Open Access PPA Settlement Models in India 2026: Pay-as-Consumed vs Pay-as-Generated

By Sudarshan Karweer · 17 September 2026 · growthifye.com

A 2026 guide to OA PPA settlement models in India: pay-as-consumed vs pay-as-generated, charges, deviations, banking and landed cost.

India's open access market is no longer just about getting the lowest quoted solar or wind tariff. In 2026, one of the most material decisions for C&I buyers is the settlement model written into the PPA and mirrored through scheduling, SLDC processes, balancing arrangements and retail-supply fallback. The same project can look attractive under a headline tariff of Rs 3.20-3.80/kWh and still underperform if the consumer has not matched contract structure with load shape, state banking rules, deviation exposure and supplemental grid purchase cost.

For many buyers, the real commercial debate is no longer only third-party versus group captive. It is pay-as-generated versus pay-as-consumed, and in some cases hybrid or banded settlement variants. This choice influences monthly billing certainty, deemed offtake expectations, imbalance treatment, procurement of top-up power, and lender comfort on receivables. It also changes the landed cost by 40-120 paise/kWh in practical cases, sometimes more in states with weak banking provisions or expensive HT retail fallback.

This article explains how these settlement models work in Indian open access PPAs in 2026, where the economics diverge, and what corporates, developers and lenders should test before signing.

Why settlement model matters more in 2026

Several 2026 realities have made settlement structure more important than in earlier contracting cycles.

- State banking rules remain uneven, with monthly, intra-day or no-banking frameworks depending on state and technology.
- Additional surcharge in many states has reduced from peak levels but still materially affects third-party open access landed cost.
- CSS, wheeling, transmission and losses continue to vary by voltage level, consumer category and whether supply is intra-state or inter-state.
- DSM discipline has tightened operationally, even where direct pass-through treatment differs by contract.
- C&I buyers are increasingly signing larger portfolios across multiple plants and multiple states, raising complexity in forecasting and balancing.
- Many buyers now compare renewable open access not only against base HT tariff, but against ToD-linked retail rates and internal carbon targets.

In this environment, the commercial outcome depends on how generated energy is allocated, who bears shortfall and surplus risk, and what happens when the renewable plant profile does not match the buyer's load.

The two core models: pay-as-generated and pay-as-consumed

At a high level, the distinction is simple.

Pay-as-generated means the buyer pays for actual energy generated and delivered under the open access arrangement, subject to meter readings, losses and applicable scheduling rules. If the plant generates 1 million kWh in a month and the buyer can absorb it through OA, billing is based on that generation or delivered schedule quantity, depending on the contract architecture.

Pay-as-consumed means the buyer is billed only for renewable energy actually consumed against its load, often with a balancing supplier or contractual mechanism stepping in to shape delivery closer to the load curve. In effect, the buyer pays for usable consumption rather than raw renewable output alone.

In practice, Indian PPAs use more nuanced versions.

- Pure pay-as-generated, as-generated injection with buyer taking scheduling mismatch risk
- Pay-as-generated with developer-backed forecasting and some deemed scheduling discipline
- Pay-as-consumed with balancing by trader, affiliate or discom-backed arrangement
- Fixed volume band or minimum offtake model with periodic true-up
- Time-block linked structures where different settlement rules apply in solar hours, non-solar hours or peak blocks

The commercial implications are significant.

Under pay-as-generated, the tariff is usually lower because the buyer absorbs intermittency and shape mismatch. Under pay-as-consumed, the all-in renewable supply price is usually higher because somebody must manage balancing energy, forecasting error, top-up supply and residual sale of excess energy.

How the economics differ on the ground

Consider a Maharashtra or Karnataka C&I consumer with a daytime-heavy industrial load of 4 MW average and annual consumption around 30-35 million kWh. Assume a solar OA project quotes Rs 3.35/kWh ex-busbar equivalent in a third-party structure. Add wheeling, transmission where applicable, SLDC fees, losses gross-up and open access charges. The delivered renewable unit may already land near Rs 4.15-4.60/kWh depending on configuration.

Now the settlement model starts to matter.

