

Ag Equipment Intelligence®

News, Information & Analysis for the Ag Equipment Marketer

- Private Equity
- Deere Autonomy
- Dealers' Concerns

CNHI Estimates \$900 Million in Precision Revenue for 2022

CNH Industrial held its first ever Tech Day on Dec. 7-8, highlighting recent advancements in its tech portfolio, including its own autonomous electric tractor prototype and the world's first tractor powered by liquefied natural gas. But it was the details revealed on the company's financial side that drew the attention of analysts.

Precision & Recurring Revenue. Precision revenue is what caught the attention of Shane Thomas, analyst of Upstream Ag Insights, in his [Dec. 11 analysis of the event](#). He specifically pointed to a quote from CNHI President of Agriculture Derek Neilson, who said, "When this all rolls up within our ag revenues for 2022, we estimate that precision technology will account for over \$900 million. And we expect that number to continue to grow at about 10-15% annually, and in the near term

we expect to deliver in excess of \$1 billion in 2023." CNHI also noted margins on its precision business are in the 30% range, which Thomas said is an increase from the traditional <14% earnings before interest and taxes margin.

On the topic of recurring revenue, CNH Industrial CEO Scott Wine stated during the Tech Day that the company's CFO Oddone Incisa has given CNHI "the ability to get paid by customers any way [we] want. If they want to pay us on a subscription basis, we can do it, if we want another recurring revenue contract ... We're not going to tell them how they want to pay us."

Thomas pointed out that questions around recurring revenue specifically in technology often assume a higher margin level of 60-80% that involve software-as-a-service business models. Based on an additional comment from

Incisa that CNHI's \$900 million in 2022 precision tech revenue would come from sources including factory components, aftermarket kits and technology sold by Raven to third parties (in addition to software fees), Thomas said there's "legitimate room for skepticism" if there's a lack of recurring revenue associated with CNHI's software.

"As a consumer or user of a software or tech driven product, I want there to be an incentive for the seller of the software to continually upgrade and progress the technology, software, AI model, etc.," said Thomas. "If it's a one-time unlock, it brings into question how the necessary maintenance gets done to have a best in class experience. Not to mention, I question whether that hinders farmer adoption due to up front capital needs for some of the

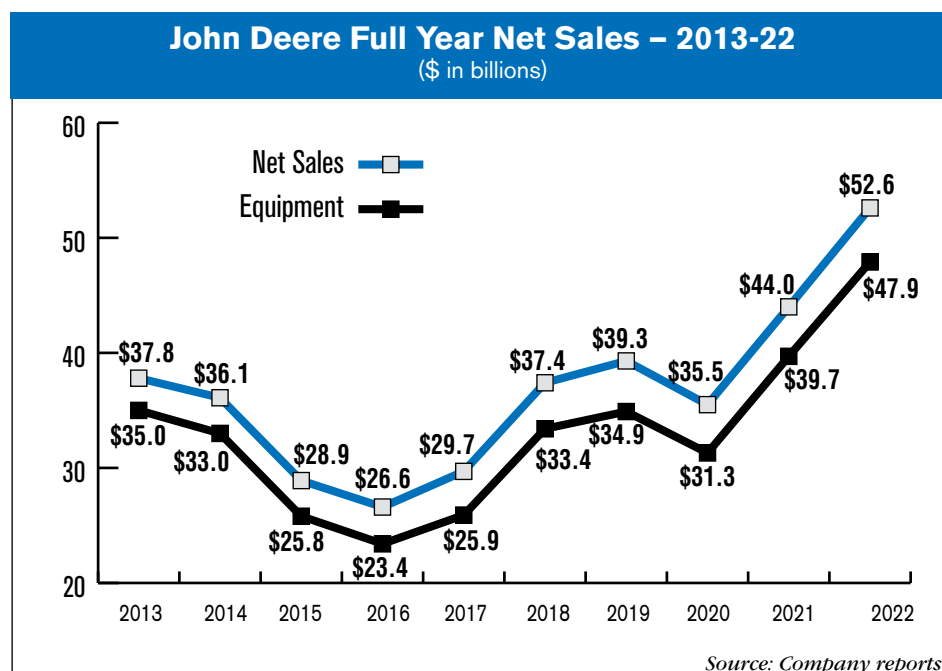
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John Deere Reports Unfinished Inventory Reaches 'More Normalized Level'

In its latest earnings release on Nov. 23, John Deere Director of Investor Relations Brent Norwood stated the company had cleared around \$400 million of partially complete machines in its production and precision ag segment in its 4th quarter. When asked about partially completed inventory in the coming year, Norwood said Deere's partially completed inventory is at a "much more normalized level."

"We have made a lot of progress on the partially completed machines we've had in inventory since the 2nd quarter," said Norwood. "That's really where we saw that figure peak. We took down about one-third of that over the course of the 1st quarter, and then we took another \$400 million down in the 4th quarter. I would

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Titan Machinery Reports Record Quarter, Talks Allocation & Consolidation

Case IH dealer Titan Machinery announced its 3rd quarter earnings for fiscal year 2023 on Nov. 30, 2022. Revenue for the quarter came in at \$668.8 million, up 47% from \$454 million in the same period last year. This was the 3rd consecutive quarter of record results for Titan.

