



U.S. STEEL INDUSTRY UPDATE

More Efficient, Lower-Emissions Steelmaking

The defining U.S. steel story of 2026 is not the end of decarbonization. It is the replacement of a single-track “green steel” narrative with a portfolio of investments judged by energy use, emissions intensity, product capability, raw-material security and commercial readiness.

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Executive summary

The U.S. steel industry's decarbonization path became both clearer and more complicated in 2026. The market is still moving toward lower-emissions steelmaking, but it is doing so through a mix of practical routes rather than a single leap to hydrogen-based ironmaking.

Cleveland-Cliffs' decision to rescope Middletown Works is the year's most consequential signal. A project once positioned around a hydrogen-ready direct-reduced-iron plant and electric melting furnaces is now a \$1 billion program centered on the existing blast furnace, advanced material handling, AI-enabled controls and cogeneration using recovered blast-furnace gas. At the same time, U. S. Steel under Nippon Steel is committing \$1.9 billion to natural-gas DRI beside Big River's EAFs; Hyundai Steel and POSCO have broken ground on a \$5.8 billion DRI-EAF sheet complex in Louisiana; Nucor is nearing production at a \$4 billion, three-million-ton sheet mill in West Virginia; and Hybar is financing a second Arkansas rebar mill after bringing its first mill to positive cash flow within months.

Taken together, these decisions do not say that emissions no longer matter. They say that capital is demanding pathways that also improve cost, reliability, quality and domestic supply security. In the United States, the emerging transition model is increasingly EAF steelmaking supplied by scrap and natural-gas DRI, cleaner electricity, selective carbon capture and practical efficiency improvements—while hydrogen remains a future option rather than the near-term foundation.

1. Why the framing should change

“Green steel” was useful shorthand when the industry was trying to distinguish transformational projects from business as usual. It has become less useful as a catch-all. The term can blur fundamentally different claims: a physical reduction in furnace emissions, an EAF product with high recycled content, renewable-electricity procurement, an attributed product claim, or a future plant designed to accept hydrogen.

For this update, the better frame is more efficient, lower-emissions steelmaking. It keeps the focus on measurable outcomes and makes room for the actual U.S. investment landscape: new EAF capacity, natural-gas DRI, blast-furnace optimization, CCS, biocarbon, product-level carbon accounting and next-generation electrochemical or electrically heated processes.

2. The 2026 capital map

Cleveland-Cliffs Middletown: the defining reversal

In August, Cleveland-Cliffs announced a framework to rescope its previously awarded \$500 million Department of Energy grant into a \$1 billion Middletown Works optimization project, funded equally by Cliffs and DOE. The new program retains the approximately three-million-ton-per-year blast-furnace route and adds a major furnace rebuild, material-handling upgrades, AI-enabled process controls and a



cogeneration plant that will use blast-furnace gas to produce electricity and steam. Completion of the rebuild is planned for the first quarter of 2030. [1]

That is a profound change from the earlier plan for a 2.5-million-ton hydrogen-ready DRI plant and two 120 MW electric melting furnaces. The old project aimed to replace ironmaking chemistry; the new one aims to improve the efficiency, reliability and economics of the incumbent route.

The honest conclusion is not that Cliffs has rejected emissions reduction. Capturing process gas for useful energy, improving controls and rebuilding equipment should reduce energy waste and emissions intensity. But it is a life-extension decision for integrated steelmaking, not a bridge to hydrogen DRI. It also indicates that the need to produce demanding automotive exposed grades, preserve uninterrupted operations and control capital risk outweighed the appeal of a more transformational pathway.

