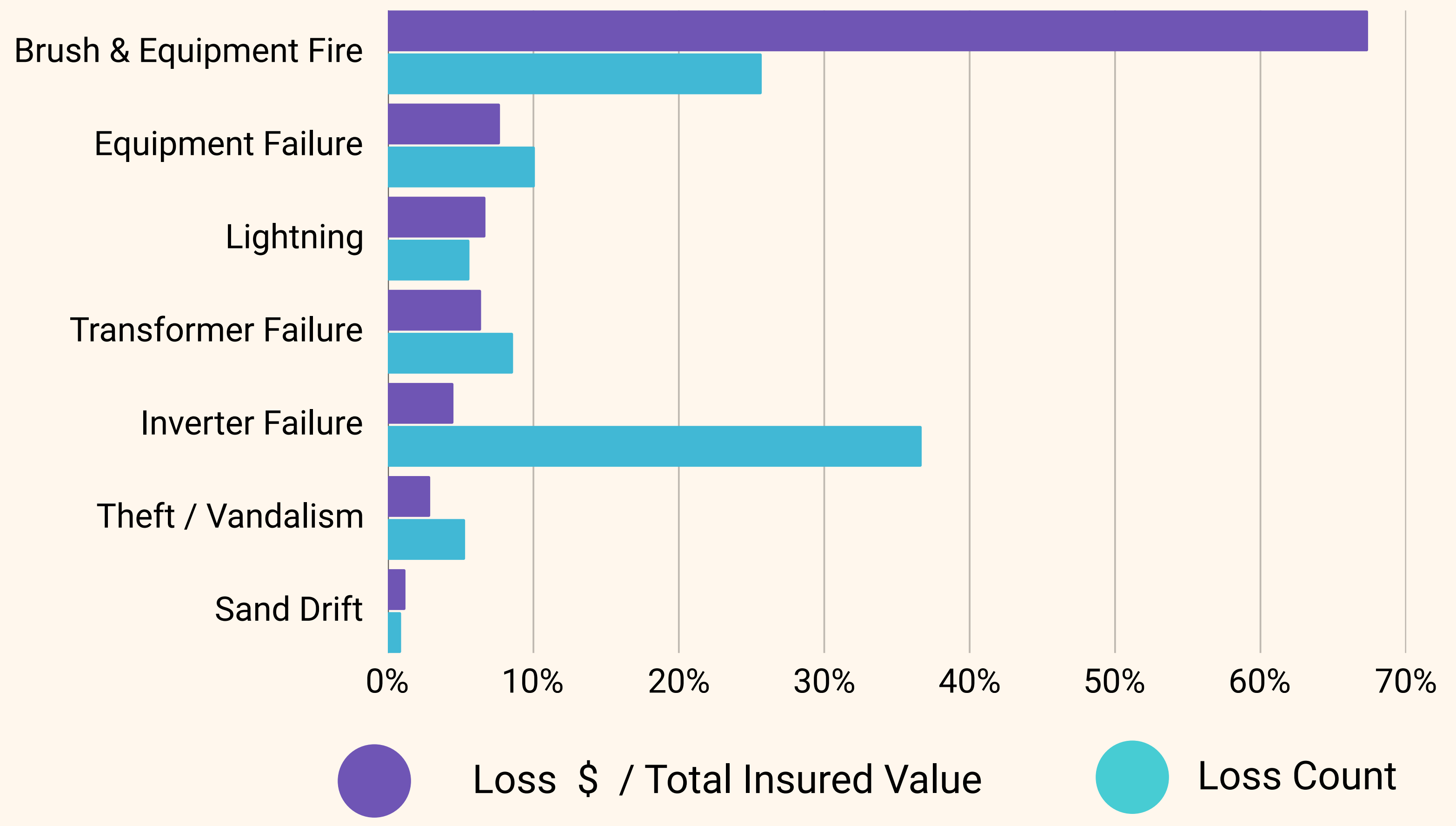
Headlines in the solar industry tend to focus on losses from natural catastrophes, yet insurance claims data tells a quieter story. Attritional losses, such as equipment fires or outages, vandalism, and theft, continue to drive frequent claims and disruption across solar portfolios. Attritional losses account for 60.5% of total claims by count, and while the dollar value of attritional losses may be smaller than that from events such as hail, hurricane, or flood (8% by claims, dollar amount), the cumulative impact is meaningful for asset owners, insurers, and lenders alike.

