



India Solar Plant Commissioning 2026: EPC Punch Lists, Grid Sync and Handover Guide

By Sudarshan Karwee · 04 September 2026 · growthifye.com

A 2026 India-focused guide to solar plant commissioning, punch lists, grid sync, testing, handover and lender-ready EPC risk control.

India's utility-scale and C&I solar market in 2026 is no longer defined only by module choice, inverter loading ratio, or ALMM compliance. A growing share of project delay, yield underperformance and payment hold-up now sits in the last 5% of execution: commissioning, grid synchronisation, punch-list closure and final handover. That final stretch determines when revenue starts, when liquidated damages stop, when lenders release conditions subsequent, and when O&M teams inherit an asset that can actually meet P50 and P90 expectations.

For Indian developers, C&I buyers, lenders and utilities, commissioning is not a ceremonial milestone. It is the technical and contractual bridge between EPC completion and commercial operation. Poorly managed commissioning can defer COD by weeks, trigger deemed-generation disputes, increase early-life inverter trips, and leave owners with incomplete as-built records, missing test certificates and unresolved safety non-conformities.

This guide sets out a practitioner framework for solar plant commissioning in India in 2026, including pre-commissioning readiness, test sequences, grid sync approvals, common punch-list issues, acceptance metrics and handover documentation.

Why commissioning is now a major bankability issue in India

Three market shifts have made commissioning more critical in 2026.

First, projects are being built with tighter tariffs and lower execution margins. In many state and central bid corridors, discovered utility-scale tariffs remain in the broad range of about Rs 2.45-3.20/kWh depending on location, transmission profile, hybridisation and offtake structure. In C&I open-access markets, delivered solar tariffs often need to land near Rs 3.2-4.8/kWh equivalent depending on state wheeling, banking, CSS and AS charges. At these levels, even a 15-30 day COD delay can materially affect project IRR.

Second, utilities and SLDC/STU/DISCOM interfaces have become more procedural. Synchronisation approvals, relay settings, metering compliance, SCADA visibility and forecasting integration are receiving closer scrutiny, especially for larger plants and pooling-station-connected assets.

Third, lender diligence has become more data-driven. Independent engineers increasingly want signed FAT/SAT records, relay test reports, I-V curve traces, thermography records, earthing measurements, protection coordination submissions and documented closure of category A defects before certifying milestone completion.

In practice, a plant can be mechanically complete yet commercially fragile. Tables are erected, modules are mounted and inverters are powered up, but missing interlocks, poor terminations, incomplete protection settings or weak document control can still block revenue.

What “ready for commissioning” should mean on a real EPC site



Many sites claim pre-commissioning readiness too early. A disciplined readiness gate should include engineering closure, physical completion, quality clearance and permit alignment.

At minimum, the following should be complete before energisation planning starts:

- Approved single-line diagrams, protection philosophy and final equipment datasheets
- Latest approved GA drawings and cable schedules reflecting site changes
- Mechanical completion of module mounting, string dressing, SCBs, inverter stations, transformers, HT yard and transmission interface within EPC scope
- Internal quality release for civil, structural, electrical and control works
- Earthing grid installation and test readings within design requirement
- IR testing, continuity checks and polarity verification completed for DC circuits
- Transformer oil test reports, vector group confirmation and pre-energisation checks
- Protection relays configured, secondary injection tested and settings approved by relevant authority where applicable
- ABT/SEM or net-metering meters installed, sealed or ready for utility verification, depending on project type
- SCADA, weather station, data logger, PPC and remote communication links configured
- Fire protection, access control, signage and statutory safety provisions completed

On Indian sites, one common mistake is to compress pre-commissioning because module erection finished on time while the HT and controls package is lagging. That creates idle labour, repeated shutdowns and rushed energisation.

A stronger approach is to manage commissioning through area-wise system completion. For example:

- DC field completion by block or inverter station
- Inverter and LV/MV package completion by bay
- Transformer and RMU/HT panel readiness by evacuation segment
- SCADA and PPC readiness in parallel with electrical package completion

This is where structured [Procurement & vendor management](/coreservices/epc/procurementandvendormanagement) and [QA/QC & HSE enforcement](/coreservices/epc/qaqcandhseenforcement) become commercially valuable, not administrative overhead.

Commissioning sequence for Indian solar projects in 2026

The commissioning path differs slightly across rooftop, captive, open-access and utility-scale assets, but the technical logic is broadly similar.