U. S. Steel after Nippon: Big River moves from expansion to integration

Nippon Steel completed its acquisition of U. S. Steel in 2025 after entering a national security agreement that included approximately \$11 billion of new U.S. investment through 2028. In 2026, the clearest decarbonization-related deployment from that commitment emerged at Big River Steel Works in Osceola, Arkansas. [2]

U. S. Steel announced a \$1.9 billion DRI facility, and Midrex was selected to provide a 2.5-million-metric-ton-per-year MIDREX Flex plant with first production expected in 2029. Hot DRI will feed the four adjacent EAFs, while the plant can also produce HBI for sale or export. Big River 2 with more than \$3 billion of prior investment is now in full production. [3][4]

This is as much a vertical-integration and quality strategy as an emissions strategy. Keetac's DR-grade pellets in Minnesota will feed a domestic ore-to-DRI-to-EAF chain. Hot charging avoids reheating and transport losses; virgin iron units help dilute residuals in scrap; and natural-gas DRI plus EAF steelmaking can materially lower emissions versus BF-BOF production. Hydrogen capability remains useful optionality, but it is not required to make the initial investment case.

Hyundai-POSCO Louisiana: a new automotive sheet route breaks ground

On September 4, Hyundai Steel formally broke ground on HPLS: Hyundai-POSCO Louisiana Steel, in Donaldsonville. The \$5.8 billion complex is owned by Hyundai Steel (50%), POSCO (20%), Hyundai Motor (15%) and Kia (15%), with annual capacity of 2.7 million metric tons and commercial production targeted for 2029. It is designed to produce hot-rolled, cold-rolled and coated automotive sheet. [5]

The project's configuration matters. It includes a direct-reduction plant using iron ore and natural gas, followed by EAF melting with a mix of DRI and scrap. Hyundai says the DR plant can eventually substitute hydrogen for natural gas. In current form, however, this is another commercially grounded natural-gas DRI-EAF project and not a green-hydrogen project on day one.

HPLS also shows that decarbonization is converging with industrial policy and captive demand. The mill will support Hyundai and Kia plants in the Southeast, reduce exposure to imports and tariffs, and attempt



something the U.S. market has historically found difficult: high-end automotive sheet from an EAF-centered route.

Nucor West Virginia: scale first, carbon advantage embedded

Nucor's new Apple Grove sheet mill represents a \$4 billion investment with three million tons of annual capacity, automotive galvanizing and a construction-grade line. Nucor's own project page continues to describe the plant as under development, while late-August industry reporting indicated that the EAF had been energized and ramp-up was approaching. Until Nucor announces first commercial production, the prudent description is commissioning rather than full startup. [6][7]

Unlike the other three headline projects, West Virginia is not an ironmaking conversion. Its emissions advantage comes from the EAF route, high scrap utilization, modern equipment and whatever power mix and contractual electricity instruments ultimately support production. The plant nonetheless matters enormously: it adds a large block of modern domestic sheet capacity with lower direct emissions than conventional integrated production.

Hybar: investor-financed efficiency with power built into the mill

Hybar's Osceola, Arkansas rebar micro-mill adds a different model to the capital map. Led by former Big River Steel chief executive Dave Stickler, the 630,000-short-ton mill rolled its first rebar on May 28, 2025. Hybar says its direct-current EAF is at least 10% more energy-efficient than the next-best available EAF technology. By June 2026, nine months after commissioning, the company reported that the mill had been cash-flow positive since its fourth full month of operations. [20][21]

Hybar then raised \$1.1 billion to build a second, adjacent mill on a 24-month schedule. Together, the two mills are expected to provide roughly 1.3 million short tons of annual capacity, which the company describes as just under 13% of the U.S. rebar market. The financing announcement identifies private equity and management capital alongside commercial bank and tax-exempt bond financing, rather than a federal demonstration grant. That makes Hybar an important counterpoint to projects whose timing and economics are more exposed to federal policy. [20]

The power system is central to the proposition. An affiliated company, Green & Clean Power, is developing a behind-the-meter solar-and-battery facility for the site. Hybar describes it as the largest behind-the-meter industrial renewable-energy facility in the United States and said in June that final certification and harmonic testing were expected later in the summer. When solar output and operating conditions align, the mill expects to be able to run entirely on renewable electricity. That is a powerful physical claim, but also a conditional one: 100% renewable operation at those hours is not the same as a 100% renewable annual electricity supply. [20]

Why virgin iron is becoming a metallurgical necessity

The expansion of EAF capacity makes the supply and quality of metallics increasingly strategic. Scrap is indispensable to the U.S. production model, but repeated recycling concentrates copper and other



residual elements that are difficult to remove during melting. Prime scrap is limited, and demanding sheet product applications require tight chemistry control.

