

Photo courtesy of Hybar LLC

Hybar: A Different Breed of Steelmaking

By Amanda Woods

Steel is an industry of continuous change. With digital technologies growing smarter every day, environmental efficiencies reshaping production routes and billions of dollars of capital investments being poured into the U.S. steel industry, this article will explore what Hybar does differently.

The first thing you notice as you're driving to Hybar in Osceola, Ark., is the facility's massive, 440-acre solar farm designed and built by Arizona-based Depcom Power Inc. Hybar is the first steel mill in North America that can produce rebar using 100% solar energy.

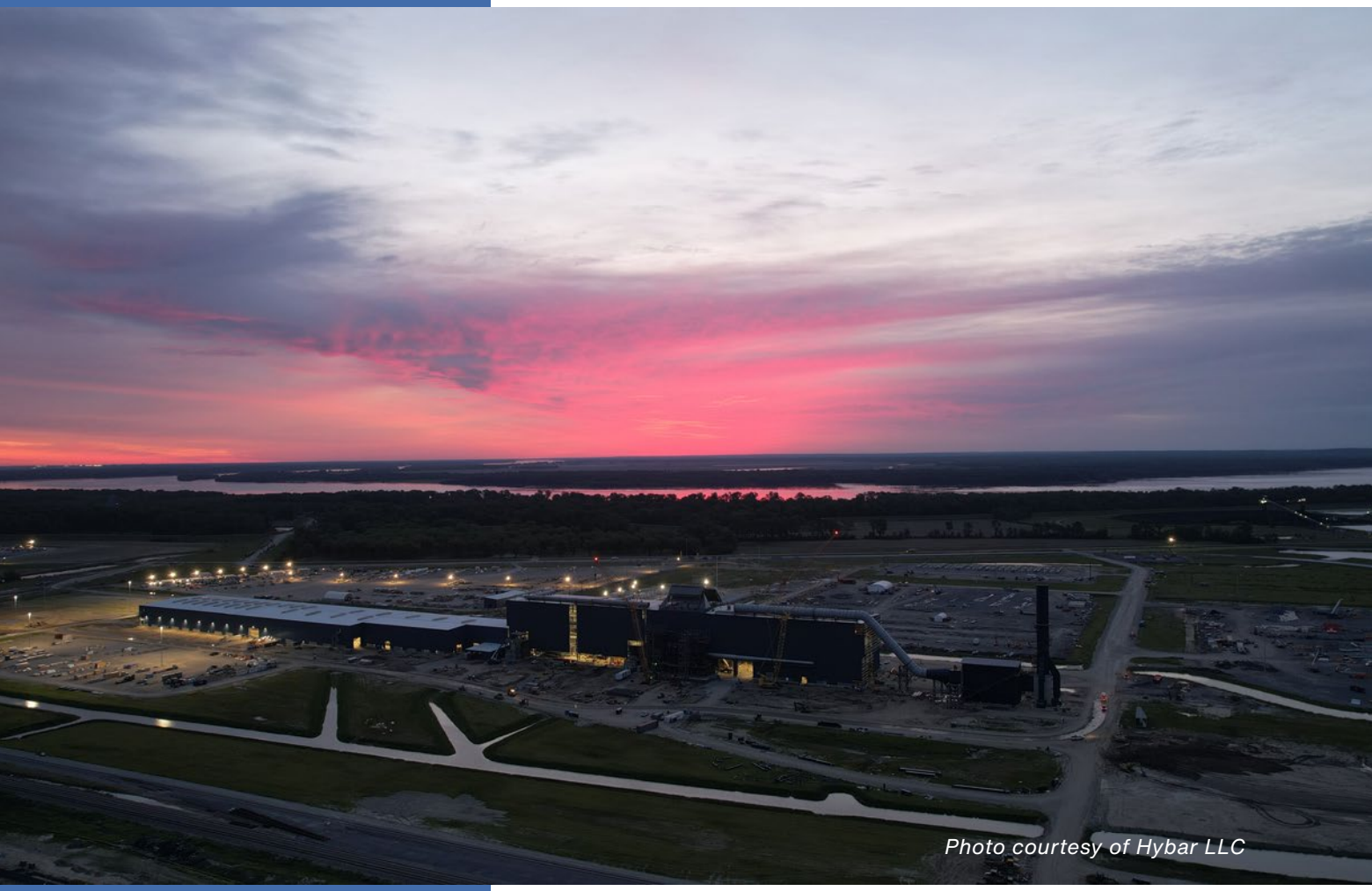

Photo courtesy of Hybar LLC

“Being environmentally sustainable is the right thing to do”