Case 1: Pay-as-generated solar PPA

- Plant CUF: 22%
- Monthly variability: high across monsoon and winter periods
- Buyer daytime load absorption: 75-90% in solar hours, lower on holidays and maintenance days
- Banking: limited monthly banking or no banking credit for some periods
- Excess injection settlement: low feed-in compensation or forfeiture risk depending on state rules and contract drafting
- Shortfall energy: purchased from discom at HT tariff or via separate market supply

In this structure, the buyer may enjoy low renewable tariff on absorbed units, but blended landed cost depends on two expensive leakages:

- surplus energy with low value
- shortfall energy bought at retail or market-linked rates

For a buyer with poor solar-hour demand alignment, effective landed cost can rise by 50-90 paise/kWh over the simple delivered OA tariff. If the retail top-up rate is Rs 7.00-9.50/kWh and 15-25% of load still comes from grid supply during mismatch blocks, the portfolio economics can deteriorate quickly.

Case 2: Pay-as-consumed solar supply with balancing

- Contracted price may be Rs 4.60-5.40/kWh depending on state, balancing source and tenor
- Buyer pays for actual renewable-linked consumed units under a shaped structure
- Balancing counterparty manages top-up and excess disposition
- Monthly invoice predictability improves
- Curtailment, forecasting and DSM allocation are usually clearer in the supply stack

Here the tariff headline is higher, but the buyer may avoid surprise top-up costs and may reduce stranded surplus. For a load with variable operations, weekend shutdowns or multiple-meter complexity, this model often produces a lower effective annual cost despite a higher contracted energy price.

This is why experienced buyers compare not tariff, but landed cost under realistic quarter-hour or 15-minute load and generation simulations. Growthifye's [Demand & ToD analysis](/coreservices/greenenergyppa/demandandtodanalysis) and Landed-cost management workstreams are particularly relevant here because shape mismatch, not tariff alone, is frequently the hidden value driver.

Banking, deviations and top-up supply: the hidden cost stack

Settlement model evaluation in 2026 must go beyond visible OA charges.

First, banking. Even where banking is permitted, key variables include:

- banking period: monthly, seasonal or restricted
- banking charge: often 6% to 10% or state-specific monetary charge
- peak-hour restrictions
- treatment of unutilised banked units at month-end or year-end
- whether energy is netted before or after certain losses or charges

A pay-as-generated model benefits more from liberal banking because surplus daytime injection can be monetised through later consumption. A pay-as-consumed model is less dependent on banking because balancing is embedded or separately managed.

Second, deviations and forecasting risk. Under as-generated structures, error in scheduling or actual offtake mismatch can lead to indirect costs through balancing actions, UI-like commercial adjustments, or pass-through of aggregator and trader charges. The legal allocation of these costs varies materially by PPA.

Third, top-up supply. This is often the most underestimated component in boardroom comparisons.

Ask three practical questions:

- When renewable output is below load, who procures the deficit energy?
- At what tariff formula: discom retail, exchange-linked, trader-arranged fixed adder, or pass-through actuals?
- Does the buyer retain freedom to source residual power separately?

If top-up is unstructured, a buyer may compare OA energy at Rs 4.30/kWh against retail at Rs 8.20/kWh and assume savings, while ignoring that 20-30% of annual consumption may continue at expensive fallback rates. That can make the weighted cost materially higher than expected.

Which consumers are better suited to each model

Pay-as-generated is generally more suitable when:

- the buyer has steady daytime load with high coincidence to solar generation
- holiday shutdowns are limited
- banking is reasonably workable in the state
- internal energy team can manage scheduling and settlement complexity
- the buyer can tolerate some monthly invoice variability
- there is an existing strategy for market-based top-up or portfolio balancing

Typical examples include continuous process industries, large manufacturing plants with stable daytime demand, and multi-meter campuses able to aggregate coincident daytime load.

Pay-as-consumed is generally more suitable when:

- the buyer's load is volatile or seasonal
- weekend and holiday generation mismatch is high
- multiple facilities have uneven consumption patterns
- management prioritises budget certainty over the lowest headline tariff
- there is weak state banking support
- the buyer wants single-window accountability for balancing and renewable delivery

This is often relevant for commercial real estate portfolios, data-backed manufacturing with variable shifts, food processing, electronics, pharma sites with changing batch cycles, and corporate portfolios spread across several meters.

For lenders, pay-as-consumed contracts can support stronger receivables predictability if the balancing stack is credible and the counterparty chain is robust. But they also require careful assessment of back-to-back power supply arrangements and the credit quality of balancing providers.

Key clauses that decide value, not just tariff

Two PPAs with the same contracted price can produce very different outcomes depending on drafting. In 2026, decision-makers should scrutinise at least the following clauses.