That is why DRI, HBI and pig iron matter beyond their emissions profile. Virgin iron units dilute residuals, improve yield and operating consistency, and allow EAFs to reach grades that cannot be produced economically from lower-quality scrap alone. The historic U.S. dependence on imported low-phosphorus pig iron from Russia and Ukraine has also exposed mills to sanctions, war and logistics risk; replacement supply from Brazil does not eliminate the concentration or trade-policy exposure.

Big River’s integrated DRI plant, Hyundai-POSCO Louisiana’s DRI-EAF configuration and NEMO’s proposed domestic pig iron all respond to this structural metallics problem. Their strongest business case is therefore broader than carbon: lower-emissions iron units can also support product quality, productivity and domestic supply security.

3. What changed from Greenway’s 2025 assessment

2025 issue	September 2026 position
Cliffs Middletown H ₂ -ready DRI/EMF	Rescoped to BF modernization, controls and cogeneration; a decisive move toward incumbent-asset optimization.
SSAB Mississippi HYBRIT proposal	No revived U.S. project announcement identified; treat as inactive unless SSAB reopens a site-and-hydrogen-backed plan.
Nucor–ExxonMobil Convent CCS	The announced target remains up to 800,000 tCO ₂ /year with 2026 startup, but public confirmation of operation remains the key missing milestone.
SDI–Aymium biocarbon	Still a credible near-term substitution pathway; the market needs repeat commercial volumes, consistent metallurgical performance and transparent biogenic-carbon accounting.
Breakthrough ironmaking	Capital and pilots are advancing, but the field is separating into commercial-near-term specialty-metal routes and longer-horizon commodity-steel routes.

Hydrogen moves from premise to option

The 2025 report concluded that full hydrogen DRI was ahead of U.S. hydrogen availability and economics. Developments in 2026 reinforce that view. The projects attracting serious capital are designed to work with natural gas now and preserve a pathway to hydrogen later. That is different from building an investment case that depends on abundant low-cost clean hydrogen from startup.



The distinction matters. A hydrogen-ready plant is not a hydrogen-operated plant, and a future conversion pathway should not be counted as a present emissions reduction.

Federal policy now favors different timelines

Federal policy helps explain the change in project behavior. The One Big Beautiful Bill Act ended eligibility for the Section 45V clean-hydrogen production credit for facilities that begin construction after 2027. That accelerated deadline substantially narrows the development window for hydrogen projects that have not already secured sites, power, equipment, permits and financing. The IRS now defines a qualified clean-hydrogen facility as one whose construction begins before January 1, 2028. [16]

The broader federal demonstration portfolio also became less predictable. In May 2025, DOE terminated 24 Office of Clean Energy Demonstrations awards totaling more than \$3.7 billion after reviewing their economics and alignment with current policy. Those cancellations did not all involve steel or hydrogen, but they changed the risk environment for capital-intensive industrial demonstrations. [17]

Carbon capture received a different signal. The same 2025 legislation retained Section 45Q and established parity between the credit for secure geological storage and qualifying utilization or enhanced-recovery pathways for facilities or equipment placed in service after July 4, 2025. [18] That does not make CCS easy. The permitting, infrastructure, energy consumption and verified storage remain material constraints, but it gives CCS-linked projects a more durable federal incentive framework than a new hydrogen facility beginning construction after 2027.

CCS remains plausible—but execution must replace announcement

Nucor and ExxonMobil's Convent agreement contemplated capturing, transporting and storing up to 800,000 metric tons of CO₂ annually from Nucor's natural-gas DRI plant, with startup expected in 2026. [8] If it operates reliably, the project could validate a particularly American route: natural-gas DRI, carbon capture and EAF steelmaking located near Gulf Coast sequestration infrastructure.