— David Stickler, chief executive officer

When the sun is shining, the mill can run entirely on solar energy through a direct connection to the 105 MW behind-the-meter solar array. Even on cloudy days, solar provides about 20% of the energy required to power the plant.

Coupled with the 160 MWh battery energy storage system on-site, Hybar can generate almost 40% of its own annual power consumption. The company also has a special-rate power contract with Entergy Arkansas, allowing it to purchase electrical power to supplement its solar and battery power when needed.

That means the mill never runs out of power. It also means that if an unexpected power outage occurs, the mill and its various assets can be safely powered down.

For Hybar’s chief executive officer, David Stickler, the decision to build an energy-efficient steel mill wasn’t purely based on dollars and cents.

“Being environmentally sustainable is the right thing to do,” Stickler said.

“We’re the largest behind-the-meter solar and battery storage facility outside of utilities in the United States.”



Photo courtesy of SMS group

Stickler's goal for Hybar is to become the world's second LEED-certified steel mill, following his first LEED-certified steel mill, Big River Steel (now operating as part of United States Steel Corporation), which is located just down the road in Osceola.

Hybar sits on 1,300 acres of land on the banks of the Mighty Mississippi. Its river port gives the 700,000-tons-per-year facility a third mode of transportation for scrap and finished product. One million tons of material move through its port each year, in addition to shipments via Class I rail and truck. With all three modes of transportation in play, the company can bring scrap in from all across the United States.

Its first rebar was produced in late May 2025, 22 months after breaking ground. Hybar offers #3 to #18 rebar in both stick and spooled form, with spools ranging from sizes #3 to #7, weighing as much as 8 tons.

The majority of the on-site electrical infrastructure was provided by Primetals Technologies USA LLC. This included a 230/34.5 kV main receiving substation and the power distribution network.

A dedicated intermediate middle bus was incorporated to enable behind-the-meter integration of the solar generation and battery energy storage systems with the utility grid, according to Primetals Technologies.

From a power infrastructure perspective, Primetals Technologies said, "Integrating solar generation and battery energy storage introduced unique design considerations. Electric arc furnace (EAF) operations are characterized by highly dynamic loads. While the solar and battery energy storage systems were designed to supply a substantial portion of the mill's active power demand, Primetals Technologies engineered the main receiving substation to ensure reliable grid support for all operating conditions for the EAF."

"The solution enables seamless coordination between the utility grid, the solar installation and the battery energy storage system, ensuring stable performance of the meltshop while maximizing the benefits of renewable energy."

For its mill technology, Hybar partnered with SMS group on the first-of-its-kind Continuous Minimill


Photo courtesy of SMS group

Technology (CMT®). A low-emission, energy-efficient steelmaking system, the CMT mill can run on solar energy for up to 12 hours daily. Fossil fuel usage and electrode consumption are minimized through the use of advanced power electronics. Essential to the CMT process is a dedicated water treatment plant that utilizes advanced technologies to reduce water consumption and eliminate process water discharge.

Combining efficient operation with lower up-front investment and reduced production costs, the CMT supplies liquid steel to a high-speed caster that directly feeds the rolling mill in a single process.

Hybar is the first steelmaker to install a CMT, which presented a unique set of challenges. The Hybar team and the SMS team relied on each other heavily — and still do, as now the operators are working to achieve additional consistency.

Caster day supervisor Brett Doolittle said, "Like any greenfield start-up, you have challenges. And you have to understand that whatever plan you have today, how great you're preparing for that, it's probably going to change."

The company's lean headcount, sitting at around 180 employees, calls for operators and engineers who are knowledgeable and well-versed in the challenges of starting up a steel mill. Doolittle, an industry veteran, pointed out that while industry and operations experience are paramount in a start-up environment, the younger generation is bringing their own set of skills.