An analysis of the kWh Analytics attritional loss database compares loss dollars (by peril type) as a share of total insured value against loss counts (Figure 1). Inverter failures are the most frequent cause of attritional loss events, accounting for 55% of all such events. However, inverters still account for a much smaller share of total loss dollars. Insurance claims data, therefore, captures the end of the failure chain, not its beginning.

By contrast, fire (including brush and equipment fires) is the most costly attritional peril and is 9X more expensive than the next most pricey loss, equipment failure (in terms of loss amount relative to Total Insured Value). Many of these fires originate from electrical balance-of-system issues, including combiners, connectors, or inverter-related faults that escalate.

Inverter-related and module-related issues are the top two operations and maintenance (O&M) events in a SETO-supported survey of over 80,000 maintenance tickets from solar sites across the US (Figure 2). The survey found that inverter-related issues were typically caused by logic board failures and fan/cooling system failures, and some incidents involved failures originating upstream in balance-of-system faults. Common module-related issues included hotspots and junction box failures. When the issues are missed or mismanaged, they reappear later as fire losses, extended outages, and business interruption claims.

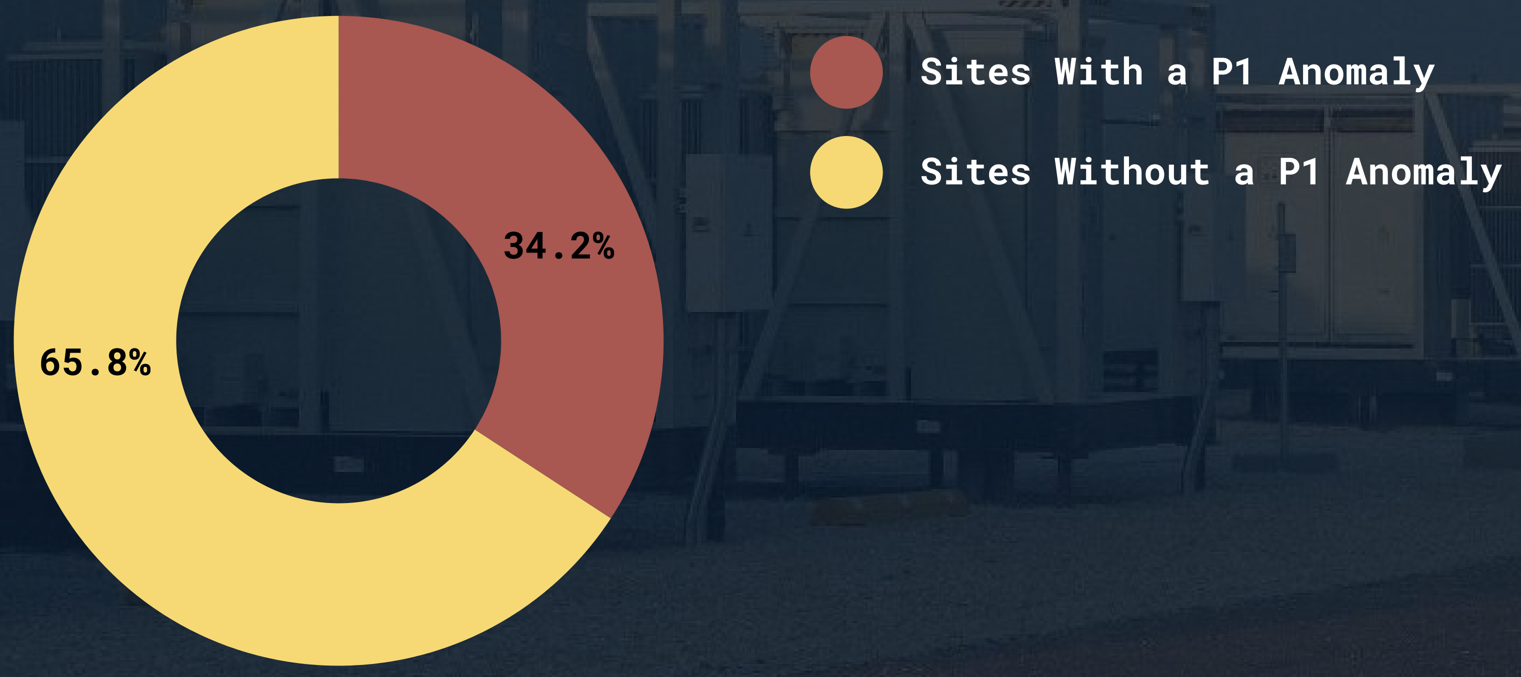
Attritional claims paid by insurers and related policy premiums paid by asset owners equate to millions of dollars of spending, most of which could be avoided with different operational risk management practices. **kWh Analytics believes that inspection programs that reliably and routinely identify system abnormalities, electrical balance-of-system defects, and emerging thermal issues provide a window into risk long before it manifests as fire damage or business interruption**. When a solar site has a high-frequency inspection program, asset owners and insurers alike can intervene earlier, reduce loss severity, and prevent small failures from becoming catastrophic events.