The next update should be based on operating facts: startup date, capture rate, uptime, net energy penalty, storage verification and realized emissions intensity per ton of DRI. Until those are public, the project remains important but not yet proven in operation.

Biocarbon remains practical and underappreciated

Steel Dynamics' work with Aymium helped put biocarbon on the U.S. steel agenda. The attraction is straightforward: sustainably sourced, specification-controlled biocarbon may substitute for a portion of fossil carbon in EAF charge carbon, slag foaming and other metallurgical uses without requiring a new melt shop. SDI now markets BIOEDGE as a renewable biocarbon product platform. [9]

Biocarbon will not eliminate steelmaking emissions, and its claims depend heavily on feedstock, land-use assumptions, yield, logistics and chain-of-custody accounting. Still, it can deliver physical fossil-carbon substitution sooner than many higher-profile technologies. The measure of progress is repeat purchase orders and sustained mill consumption. EU and CBAM will potentially be significant driver.



4. The emerging-technology race

The technology field should be evaluated on a tougher standard than whether a laboratory can produce iron. Continuous operation, product quality, ore tolerance, energy consumption, equipment life, capital intensity and a credible path to hundreds of thousands—or millions—of tons per year are now the relevant tests.

Electra: unusually strong commercial momentum

Electra uses low-temperature electrochemistry to produce 99% pure iron using electricity rather than coal, hydrogen or energy-intensive high-temperature processing. The technology is designed to process a broader range of iron ores, including already-mined resources left behind by conventional ironmaking pathways, helping address both the significant emissions from conventional ironmaking and growing constraints on premium DR-grade ore supply.

The company entered 2026 with a demonstration plant under development and a growing roster of financial and commercial commitments, including a \$186 million Series B, a \$50 million Breakthrough Energy Catalyst award, an \$8 million Colorado industrial-emissions-reduction tax credit, advance purchase orders from Nucor, Toyota Tsusho and INTERFER, and an environmental-attributes agreement with Meta. In March, Electra added a \$30 million J.P. Morgan venture-debt facility to support planning for its first commercial plant. [10]

Electra's upcoming objectives include sustained operation of its demonstration plant, continued validation of technology performance and progress toward deployment of its first commercial facility. The company's financing, commercial agreements and demonstration infrastructure give it unusually strong commercial momentum within the emerging-ironmaking field; scale-up performance remains the decisive test.

Limelight Steel: laser ironmaking deserves a place on the map

Limelight Steel is developing a laser furnace that applies high-powered semiconductor laser energy directly to iron ore fines to produce iron without coke and without a hydrogen supply chain. ARPA-E's ROSIE program awarded the company approximately \$2.9 million for development through 2027, with program goals that include kilogram-scale production and a one-kilogram-per-hour rate—not commercial scale. [11]

The concept is compelling because it could eliminate pelletizing or sintering, use a wider range of ores and deliver direct electrification at extreme temperature. The risk is equally clear: optical efficiency, heat transfer, refractory life, continuous solids handling and the cost of scaling laser arrays to industrial throughput.

Limelight belongs beside Electra, Boston Metal and Hertha in any serious U.S. technology review. The milestones to watch are its pilot roadmap, energy balance, product form, continuous operating performance and scale-up architecture.



Hertha Metals: moving toward a first commercial product

Hertha's single-step pyrometallurgical process is designed to accept lower-grade ores and fines and operate on natural gas or hydrogen. The company reports continuous operation of a one-tonne-per-day pilot since late 2024 and more than \$17 million raised. It plans a roughly 30-tonne-per-day facility producing high-purity iron for the permanent-magnet supply chain before pursuing much larger steel capacity. [12]

Hertha recently reported 99.95% iron purity ahead of groundbreaking for that first commercial plant. This specialty-market-first strategy is significant: high-purity iron can support better margins and a more manageable first commercial step than commodity steel. The key question is whether the operating learning and equipment architecture transfer cleanly to steelmaking scale.