A practical sequence is:

- Document readiness review
- Mechanical completion certification by system
- DC pre-commissioning tests
- Inverter/LV panel checks
- Transformer and HT system checks



- Relay testing and protection verification
- SCADA/PPC/metering integration
- No-load energisation
- Block-wise synchronisation
- Trial run and performance observation
- Punch closure for critical defects
- Provisional acceptance or COD certification
- Final handover package and O&M takeover

For DC systems, teams should verify string count, polarity, insulation resistance, open-circuit voltage consistency and connector integrity. With modern high-current modules and larger string currents, MC4-compatible connector mismatch remains an underrated risk. Even when connectors appear to mate, long-term heating and contact resistance can create failures. Thermography during early generation hours is essential.

For inverter commissioning, checks should include:

- Firmware version and approved settings
- DC input mapping by MPPT
- AC voltage and phase sequence
- Anti-islanding settings as per utility requirement
- Reactive power and power factor control capability
- LVRT/HVRT settings if required by interconnection code or utility instruction
- Harmonic performance and communication with SCADA/PPC

For transformers and HT systems:

- Winding resistance, IR, ratio test and oil BDV where applicable
- Marshalling box checks and alarms
- OLTC functionality if installed
- CT/PT polarity and ratio verification
- Breaker timing, interlocks and annunciation checks
- Earthing continuity across all major equipment

On larger projects, block-wise synchronisation can start before the entire plant is complete, but only if export metering, protection boundaries and utility approvals support that configuration.

Utility approvals, grid synchronisation and the real causes of COD delay

In India, many EPC schedules underestimate the external dependency chain. The internal construction team may be ready, but grid sync can still slip due to utility-side process gaps.

Common delay points in 2026 include:

- Pending approval of relay settings by STU/DISCOM/SLDC interface teams
- Mismatch between installed metering arrangement and approved interconnection drawing
- Communication failure between plant SCADA/PPC and utility remote terminal requirements



- Incomplete transmission line or bay readiness outside the main EPC package
- Delays in CEIG or state electrical inspector approvals where applicable
- Unresolved harmonic or reactive-power compliance issues during witness tests
- Protection trip during first energisation due to CT polarity, incorrect relay logic or auxiliary supply instability

For open-access and utility-scale projects, PPC tuning has become more important. Grid operators increasingly expect stable active and reactive power control, voltage regulation response and forecasting-data interface readiness. A plant that can generate but cannot reliably follow dispatch or reactive setpoints may face synchronisation friction.

Project owners should lock a utility-interface matrix at least 60-90 days before planned synchronisation. That matrix should assign each approval, witness test, document submission and physical dependency to a named party with target dates.

This is particularly important where evacuation infrastructure is split across multiple contracts. A frequent failure mode is the solar EPC team reaching readiness while the bay extension, transmission line, or utility metering package is still unfinished. In such cases, mechanical completion without energisation becomes an expensive limbo.

The punch list: what matters, what can wait, and what should block handover

Not all punch points are equal. A disciplined owner and lender should classify defects before deciding COD or takeover.

A useful three-tier classification is:

- Category A: safety, protection, statutory or generation-critical defects that must block energisation or acceptance
- Category B: reliability or maintainability defects that may allow provisional acceptance with deadline-bound closure
- Category C: cosmetic or minor documentation items that do not affect safe operation

Typical Category A defects:

- Missing or failed earthing continuity
- Relay settings not matching approved protection scheme
- Hot spots in terminations or connectors
- Incomplete fire protection or unsafe access at inverter/HT areas
- SCADA blind spots on critical alarms or breaker status
- Inverter trips due to unresolved grid-compliance settings
- Water ingress in JB/SCB/inverter kiosks

Typical Category B defects:

- Incomplete cable tagging or ferruling
- Minor trench or route restoration pending
- Spares inventory not fully handed over
- Non-critical SCADA dashboards pending final formatting



- Some as-built drawings not yet consolidated

Typical Category C defects:

- Paint touch-up
- Non-critical signage alignment
- Housekeeping closeout in non-operational areas

In 2026, owners should resist the habit of accepting broad “balance work” language in handover certificates. Every punch item should carry location, photo evidence, responsible party, material status, target closure date and commercial linkage if retention money is involved.