# Managing Against Unplanned Losses and Asset Risk

Increased orders for advanced inspections in 2025 gave us more insight into the types, and magnitudes of risks solar farms face – trends that we are excited to check in on in subsequent years. Specifically, this new data revealed that solar assets are consistently at risk of events – such as fires, substation anomalies , malfunctioning trackers, and erosion – that have the potential to lead to downtime and unplanned costs.

## 34.2% of Substations Had at Least One High Priority Anomaly in 2025



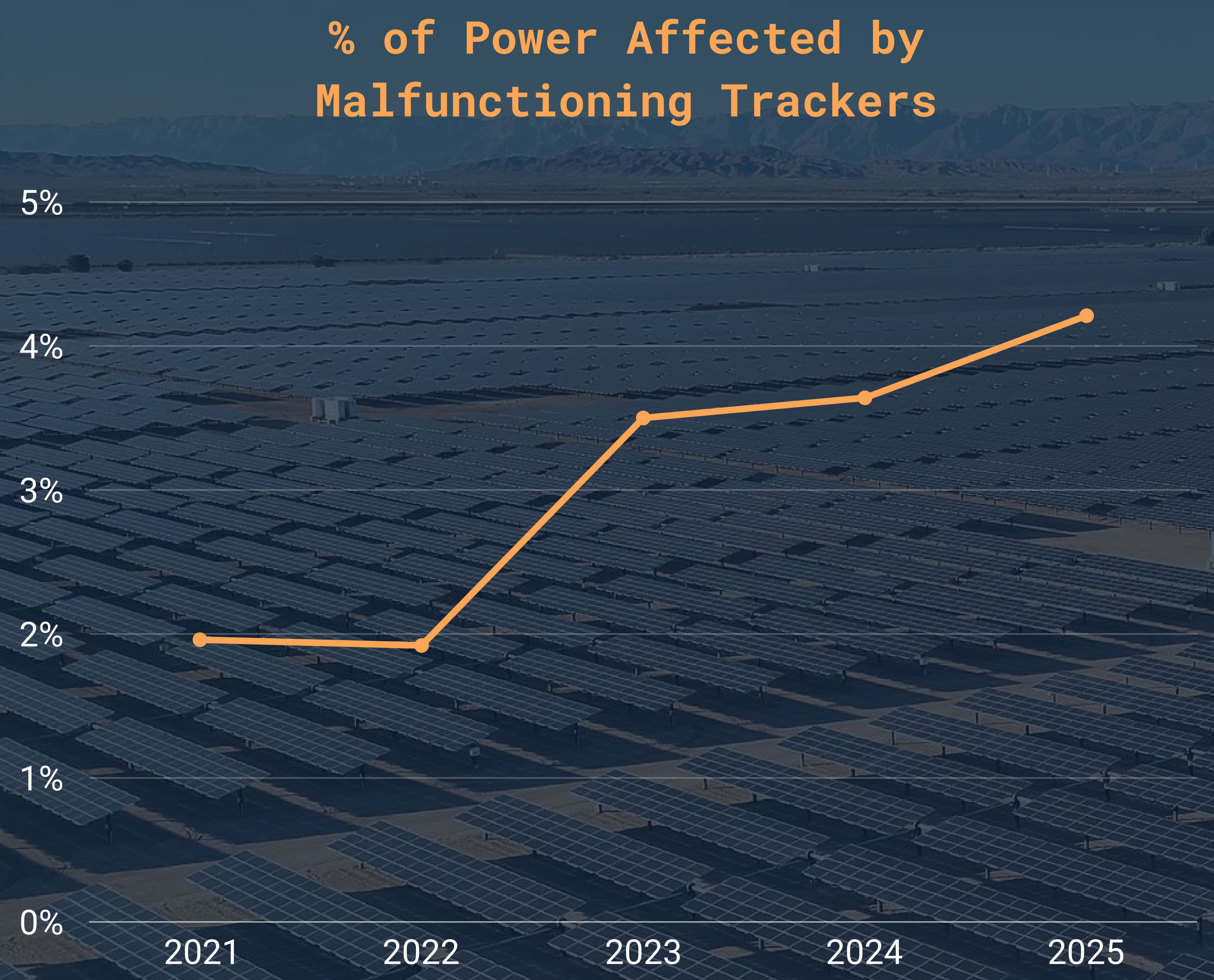

Of the substations that we inspected more than once per year in 2025, 34.2% had at least one high priority anomaly (i.e. an anomaly where an immediate follow-up action is recommended, often identified through thermal analysis). Left undetected, these anomalies can deteriorate and cause major disruptions to power delivery and result in costly repairs.