Boston Metal: commercialization through critical metals

Boston Metal's molten oxide electrolysis platform remains one of the most technically ambitious routes to carbon-free iron. Its near-term commercialization path has run through high-value metals: initially ferroalloys used in steelmaking at its Brazilian operation, and now emphasizes a broader critical-metals business. A \$75 million financing announced in May brought total capital raised above \$500 million and is being directed to critical-metals deployment in the United States and abroad. [13]

That is not necessarily a retreat from steel. It is a commercialization sequence: prove cells, materials, uptime and operating discipline in higher-value applications before competing in commodity iron. For steel, the watch items remain inert-anode life, refractory performance, electricity consumption, continuous operating hours and the timing of a steel-specific industrial demonstration.

NEMO Ironworks: conventional technologies in a new domestic configuration

NEMO Industries is not a novel iron-reduction chemistry. Its proposed Louisiana project combines an ENERGIRON Zero Reformer DRI plant with electric smelting to produce granulated pig iron for EAF customers. Tenova has been selected for front-end engineering on a 2.5-million-tonne DRI plant; final investment decision is targeted for December 2027. The broader Phase One plan has been described as approximately \$3 billion, with commissioning around 2030, subject to permits, commercial agreements and project financing. [14][15]

The strategic proposition is a lower-emissions domestic substitute for imported pig iron, with future CCS and hydrogen options. NEMO has credible named backers and a technology provider, but it has not yet crossed the decisive threshold: a fully financed positive FID. It should be tracked as a serious development project, not described as committed operating capacity.



5. Products, power and proof

Commercial lower-carbon steel is already available through products such as Nucor ECONIQ, SSAB Zero, JSW Steel USA GreenEdge and U. S. Steel verdeX. These offerings do not all use the same production route, boundary or attribute-accounting method. That is precisely why the market needs to move beyond labels.

EAF decarbonization has two separate levers

EAF decarbonization is developing on two tracks. The first is what feeds the furnace: scrap quality, DRI, HBI, pig iron and emerging low-emissions ironmaking. The second is what powers it: equipment efficiency, grid emissions, onsite generation, storage and contractual electricity procurement. A mill can make material progress on either track, but the largest physical reductions require both.

The public emphasis in the United States appears to be shifting from new offsite PPAs and VPPAs toward power systems integrated with the mill. Hybar is the clearest example: EAF efficiency and a large behind-the-meter solar-and-battery system are integral to its Arkansas site. Pacific Steel Group is taking a similar approach at its Mojave Micro Mill, where more than 40 MWp of onsite solar is planned alongside a 32 MWh vanadium-flow battery. These systems can reduce purchased power and give operators a more direct connection between renewable generation and production, although annual claims still depend on operating profiles, grid purchases and ownership or retirement of the associated electricity attributes. [20][28]

This does not mean PPAs have disappeared from the U.S. steel sector. Nucor's 250 MW Sebree Solar agreement and Steel Dynamics' 308 MW renewable product purchase agreement remain important, but both were signed in 2023. No comparably significant new U.S. steel-producer PPA or VPPA had been publicly announced in 2026 as of this report's cutoff. The newer story is physical integration of generation and storage at the production site. [29][30]

Nucor has also explored a longer-term version of the onsite-power model through its 2023 agreement with NuScale to evaluate co-locating small modular nuclear reactors near EAF mills. No specific site or deployment commitment has been announced, so the initiative remains exploratory rather than committed capacity. [35]

Steel environmental attributes begin to form a market

A separate market is emerging around the emissions attributes of iron and steel. These instruments are sometimes called environmental attribute certificates or credits, but they should not be confused with renewable-energy certificates. A REC represents the environmental attributes of electricity generation. A steel EAC or book-and-claim certificate represents a verified difference in product emissions and separates that environmental value from delivery of the physical material.