"There's a really good group of young folks that are eager, hungry — it's refreshing," Doolittle said.

"When it came time for OPIs (operational performance indicators) on tablets and how we were keeping up, the young kids all at once said, 'I got this.'"

Table 1: EAF Technical Details

Furnace type	Tap-to-tap time	Average heat size	Shell diameter	Type of fume collection system	Hot heel (% of heat size)	Annual capacity
DC, eccentric bottom tapping	37 min.	55 short tons (50 metric tons)	5.6 m	Baghouse	80	639,300 short tons/year (583,000 metric tons/year)

David Garrison, Hybar's construction manager, has worked on start-up projects since the 1980s and spoke of how the role of operator has changed.

"When I started, it was like Fred Flintstone. Rock rolls and wooden rest bars."

"From an operator standpoint, we just looked for a guy who wanted to come to work every day and wanted to work. No special skills needed," Garrison said. "Today, the skill set that an operator needs is so much broader," he said. "They're part IT specialist, they're part programmer and a very small percentage of that is operator. It can be kind of a rough environment, especially in an upset condition. The automation controls everything."

One might say Hybar is right now at the "tip of the iceberg" regarding what its SMS-supplied automation system can do. While there are infinite possibilities, the automation relies on the experienced operator to teach the system what it needs to do.

"We all come from varying backgrounds in different mills. We bring a wide array of knowledge to this process," Garrison said. "You look across our supervisory and management team, and they have hundreds of years of experience. Dave [Stickler] has done a good job putting together a pretty impressive team."

"Hybar is the company that I went to work for 40 years ago," Garrison added. "Mr. Stickler worked very closely with John Correnti. John Correnti worked very closely with Ken Iverson. And [Dave Stickler] has embraced a lot of the principles that have been diluted over the years, because they all come from that, originally — and we've gone back to that [at Hybar]."

Another industry veteran on Hybar's team is Joe Wilkerson, meltshop maintenance supervisor, who has been in maintenance his entire career at different steelmaking facilities. For him, growing up on a farm instilled an unmistakable work ethic.

"Some of the best workers in the steel industry have come right out of the field, because they're hard workers."



Photo courtesy of SMS group



Photo courtesy of SMS group

"One of the things that I respect so much about Hybar is we don't run high-dollar scrap, because it's rebar, but we treat the rest of the process more like an SBQ."

— Brett Doolittle,
caster day supervisor

Wilkerson experienced different work cultures and environments over his 23 years at various mills. At Hybar, however, "we had the opportunity to build the culture. We knew what we didn't like and what we didn't want," Wilkerson said.

Regardless of title, he added, "Stickler believes in everybody."

Hybar has built a company culture from the ground up, where the entire workforce is working toward a common goal, where every employee knows that their opinion matters and that they can count on the person working next to them.

That culture, paired with the collective industry experience of its team, enables Hybar to employ the latest technologies and efficiencies that will allow it to continue to push the envelope.

Hybar's meltshop has a 75 MVA, 50-ton DC EAF fed with 100% scrap consisting of a 50/50 mix of shredded and heavy melt. The EDGE DC furnace features efficient power usage, minimized carbon injection, minimal demand for natural gas and lower overall CO_2 emissions. The selection of a DC furnace, in combination with its

Table 2: Ladle Capacity

Ladle nominal capacity	Freeboard at nominal capacity and new lining	External diameter	Overall height, including feet	No. of porous plugs	Structure weight	Refractory weight	Total weight at nominal capacity and new lining	Total weight at full capacity and new lining
52 short tons (47 metric tons)	535 mm	2,750	3,650 mm	1	~18 tons	~20 tons	~91 tons	~100 tons

renewable energy supply, makes Hybar's meltshop one of the most environmentally friendly in North America.

An automated slag door system manages the slag volume and atmosphere in the EAF, providing controlled furnace door operation. By controlling the slag volume and internal atmosphere, material losses are reduced and energy is optimized, thereby improving yield and electrode consumption.

