India Net Zero 2026: MACC, Electrification and Green Hydrogen for Industry

By Sudarshan Karweer · 29 August 2026 · growthifye.com

A 2026 practitioner guide for Indian industry on MACC, electrification, green hydrogen and RE-led net zero strategy.

India's industrial net-zero plans are entering a more disciplined phase in 2026. The shift is clear: boards, lenders and export-facing manufacturers are moving beyond broad emissions statements toward plant-level, costed decarbonisation pathways. The key reason is simple. Carbon now affects operating cost, market access, disclosure quality and future competitiveness at the same time.

For Indian commercial and industrial energy consumers, the right question is no longer whether to decarbonise. It is where to start, what to do first, what to defer, and how to sequence capital so that emissions reduction does not damage margins. For renewable developers, utilities, lenders and policymakers, the same question appears in another form: which interventions can scale fastest in Indian conditions while staying bankable?

A practical answer usually starts with a marginal abatement cost curve, or MACC. When built properly, a MACC ranks decarbonisation options by cost per tonne of CO2e avoided, capital intensity, implementation risk and deployment timeline. It helps management distinguish no-regret actions from long-gestation bets. In India's 2026 context, this matters because industrial decarbonisation is no longer driven by one policy or one technology. It sits at the intersection of power tariffs, open-access economics, BRSR Core disclosures, export compliance, domestic carbon-market readiness, lender diligence and technology maturity.

This article focuses on a distinct angle: how Indian industry can use MACC thinking to prioritise three big levers in 2026, namely industrial electrification, RE-led Scope 2 reduction and selective green hydrogen for hard-to-abate processes. That sequence is where most near-term value sits.

Why MACC matters more in India in 2026

Many Indian manufacturers still assess decarbonisation options in silos: rooftop solar as an energy project, energy efficiency as an OPEX-saving exercise, hydrogen as a future innovation topic, and carbon reporting as a compliance task. That structure leads to poor capital allocation. A MACC approach integrates these into one financial and operational decision framework.

In practice, the MACC for an Indian industrial site should compare at least the following:

- Annual tCO2e abatement by measure
- Upfront capex and replacement capex
- Change in annual energy cost
- Delivered energy price by source in Rs/kWh, Rs/tonne steam, Rs/MMBtu or Rs/kg fuel equivalent
- Operational constraints such as downtime, quality impact, temperature requirement and load profile
- Implementation timeline and permitting risk
- Interaction with Scope 1, 2 and 3 inventories
- Exposure to disclosure, export and domestic carbon-pricing mechanisms

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This is especially relevant because Indian industrial tariffs remain structurally uneven. In many states, grid tariffs for HT consumers in 2026 can still land in the range of roughly Rs 6.5-9.5/kWh depending on category, time-of-day structure, demand charges and electricity duty. By contrast, open-access solar or solar-wind hybrid supply for strong offtakers can still be structured in a broad range of around Rs 4.0-5.5/kWh on a landed basis, though final economics vary by state wheeling charges, banking rules, cross-subsidy surcharge treatment and scheduling profile. RTC or firmed renewable supply is naturally higher, often materially so, depending on storage, balancing and contract design.

That price spread means Scope 2 reduction is not just an emissions story. It is often a cost story. But it must be mapped against process electrification and thermal fuel substitution choices. A boiler, furnace or dryer conversion can increase power demand sharply. If the electricity source is poorly structured, the project may raise cost even while lowering emissions.

Build the MACC from process heat upward, not from disclosures downward

A common mistake is to begin with the emissions inventory and jump straight to target setting. The better route for industry is to begin with energy and process mapping, then translate that into emissions and target pathways.

For most Indian heavy and mid-market industries, the core sequence looks like this:

- Map electricity loads by process, shift and season
- Map thermal loads by temperature band
- Segment fuels: grid electricity, captive power, coal, petcoke, furnace oil, HSD, LPG, PNG, biomass and steam purchases
- Identify process-specific constraints: product quality, ramp rates, contamination risk, redundancy requirements
- Establish current emission factors, costs and specific energy consumption
- Screen abatement levers and rank them using a site-specific MACC

The temperature-band view is crucial. Low- and medium-temperature heat can often be electrified earlier than companies assume. Technologies such as industrial heat pumps, electric boilers, electrode boilers, induction systems and electric dryers can address a meaningful share of thermal demand in sectors such as food processing, textiles, chemicals, pharmaceuticals, dairy and parts of light engineering. The economics are highly site-specific, but the technology question is usually easier than the power-sourcing question.

