

The Future of Utility-Scale Solar Construction

Why Installation Efficiency Is Becoming the Industry's Next Competitive Advantage

1GW

Projects in Planning

The new frontier of project scale

300MW

Now Common

Standard utility-scale project size today

50MW

Was "Large"

What counted as a major project a decade ago

The Big Shift

CHAPTER 1

Utility-scale solar is changing — fast. Projects are getting larger. Schedules are getting tighter. Margins are getting thinner. And labor and weather are becoming the biggest sources of risk to project timelines. Ten years ago, a 50 MW project was considered large. Today, 300–500 MW projects are common, and 1 GW projects are already being planned and designed.

But while projects have scaled dramatically, **construction methods have not changed at the same pace**. Most utility-scale solar projects are still built using traditional construction approaches that were designed for a different era — one where project scale, labor availability, and schedule pressure looked fundamentally different than they do today.

How Projects Are Still Being Built

- Large field crews
- Sequential installation
- Weather-dependent schedules
- Manual, repetitive processes

The Gap That's Opening Up

This mismatch between project scale and construction speed is creating real consequences for developers and EPCs. As gigawatt-scale projects move from concept to contract, the limitations of traditional methods become more visible — and more costly.

The next major improvement in solar will not come from panel efficiency gains or inverter technology. **It will come from construction efficiency.** The companies that recognize this shift early will hold a meaningful competitive advantage in the decade ahead.

Solar Construction Is Starting to Look Like Manufacturing

CHAPTER 2

Utility-scale solar construction is no longer a typical construction project. It is becoming something else: **a large-scale, repeatable installation process** — much closer to manufacturing than traditional construction. The parallels are striking: high-volume repetitive tasks, sequenced workflows, material flow management, and throughput metrics that determine whether a project succeeds or falls behind.

Every project includes the same repeating, high-volume tasks executed across hundreds of acres: pile installation, racking assembly, module placement, cable management, and coordinated material movement across large, complex sites. As project sizes scale, each of these tasks multiplies in volume — and so does the complexity of coordinating the crews, equipment, and materials that execute them.



Throughput Metrics

Success is measured in piles per day, tables per day, modules per day, and MW installed per week — the language of production, not traditional construction.



Predictable Output

How predictable the schedule is — and how consistently crews hit daily production targets — is now a core measure of project execution quality.



Sequenced Workflows

Crews, materials, and equipment must be tightly coordinated across large sites. Bottlenecks in any single step cascade across the entire schedule.



Who Wins

The companies that win will not just design the best projects. They will be the ones who **build the fastest, safest, and most predictably.**

The New Bottleneck: Installation Speed

CHAPTER 3

For many projects today, the biggest risks are no longer panel supply or inverter technology. The supply chain has matured, equipment is widely available, and engineering is well understood. The risks that are keeping project managers and developers up at night are operational: labor availability, weather delays, site access challenges, and the relentless pressure of a fixed commercial operation date. These are the risks that determine whether a project hits its financial targets — or misses them.

Project Risk Factors Today

Labor Availability

Skilled crews are scarce in many markets, especially as project density in key solar regions increases.

Weather Delays

Unplanned weather shutdowns compress workable windows and push schedules into higher-risk periods.

Crew Productivity

Manual, repetitive tasks are subject to fatigue, inconsistency, and rework — all of which erode daily output targets.

Liquidated Damages

Late COD (Commercial Operation Date) triggers financial penalties that can significantly impact project returns.

The Financial Case for Speed

Installation speed is now directly tied to project financial performance. Finishing even a few weeks earlier can unlock significant value across multiple dimensions simultaneously.

- **Earlier revenue generation**
- **Better project IRR**
- **Lower labor and equipment costs**
- **Reduced financing risk**
- **Less exposure to weather delays**

- ❑ The question driving the next generation of solar construction is no longer just "How do we build this project?" — it's "How do we build this project faster and more predictably?"

Where Robotics and Installation Strategy Come In

CHAPTER 4

This is where the industry is beginning to change. The next phase of utility-scale solar construction will not be defined by any single technology — it will be defined by the integration of robotics, smarter installation sequencing, improved material flow management, data-driven production tracking, and standardized processes designed for speed and repeatability at scale. Each of these elements reinforces the others, and together they create a fundamentally different construction capability.