Two transactions show why large technology companies are interested. Meta agreed in October 2025 to purchase verified environmental attribute credits linked to emissions reductions from Electra's U.S.-made clean iron, with an option for attributes from future commercial facilities. Microsoft separately signed both



a physical steel-supply agreement and an EAC agreement with Stegra. Under Stegra's structure, the lower-emissions value is separated from steel sold physically without a green claim, with controls intended to prevent both buyers from claiming the same reduction. Stegra's production will be in Sweden, but Microsoft is a U.S. buyer using the instrument to address data-center supply-chain emissions. [31][32]

RMI is working to turn these early transactions into a more credible and repeatable market. Its Sustainable Steel Buyers Platform issued a North American request for proposals in October 2024 involving nine buyers and thirteen producers; RMI says term-sheet negotiations are expected to conclude in late 2026. In 2026, RMI also released a proposed Steel Book and Claim Framework for public consultation, addressing eligibility, emissions measurement, certificate issuance and transfer, accounting claims and double-counting controls. [33][34]

The opportunity is real: book and claim can direct buyer premiums toward low-emissions production even when specifications, geography or intermediary purchasing make physical delivery impractical. The risk is equally real. Without rigorous baselines, additionality, chain of custody, retirement and exclusive-claim rules, a certificate can become an accounting allocation rather than evidence of incremental industrial change. For U.S. steel, these instruments should complement and not substitute for physical efficiency, cleaner power and lower-emissions ironmaking.

SSAB Zero: the iron and power levers meet in a product

SSAB provided an especially useful example in September 2025. The company reported that SSAB Zero produced at its Montpelier, Iowa EAF mill, with recycled scrap, fossil-free electricity, biocoal, renewable natural gas and hydrogen-reduced iron from the HYBRIT process, became the first steel to meet both the International Energy Agency near-zero-emissions threshold and the First Movers Coalition standard. The material is commercially available for GE Vernova onshore wind towers. [19]

SSAB added a closed-loop circularity initiative in June 2026 with The Greenbrier Companies and Alter Trading. Greenbrier is producing 50 gondola railcars from SSAB Zero for Alter; the cars will carry recycled metal back to SSAB's Iowa operations for use in new steel. The initiative connects lower-emissions production with physical logistics and material traceability, without offsets, and SSAB says later updates will document fabrication, service and the return of recycled metal to steelmaking. [27]

This does not revive the proposed Mississippi HYBRIT ironmaking project. It demonstrates a different route: bring limited lower-emissions virgin iron units into an existing U.S. EAF and blend them with scrap and lower-carbon energy. That model may scale differently from a new domestic hydrogen-DRI complex, but it is a real commercial counterpoint to the conclusion that hydrogen-based steelmaking has stalled entirely.

Ultimately, buyers will decide what lower-emissions steel means

Buyers should ask five questions:

- What is the declared carbon intensity, boundary and unit of measure?
- How much of the improvement comes from physical process performance versus contractual electricity or environmental attributes?



- Is the claim specific to the producing mill, the product, or an allocated batch?
- Is the result independently verified through an EPD, product carbon footprint or equivalent assurance process?
- Can the environmental information travel with the material through processing and fabrication?

Those questions matter because no single standard answers all of them in the same way. In practice, buyers and not producers or any one certification body will determine which lower-emissions claims carry commercial value. The frameworks now available are credible but not yet converged, and they emphasize different dimensions of performance.

The industry-led Global Steel Climate Council's Steel Climate Standard is technology-neutral. It applies defined emissions boundaries and numeric product-intensity benchmarks to steel from any production route, requires independent verification, and requires participating producers to establish science-based targets aligned with a 1.5°C pathway. It is designed to recognize measurable product performance and progress without prescribing BF-BOF, DRI-EAF or scrap-EAF technology. As of September 2026, GSCC lists certified products from three U.S.-based producers: Arkansas Steel Associates, Steel Dynamics and Nucor. [22]