For higher-temperature applications, the picture changes. Cement, steel, ceramics, glass, some chemicals and refining-related processes face harder substitution choices. Here, efficiency, waste heat recovery, fuel switching, material substitution and selective use of hydrogen-derived fuels may matter more than direct electrification in the near term.

This is where [Net-zero roadmaps & MACC](/coreservices/netzerodecarbonisation/netzeroroadmapsandmacc) becomes a practical board tool rather than a presentation exercise. A good roadmap should not promise every technology at once. It should identify which measures are negative cost, which are low-cost with short payback, which depend on policy support, and which should be piloted rather than scaled.

No-regret measures in 2026: efficiency plus RE-led Scope 2 reduction

For many Indian plants, the left side of the MACC still contains the cheapest tonnes to abate. These often include:

- Motor system optimisation and VFD retrofits
- Compressed-air leakage control and pressure optimisation
- Steam-system insulation, condensate recovery and trap maintenance
- Waste heat recovery where thermal profiles allow
- Chiller and HVAC optimisation in process-linked facilities
- Demand management and power-factor correction
- RE procurement through rooftop, group captive, third-party open access or utility green tariff where viable

These actions are not new, but 2026 conditions make them more strategic. First, renewable procurement can materially reduce Scope 2 emissions and often lower delivered power cost. Second, better load management improves the economics of electrification later. Third, disclosure regimes are pushing companies to explain not just targets but implementation evidence.

For a large C&I consumer, renewable procurement structure matters as much as tariff. Rooftop solar remains useful for daytime self-consumption but is usually insufficient for large industrial loads. Group captive and third-party open access remain the main pathways for deeper penetration, subject to state policy. Storage-backed structures and hybrid PPAs are increasingly relevant for consumers with evening peaks or high reliability requirements, though they require careful landed-cost analysis.

Companies should model at least three scenarios:

- Minimum-risk scenario with partial renewable penetration and no major process changes
- Cost-optimised scenario with deeper open-access renewable sourcing and selected flexibility measures
- Net-zero-aligned scenario that also prepares for electrification of thermal loads and future green-fuel integration

This is the point at which [RE-led decarbonisation](/coreservices/netzerodecarbonisation/releddecarbonisation) and Industrial efficiency & electrification need to be designed together. If they are handled separately, the plant may procure renewables for today’s load while ignoring tomorrow’s load shift from fossil heat to electricity.

Industrial electrification: where economics are already workable

Electrification is often discussed as a future pathway, but in 2026 it is already commercially relevant in selected use cases. The critical screen is not ideology; it is temperature, duty cycle, tariff structure and renewable-power access.

Applications with comparatively stronger near-term potential include:

- Electric boilers for specific steam applications where power cost is competitive and emissions reduction is valued
- Heat pumps for low- and medium-temperature process heat, hot water and drying applications
- Induction and resistance heating in metalworking and precision processes
- Electric forklifts and intra-plant mobility systems replacing diesel or LPG in logistics-intensive facilities
- Electrified utility systems paired with demand-response and thermal storage

In many cases, the direct energy-cost comparison between PNG and electricity will not by itself justify conversion. But the business case can still work when companies account for maintenance savings, better controllability, improved product quality, reduced local air pollution, lower carbon intensity under renewable supply, and future carbon-cost exposure.

A simple example illustrates the point. If a process can be shifted from a fossil thermal system to an electric system with a coefficient of performance above 2 in the case of heat pumps, the effective delivered heat cost may become attractive even if grid power appears expensive. If that electricity is partially met through open-access renewable supply, the economics improve further. Conversely, direct resistance heating for high-load applications can become expensive unless paired with low-cost power and operational flexibility.

Therefore, electrification should be screened process by process, not announced at enterprise level without engineering diligence.

Green hydrogen: important, but only for the right tonne of CO2e

Green hydrogen has a real role in India's industrial decarbonisation story, but 2026 is the year to become selective. Too many strategies still place hydrogen at the centre of near-term plans even where cheaper abatement options remain unaddressed.