Systems Spray-Cooled was tapped to supply Spray-Cooled™ equipment for the furnace's cooling requirements, including the furnace sidewall, roof and elbow. Systems also provided a heavy-duty industrial water filtration system to improve the longevity of the cooling equipment.

Commissioning of the furnace was completed in two months thanks to the use of advanced development, testing methods and utilization of Real-Time Digital Simulator (RTDS) to pre-tune the system before delivery to Hybar. The result is a fully modular and redundant "plug-and-play" system that can be scaled with the size of the furnace. X-Pact AURA enables the reduction of flicker and harmonics while allowing constant power control and higher availability.

From the EAF, the liquid steel goes to the ladle furnace for refining before heading to the high-speed single-strand caster.

SMS Concast supplied a continuous caster featuring CONREX® mold technology, which optimizes cooling, reduces thermal stress and maintains lower temperatures. Its tundish slidegate control system ensures optimal flow and stability of the mold level. Specialized entry shrouds and lubricating powder are employed to guarantee uninterrupted submerged casting at high speeds.

The CONREX design minimizes containment length and reduces wear on the mill rolls. Grooves on the mold tube enhance heat transfer, improving cooling efficiency.

"That is a game-changer," said Doolittle. "It's like a square with rounded edges. It's a little bit trickier to fine-tune."

"The quality and the throughput — the amount of throughput we're able to do — is unbelievable with this caster," Doolittle added.

The caster drive system uses torque drive technology to provide precise mold oscillation. It allows for on-line adjustments in real time and helps reduce operating costs compared to hydraulic systems.

"Our oscillator is not hydraulic — it's electric, and it gives us the ability to change the stroke and frequency of the speed of the oscillation while you're casting," Doolittle said. "Typically, it's fixed on an eccentric shaft. So you may be able to change your speed, but you're not going to change your stroke."

"We don't run the grades that the big boys in the CSP world do. One of the things that I respect so much about Hybar is we don't run high-dollar scrap, because it's rebar,

Table 3: Caster Technical Details

Mold type	No. of strands	Nominal casting speed		Ladle capacity	Throughput		Stated capacity	Cast product	Product dimensions
CONREX165	1	6.5 m/min.	256 IPM	55 short tons (50 metric tons)	1,370 kg/ min.	1.51 short tons/min. (1.36 metric tons/min.)	630,000 short tons (571,500 metric tons)	Billet	165 x 165 mm

“Our power numbers are just amazing, especially with our battery storage and all the things that we’re capable of here”

— David Garrison, construction manager

but we treat the rest of the process more like an SBQ. Because if you’re treating them more like an SBQ or MBQ, it just kind of takes care of itself. And what we’re running, with the submerged entry and the mold powder, you would typically see in a bigger mill,” Doolittle said.

Carrying residual heat from the caster, the billets travel through an induction equalization furnace directly to the rolling mill. This reduces energy consumption compared to a reheating process. It also provides homogenization over the cross-section of the material, which results in a stable rolling process, reduced roll wear and extended roll life.

The rolling mill features 14 housingless stands and an 8-pass MEERdrive® high-speed finishing block. MEERdrive’s individual drive concept lowers consumption and operating costs by approximately 30%.

“This mill is designed to run, at speed, all products,” Garrison said. “Meaning I can run 82 tons an hour across the entire array. This is a 700,000-tons-per-year mill — a continuous mill. We’re doubling the output of any conventional continuous mill.”

“Our power numbers are just amazing, especially with our battery storage and all the things that we’re capable of here; and the RMS system, which is different from a traditional transformer setup, allowing us to operate extremely efficiently,” Garrison said.

SMS group’s quenching and soft cooling TMbaR® thermoprocessing system is also integrated, providing fine-grained structural products with reduced manganese content. To achieve this fine-grained microstructure, the process consists of precise and reproducible cooling



Photo courtesy of SMS group

Table 4: Rolling Mill Technical Details

Size of cast product	No. of stands	No. of mill drives	No. of hot/cold shears	Cooling bed width x length	Product size (mm) and shape range	Rated design	Yearly average yield	Annual production capacity
158 mm rd.	22	22	4	82 x 7 m	#3–#7 rebar coils, #3–#18 rebar	83 metric tons/hr.	101%	610,000 metric tons

and equalization before the final passes; high deformation during the final passes; and soft cooling after the last passes.