ResponsibleSteel takes a broader multi-stakeholder approach. Its certification evaluates decarbonization together with responsible sourcing and site-level environmental and social performance. Big River Steel became the first site certified under the additional ResponsibleSteel requirements for GHG emissions and responsible sourcing in 2024; its certificate reports Progress Level 1 for both categories and a site-level intensity of 1.34 tCO₂e per tonne of crude steel. The certification report also makes an important distinction: site certification alone does not mean that every product shipped from the site carries a certified-steel claim. [23][24]

These are not necessarily competing choices in every procurement. They do, however, reflect different buyer priorities: a tightly defined, verified product-emissions metric; a broader assurance of responsible production; or some combination of the two. The relevant question is not which label wins in the abstract, but which evidence satisfies the buyer's specification, reporting obligation and risk tolerance.

Timing matters as much as framework. A buyer with an immediate public-infrastructure specification or Buy Clean requirement needs verified present-tense data. A buyer pursuing a longer-term Scope 3 target may also value a producer's transition plan and be willing to support future capacity through an offtake agreement. Neither should confuse a future glide path with the emissions intensity of steel delivered today.

Regulatory exposure makes that distinction increasingly consequential. The European Union's Carbon Border Adjustment Mechanism entered its definitive phase on January 1, 2026. Authorized importers must report verified embedded emissions and incur a carbon-price obligation for covered imports, including iron and steel. The system phases in as free allocation under the EU Emissions Trading System declines. [25]

The boundary may also move downstream. In December 2025, the European Commission proposed expanding CBAM from January 1, 2028 to 180 steel- and aluminum-intensive downstream products, including machinery and appliances. Because this remains a proposal, companies should track the final legislation rather than assume the scope is settled. But the direction is clear: a U.S. manufacturer that



exports finished goods into the EU or supplies a customer that does may face a materially different need for verified product-level emissions data than a company serving only the domestic market. [26]

Whatever framework and pace a buyer chooses, the underlying diligence does not change: define the carbon intensity and boundary; separate physical reductions from contractual attributes; identify whether the claim applies to a mill, product or allocated batch; and require independent verification.

One requirement is likely to become universal: the environmental information must travel with the material through processing and fabrication. Digital material passports, product-level Scope 3 data and Buy Clean requirements are all pushing in that direction. A lower-emissions melt creates value only when the downstream buyer can substantiate it. In the end, traceable proof will define lower-emissions steel in the market.

6. The 2026 conclusion

The U.S. steel industry has entered a more pragmatic phase of decarbonization. Hydrogen has not disappeared, but it has moved from near-term premise to future option. Natural-gas DRI paired with EAFs is attracting multibillion-dollar commitments. Modern scrap-based EAF capacity continues to expand. CCS and biocarbon offer targeted physical reductions. Existing blast furnaces will still receive major capital where product requirements, asset position and economics support them. Meanwhile, electrochemical, molten-oxide, laser and flexible-smelting technologies are competing to establish a commercially credible next generation.

The strongest single lesson from 2026 is that decarbonization will advance when it is integrated with the steelmaker's core business case—not when it is treated as a separate aspiration. The winning projects will reduce emissions while improving one or more of cost, energy efficiency, metallics quality, reliability, product capability and supply-chain security.

That is a less tidy story than “green steel.” It is also a more accurate—and more useful—account of where the U.S. industry is actually going.

What to watch through year-end and into 2027

- Final DOE terms and quantified emissions benefits for the rescoped Middletown project.
- Commercial commissioning and first coil at Nucor Steel West Virginia.
- Hybar's second-mill construction and verified operating data from the first mill's behind-the-meter solar-and-battery system.
- Execution milestones for Hyundai-POSCO Louisiana and Big River's DRI plant.
- Operating confirmation and performance data for Nucor-ExxonMobil CCS at Convent.
- Financing, permits and offtake sufficient to move NEMO from FEED to positive FID.
- Commercial-facility design and output milestones from Electra and Hertha.
- Pilot throughput and energy-balance data from Limelight.



- Whether Boston Metal's critical-metals scale-up materially de-risks MOE Steel.
- Greater comparability among product carbon claims, EPDs and environmental-attribute instruments.



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