## 21% of Sites Inspected with Docked Drones in 2025 had a Fire

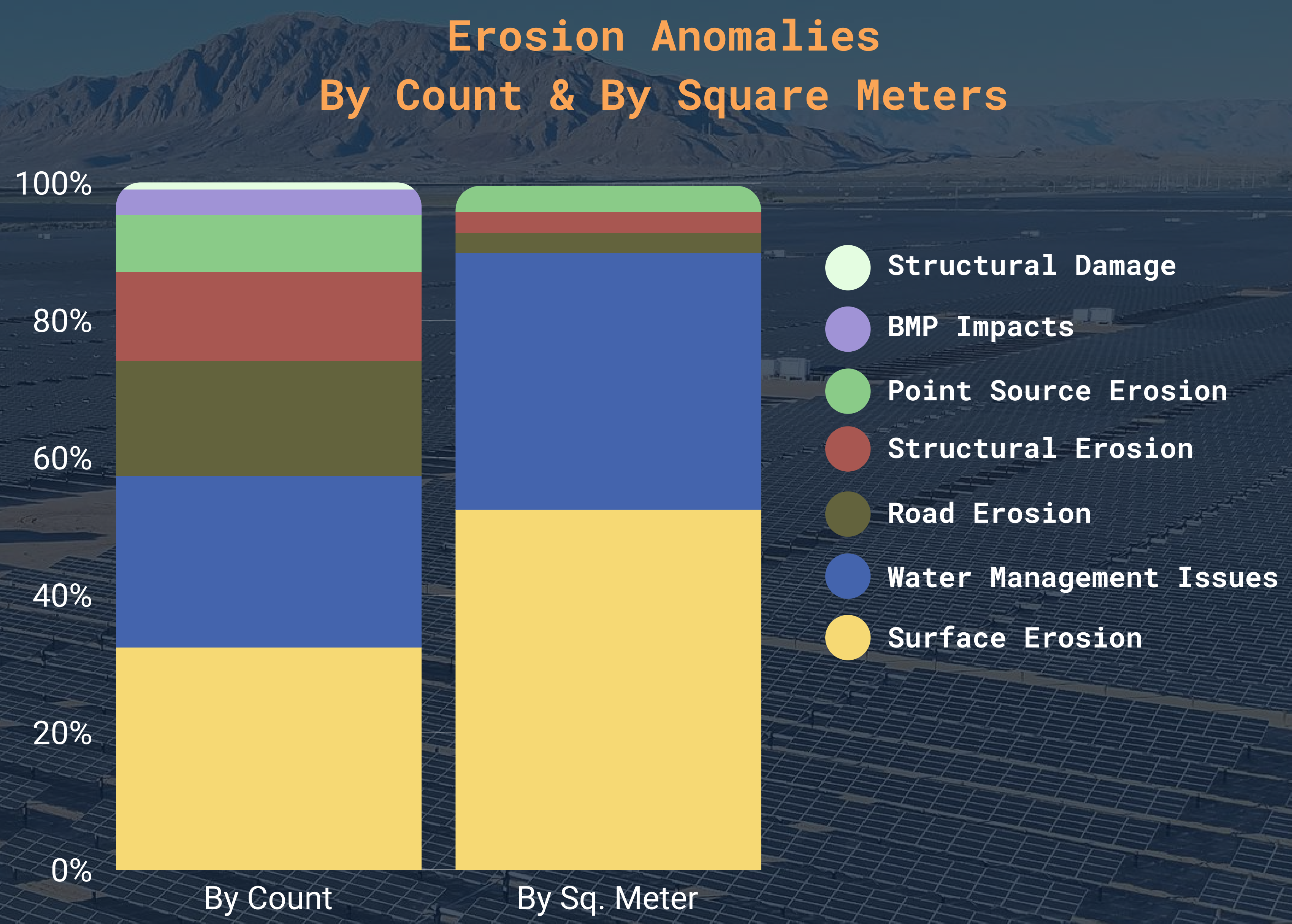
21%

We observed fires on over 20% of the sites that we inspected with our autonomous docked drone solution throughout the year. Many of these fires could be attributed to connector issues, where electrical arcing melted components on the wiring and subsequently ignited surrounding vegetation.

# Managing Against Unplanned Losses and Asset Risk




Each year, we have observed more power affected by malfunctioning trackers, which not only cause power loss, but also undermine effective hail damage mitigation. We observed a more than 2x increase in the DC capacity impacted by malfunctioning trackers compared to 5 years ago, impacting 4.21% of DC capacity on sites with trackers in our dataset.




Depending on the location of the asset, erosion is an omnipresent risk on solar farms that must be consistently managed. Erosion can affect the structural integrity of an asset, and can also lead to lawsuits if sediment is running off onto neighboring properties. In 2025, surface erosion and water management erosion were the most common issues by both frequency and surface area impacted in our dataset.

# Conclusions

As the industry scales toward installing 3TW of solar capacity, the data in the 2026 Global Solar Report highlights a trend that has applications for both owners and operators: **the most successful solar assets are deploying robotics and automation.**

**For asset owners, these techologies are a way to increase performance**. Moving from mostly once-per-year site inspections to high-frequency inspections using robotics has a clear, positive impact on power loss: **sites with docked drone technology had average power loss of just 3%, compared with the dataset-wide average of 5.08%**. This is because inspecting more frequently delivers more data – on performance and risk – empowering assets owners to manage their portfolio more proactively.

**For O&M teams, automation helps technicians operate with efficiency and precision**. From 2024 to 2025, there was a 3.94x increase in orders for advanced inspections – substations, wiring, inverter pads, environmental conditions, etc. – helping reduce hours spent on time-consuming PM tasks for technicians, who are, on average, responsible 70% more MW than they were in 2019.



# About Raptor Maps

Raptor Maps builds the software infrastructure that powers the solar lifecycle. Our work increases the efficiency, reliability, and financial performance of PV systems. We digitize and analyze the world's solar information to catalyze the transition to renewable energy. By enabling consistent data, faster action, and scalable operations through a focus on robotics and automation, we help the solar industry grow with confidence, accuracy, and speed.