The design does not require natural gas during the production process — another first of its kind. This allows for a significantly lower carbon footprint and up to a 50% reduction in emissions compared to other leading rebar mills, according to SMS group.

An autonomous laser measurement system checks the product dimensions and enables early detection of dimensional anomalies. It utilizes advanced laser light-section technology to measure up to 99% of the bar surface at a scanning rate of up to 15,000 scans per second, providing synchronous, contact-free measurements over the entire cross-section of the material. This allows for real-time adjustments and quality control during the production process.

The integration of SMS's High Speed Delivery (HSD®) system and the Vertical Compact Coiler (VCC®) technology in the two separate finishing lines enhances material yield by up to 2% by minimizing the occurrence of short bars in multistrand bar rolling.

The HSD system processes diameters from 6.0 to 43 mm in single-strand rolling without equipment changes. It minimizes short bars, prevents cobbles, and enhances the accuracy of cold cutting and bar counting.

The VCC can produce coils weighing up to 8 tons, which reduces the time needed for coil-changing operations downstream. Its compact design ensures consistent coil dimensions, resulting in improved handling and reduced risk of damage.



Photo courtesy of SMS group



Table 5: Straight Rebar Specifications

Grades	**ASTM Standards**									
	A615-40		A615-60		A615-80			Future Grade: 100		
			A706-60		A706-80					
			A615-60/A706 GR 60		A615-80/A706 GR 80					
	CSA G30.18 Standards									
			400R		500R			Future Grade: 600		
			400W		500W					
Sizes	**U.S. Imperial Bar Sizes**									
	#3	#4	#5	#6	#7	#8	#9	#11	#14	#18
	Canadian Metric Bar Sizes									
	10M	15M	20M	25M	30M	35M	45M	55M		

Table 6: Spool Rebar Specifications

Grades	**ASTM Standards**					
	A615-40	A615-60	A615-80			
		A706-60	A706-80			Future Grade: 100
		A615-60/A706 GR 60	A615-80/A706 GR 80			
	CSA G30.18 Standards					
		400R	500R			Future Grade: 600
		400W	500W			
Sizes	**U.S. Imperial Bar Sizes**					
	#3	#4	#5	#6	#7	#8
	Canadian Metric Bar Sizes					
	10M	15M	20M	25M		

At Hybar's grand opening in 2025, Stickler said, "I can confidently say that Arkansas is not only a great place to do business, but it is a really, really great place to do steel business."

Hybar announced in June 2026 that it had raised US$1.1 billion for an expansion mill. Designed to double the facility's annual production capacity to approximately 1.3 million tons, the new mill will be identical to the original mill and will sit perpendicular to it. The expansion will also include more batteries and possibly additional solar panels.

"Building on the success of our first CMT mill at Hybar's Osceola site to produce long products, we see huge potential to expand our capacities here at Osceola by combining logistics and labor expertise already onsite with this CMT twin solution. This enables us to effectively respond to the increasing demand for green long products by taking advantage of shared utility costs," Stickler said.

Construction of the new mill, supplied by SMS group, will take about 24 months. Leveraging its experience executing the first CMT 550 mill at Hybar, SMS group will support project execution and commissioning to reduce start-up risk and accelerate the transition to profitable production.

Stickler forecasts adding approximately 85 employees to Hybar's roster with the new mill.

"That helps me get to my two goals: Highest paid steel workers in the world, yet lowest labor cost per ton of steel," Stickler said.

By taking long-established steelmaking processes and know-how and integrating the latest technologies and efficiencies, Hybar is in the business of setting itself apart. From its installation of a brand-new, first-of-its-kind mill technology to relying on the power of the sun, Hybar is doing things differently.

As Stickler put it, "what truly differentiates Hybar is our 'can-do, get-it-done' culture. Empowering employees, stripping away bureaucracy, pushing decision-making down to the mill floor, and constantly looking for better, faster, more sustainable ways to make steel are the keys to Hybar's success." ✦

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