Robotics alone is not the solution. But **robotics combined with the right installation strategy** creates a compounding advantage across the most critical dimensions of project execution. The goal is not to replace experienced crews — the goal is to help crews do dramatically more work, faster, and more safely, especially as project sizes continue to increase and labor markets remain constrained.

⚡ Speed

Increase installation rates and hit production targets more consistently across all weather and site conditions.

🧑‍🚒 Safety

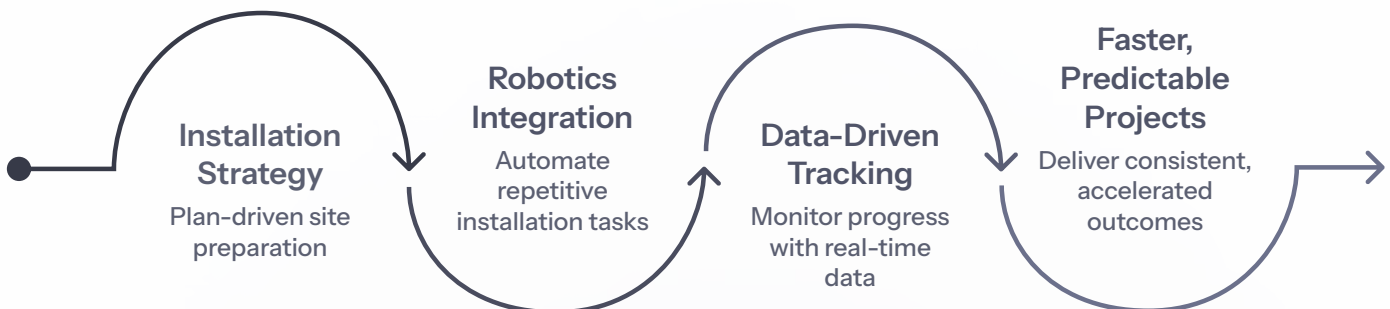
Reduce manual handling of heavy materials and repetitive strain tasks that contribute to crew injuries and fatigue.

📅 Predictability

Make schedules more reliable by reducing the variability that comes from manual, labor-intensive installation processes.

💰 Cost Control

Reduce rework, compress timelines, and lower labor requirements to protect project margins under pressure.



This integrated approach compresses overall project timelines while simultaneously reducing risk — creating a compounding financial benefit that grows with project size. As GW-scale projects become the standard, the teams that have built this capability will have a structural advantage over those still relying on traditional approaches.

What SunRobi Does

CHAPTER 5

SunRobi works with EPCs, developers, and construction teams to help improve **installation efficiency on utility-scale solar projects**. The work begins with an honest assessment of where a project stands today — its scale, its schedule, its labor plan, its site conditions, and the specific risks that are most likely to threaten on-time delivery and financial performance. From there, SunRobi helps teams identify where targeted changes to installation approach, sequencing, or technology deployment can create meaningful schedule and cost improvements.

Most conversations start simply. There's no complex onboarding process or lengthy evaluation period — just a focused discussion about the project realities that matter most to the team responsible for executing it. SunRobi brings deep experience with large-scale solar construction and a clear-eyed view of where the industry is heading, and combines that perspective with practical, project-specific recommendations that teams can act on.

How SunRobi Engages

01

Evaluate installation approaches and sequencing

Identify inefficiencies in current construction methodology and sequencing plans.

03

Support constrained labor environments

Help teams execute successfully in markets where skilled labor availability is limited.

02

Identify robotics opportunities

Pinpoint where robotic deployment can improve installation speed and reduce labor dependency.

04

Compress schedules and reduce risk

Deliver faster, more predictable project timelines that protect COD commitments and project IRR.

Start the Conversation

If you are working on large utility-scale projects and looking at ways to install faster, reduce schedule risk, or improve labor productivity, SunRobi would be happy to start a conversation.

Most discussions cover:

- Project size and schedule
- Current installation approach
- Labor plan and constraints
- Site conditions and terrain
- Key schedule risks
- Where speed improvements are possible

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