Testing and acceptance metrics that owners and lenders should insist on

A robust acceptance regime is measurable. It should not rely only on EPC declarations.

For utility-scale and larger C&I plants, owners should seek a structured dossier covering:

- String and block-wise test records
- Inverter SAT reports
- Transformer and switchgear test certificates
- Protection relay setting sheets and test reports
- Meter calibration and sealing records as applicable
- SCADA point list verification and communication test records
- Weather station calibration records
- Thermography reports for DC and AC terminations
- I-V curve traces or equivalent string health sampling strategy
- Earthing resistance test reports at representative and critical points
- Trial run generation and availability logs

Acceptance metrics should be aligned with project design and contract language. Typical examples in India include:

- Plant availability during trial operation above 98%, excluding approved grid outages
- No unresolved Category A punch points at provisional acceptance
- Measured AC capacity and equipment ratings consistent with contract
- SCADA data completeness above 99% for critical operational points during trial period
- Specific generation during trial consistent with irradiance and seasonal expectation, allowing for weather variation
- Auxiliary consumption within design expectation

Owners should also separate “commissioned” from “optimised.” It is common for a plant to synchronise successfully while PPC tuning, tracker backtracking refinement, inverter clipping analysis or SCADA analytics still need adjustment. The O&M ramp-up plan should explicitly capture these post-COD optimisation items.

Where Growthifye supports [Solar & hybrid plant EPC](/coreservices/epc/solarandhybridplantepc) and Testing, commissioning & handover, the objective should be first-time-right energisation, evidence-based acceptance and a clean transfer into stable operations rather than rushed milestone chasing.



Documentation, O&M takeover and early-life reliability in the first 180 days

The biggest hidden cost after COD is incomplete knowledge transfer. Plants that begin operation with weak handover records often face longer outages, warranty claim disputes and poor root-cause analysis.

The final handover package should include:

- AFC and as-built drawings with revision control
- OEM manuals and warranty certificates
- Bill of materials and approved makes list
- Spare parts list and minimum critical inventory recommendation
- All FAT, SAT and field test reports
- Protection settings, logic diagrams and change logs
- SCADA architecture, tag list, IP plan and user credentials under controlled transfer
- Preventive maintenance schedule for all major equipment
- Module flash data and serial number mapping where contractually applicable
- Training records for owner/O&M personnel
- Open warranty-claim tracker, if any defects remain under monitored closure

The first 90-180 days should be treated as a stabilisation window. Performance review should focus on:

- Inverter trip frequency by root cause
- Grid outage and curtailment logging
- Block-wise PR comparison to identify hidden defects
- Tracker alignment or mechanical settling issues, where applicable
- Early hot spots in connectors, lugs, busbars and fuse holders
- SCADA data loss and communication integrity
- Auxiliary transformer and station service stability
- Drainage and monsoon resilience for cable trenches, inverter pads and control rooms

This early-life review is especially valuable before peak summer and monsoon cycles. Many latent issues only become visible under thermal stress or heavy rainfall.

A practical 2026 takeaway for Indian solar stakeholders

In India's 2026 solar market, commissioning is where engineering discipline meets commercial reality. A plant that misses synchronisation by 20 days, trips repeatedly in its first month, or enters operation with incomplete test evidence can lose far more value than was "saved" by hurrying the finish.

Developers should manage commissioning as a structured workstream from day one, not an end-stage activity. C&I consumers should insist on acceptance criteria tied to safety, data and actual operability. Lenders should examine not just construction progress but the quality of system completion and handover evidence. Utilities benefit when projects arrive with clean relay coordination, compliant metering and stable PPC behaviour.

The projects that perform best are usually not those with the fastest mechanical completion, but those with the cleanest readiness discipline, witness-tested systems, controlled punch closure and complete O&M transfer.



If you are planning a new solar or solar-plus-storage asset and want a bankable commissioning and handover strategy, contact Growthifye's advisory desk for project-specific support on EPC risk, utility interface, acceptance testing and commercial readiness.

Explore Growthifye's related capabilities

This analysis connects directly to our advisory practice: [Solar & hybrid plant EPC](/coreservices/epc/solarandhybridplantepc) · [BESS system integration](/coreservices/epc/besssystemintegration) · [Balance of system & civil works](/coreservices/epc/balanceofsystemandcivilworks) · [Procurement & vendor management](/coreservices/epc/procurementandvendormanagement).

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