- Definition of delivered energy: generated, scheduled, injected, wheeled or consumed
- Meter hierarchy: plant meter, CTU/STU interface, discom meter, consumer meter
- Loss allocation: who bears transmission and wheeling losses, and how they are grossed up
- Curtailment treatment: grid curtailment versus commercial curtailment by buyer
- Must-run references and compensation language where applicable
- Forecasting and scheduling responsibility
- DSM, imbalance and penalty pass-through mechanics
- Banking use, expiry and settlement value of unutilised energy

- Top-up supply terms and fallback tariff methodology
- Force majeure carve-outs for evacuation and grid events
- Change-in-law treatment for OA charges, CSS, AS, transmission and banking rules
- Consequences of meter outage, SLDC dispute or discom denial of adjustment

One recurring issue in negotiations is ambiguity around deemed offtake. Developers often seek stronger payment assurance on generated energy. Buyers seek protection against paying for energy they cannot use due to state-level operational constraints or poor scheduling. The middle ground is not a generic compromise clause; it is a clearly engineered settlement design tied to state rules, load pattern and balancing strategy.

This is where PPA structuring & negotiation matters more than a simple tariff tender. In several mandates, a 10-20 paise/kWh tariff concession has been less valuable than a well-negotiated surplus-settlement and top-up framework.

A practical evaluation framework for 2026 procurement

Before launching a procurement or signing a term sheet, buyers should run a structured model.

Step 1: Map 15-minute load shape by meter and season

At least 12 months of interval data should be analysed for weekday, weekend, shutdown and peak-season patterns.

Step 2: Simulate renewable output by technology and location

Use realistic CUF, degradation, monsoon variability and evacuation assumptions rather than P50 annual averages alone.

Step 3: Apply state-specific charge stack

Include CSS, additional surcharge where applicable, wheeling, transmission, losses, banking charges, SLDC fees, standby or parallel charges if relevant, and taxes or duties where they affect delivered cost.

Step 4: Model settlement alternatives

Compare pay-as-generated and pay-as-consumed under at least base, adverse and high-variability scenarios.

Step 5: Price residual supply correctly

Top-up should be valued at actual likely procurement cost, not assumed low market averages unless a firm arrangement exists.

Step 6: Stress-test regulatory change

Open access economics can shift if banking rules tighten, surcharge methodology changes, or eligibility thresholds and approvals are delayed.

Step 7: Tender with commercial comparability

Bid formats should force developers and suppliers to quote on a like-for-like basis. Otherwise one bidder may appear cheaper only because costs are left outside the headline tariff.

This is why serious C&I buyers increasingly need [Sourcing strategy](/coreservices/greenenergyppa/sourcingstrategy) and [Competitive developer selection](/coreservices/greenenergyppa/competitivedeveloperselection) disciplines rather than only tariff

discovery.

What policymakers and utilities should note

Settlement-model friction is not just a private contracting issue. It affects system integration, curtailment exposure, customer migration quality and dispute volume.

Policymakers can improve market efficiency by:

- standardising definitions for delivered energy and settlement points
- clarifying banking treatment and expiry rules
- improving visibility on OA charge revisions
- enabling transparent balancing-supply frameworks
- reducing ambiguity in curtailment and meter-adjustment processes

Utilities also benefit when OA consumers adopt better-matched settlement models. Poorly designed as-generated contracts often create avoidable disputes around adjustment, standby dependence and billing reconciliation. Better contract design leads to more predictable residual demand and fewer contested invoices.

The 2026 bottom line

The right settlement model can matter as much as the right project tariff. Pay-as-generated can be the lowest-cost route for consumers with strong daytime demand alignment, workable banking and internal capability to manage shape risk. Pay-as-consumed can produce superior annual economics for buyers with variable load, weak banking support or a need for invoice certainty and single-window balancing.

In 2026, the winning open access strategy is not the cheapest quoted PPA. It is the contract structure that minimises delivered cost after charges, losses, mismatch, top-up power and regulatory friction are fully accounted for.

If your organisation is evaluating open access supply, corporate PPA design or a multi-site procurement, contact Growthifye's advisory desk. We can support commercial modelling, contracting strategy and execution from state-rule assessment through landed-cost evaluation and counterparty selection.

Explore Growthifye's related capabilities

This analysis connects directly to our advisory practice: [Demand & ToD analysis](/coreservices/greenenergyppa/demandandtodanalysis) · [Sourcing strategy](/coreservices/greenenergyppa/sourcingstrategy) · [Competitive developer selection](/coreservices/greenenergyppa/competitivedeveloperselection) · [PPA structuring & negotiation](/coreservices/greenenergyppa/ppastructuringandnegotiation).

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