In today's market, delivered green hydrogen cost in India remains highly sensitive to renewable-power price, electrolyser utilisation, water treatment, financing cost and logistics. While some pilot or cluster-based cases are advancing, the fuel is still generally too expensive for broad fuel substitution in many conventional industrial heat applications unless supported by strong policy incentives, premium product positioning, blending mandates or export-linked value capture.

That said, hydrogen deserves serious attention in hard-to-abate segments where alternatives are weak. These include:

- Feedstock substitution in ammonia and selected chemical pathways
- High-temperature thermal applications where direct electrification is technically difficult
- Iron and steel pathways that may progressively adopt hydrogen-based reduction in specific configurations
- Refineries and industrial clusters where hydrogen demand already exists and grey replacement opportunities can be staged

The correct MACC treatment for hydrogen in 2026 is usually one of three categories:

- Pilot now, scale later
- Use only in niche hard-to-abate processes
- Monitor until renewable-power, electrolyser and policy conditions improve

This is also where Green fuels transition should connect with infrastructure reality. On-site production, tube-trailer supply, pipeline access, storage, safety systems and offtake certainty all affect project viability. Hydrogen should not be treated as a standalone branding decision. It is a systems decision.

Financing and lender diligence: what gets funded in 2026

Lenders and investors are becoming more rigorous on industrial decarbonisation claims. They increasingly ask whether emission reduction is measurable, whether savings are durable, and whether the intervention improves resilience under policy and market stress.

Projects that tend to pass diligence more easily include:

- Renewable-procurement structures with clear tariff advantage and contracted offtake
- Efficiency upgrades with proven baselines and short payback
- Electrification measures backed by detailed engineering, load studies and power-supply strategy
- Cluster-based low-carbon fuel projects with visible offtake and infrastructure planning

Projects that face tougher scrutiny include broad net-zero commitments without capex phasing, hydrogen concepts without demand certainty, and decarbonisation plans that rely on future market instruments without internal abatement readiness.

For boards and CFOs, the message is practical: treat decarbonisation as a portfolio. Use low-cost and negative-cost measures to create headroom. Use renewable sourcing to lock in competitive power where possible. Then deploy capex into the highest-confidence electrification opportunities. Reserve hydrogen and other advanced fuels for the process steps that truly need them.

A 2026 action plan for Indian industry

A realistic industrial decarbonisation programme for the next 12-24 months should include six workstreams.

- Establish a verified emissions and energy baseline across Scope 1 and 2, and the most material Scope 3 categories
- Build a plant-level MACC with technical, financial and implementation filters
- Secure a renewable-power strategy based on state policy, load profile and contractability
- Screen thermal processes for electrification by temperature band and operating pattern
- Identify hard-to-abate applications where hydrogen or other green fuels merit pilot evaluation
- Put in place MRV systems that can support disclosures, lender diligence and future market participation

The winners in 2026 will not be the companies with the loudest net-zero claims. They will be the ones that know their cost per avoided tonne, can defend their assumptions to lenders and auditors, and can phase projects without disrupting production.

For Indian industry, net zero is now an engineering and capital-allocation challenge, not a slogan. MACC-led planning provides the discipline. Renewable procurement provides the first major lever. Electrification provides the next wave where process conditions allow. Green hydrogen remains essential, but mainly for the genuinely hard-to-abate tonne.

If your organisation is evaluating plant-level abatement options, renewable sourcing, electrification economics or hydrogen readiness, contact Growthifye's advisory desk. We can help structure a practical decarbonisation pathway covering [Carbon accounting & disclosure](/coreservices/netzerodecarbonisation/carbonaccountinganddisclosure), Net-zero roadmaps & MACC, and implementation-ready investment priorities.

Explore Growthifye's related capabilities

This analysis connects directly to our advisory practice: [Carbon accounting & disclosure](/coreservices/netzerodecarbonisation/carbonaccountinganddisclosure) · [Net-zero roadmaps & MACC](/coreservices/netzerodecarbonisation/netzeroroadmapsandmacc) · [RE-led decarbonisation](/coreservices/netzerodecarbonisation/releddecarbonisation) · [Industrial efficiency & electrification](/coreservices/netzerodecarbonisation/industrialefficiencyandelectrification).

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