Commenting on the results, Mig Dobre, senior research analyst with Baird, wrote in a note to investors, “Titan is undoubtedly executing well amidst the best demand environment in a decade. Looking through the numbers two things stood out: strength in equipment sales (Titan was able to secure OEM shipments) but also unusually strong equipment gross margin (a function of attractive new and used pricing environment).”

Allocation. As Dobre pointed out in his investor note, Titan’s equipment sales strength was closely tied with the dealership’s ability to get inventory from CNH.

Titan President and COO Bryan Knutson confirmed that the inventory Titan has is due to allocation, saying, “What we’re seeing is still on allocation, still have long lead times and still have demand while outstripping supply. We continue our concerted effort here with our teams out on the ground communicating daily with growers, where we’re getting with those customers booking presells, watching for any more allocation as it becomes available.”

Knutson added that Titan is also watching for other dealers in drought impacted areas who do not take any of their allocation “or allowed some allocation to free up due to that.” Titan is also watching the impact rising interest rates are having on dealer balance sheets. “We’re in a great position here with our strong balance sheet and our strong cash position ... to be able to make decisions quickly and react very quickly as anything becomes available,” he said.

CNH is keeping its order windows tight, Knutson noted, and Titan has “presold and locked in the allocation we do have so far.” He expects it will be March at the earliest, if not into April and May, before Titan gets its final allocation for the end of the year, Knutson said.

Talking about product availability for next year, CFO Mark Kalvoda reiterated the dealership only has its allocations for the first part of the next year at this point.

“It’s hard to say on the OEM side — in my opinion, plant capacity is there. They’re not free of the labor challenges that the rest of the U.S. is facing right now,” Kalvoda said.

Consolidation. Since December of 2021, Titan has closed on 3 acquisitions: Jaycox Implement (December 2021), Mark’s Machinery (April 2022) and Heartland Ag Systems

| Third Quarter Revenue Analysis (in millions of dollars) | | | |
|--|-----------|-----------|--------|
| | Q3 FY2023 | Q3 FY2022 | Change |
| Total Revenue | \$668.8 | \$454.0 | +47.3% |
| Equipment | \$509.0 | \$329.8 | +54.3% |
| Parts | \$108.7 | \$80.5 | +35.0% |
| Service | \$39.0 | \$32.0 | +21.7% |
| Rental & Other | \$12.1 | \$11.6 | +4.2% |

Source: Company reports

(August 2022). Titan’s role as a consolidator will continue, said CEO David Meyer. “We’re currently talking to a number of owners,” he said. “As you’re aware, this continues to be a fragmented dealer network out there with aging dealer principals and growing sophistication, equipment and needed support services to support this seasonal equipment today. With the growing dealer capitalization requirements and lack of succession alternatives out there — there’s still a long runway of acquisitions out there.”

Meyer said Titan “anticipates an orderly flow and quality acquisitions in the year ahead.” Those acquisitions are likely to be in Titan’s upper Midwest footprint. “We like these strong growing areas where we have synergies in our equipment,” he said.

Kalvoda added that both smaller and larger dealer group acquisition opportunities exist. “I think there’s going to be opportunities on all different sizes of acquisitions here,” he said.

3Q Results. Equipment sales for the quarter were \$509 million vs. about \$330 million for the third quarter of 2022. Parts sales were up 35% to \$108.7 million during the quarter. Service revenue also grew during the quarter, but to a lesser degree at up 2.2% to \$39 million.

Ag segment revenues for the third quarter of 2023 were \$493.3 million, up 75% year-over-year. According to Titan, the sales increase was positively impacted by organic growth as well as the acquisitions of Jaycox Implement, Mark’s Machinery and Heartland Ag Systems.

Floorplan and other interest expense was \$1.8 million in the third quarter of fiscal 2023, compared to \$1.3 million for the same period last year.



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say the level of partially completed inventory within the system right now is running at a much more normalized level.

“The benefit that you saw in the 4th quarter is not going to repeat in the 1st quarter. By and large, the tailwind from that has largely been completed in the 4th quarter.”

Norwood also stated during the call that dealer inventory to sales ratios are at 10% for high horsepower 4WD equipment and at 12% for high horsepower 2WD equipment. These ratios, he said, would historically be around 25-30%. Norwood added that combine inventory to sales ratios are “especially low, although that’s a bit seasonal.”

Full Year Sales. John Deere’s worldwide net sales and revenues rose 37% to \$15.5 billion for its 4th quarter 2022 and rose 19% to \$52.6 billion for the full year.

This was a 10-year high for Deere’s full year net sales and its second year in a row of year-over-year increase. Equipment operations net sales were \$14.4 billion for the quarter and \$47.9 billion for the year. Deere’s 2022 equipment operations net sales made up 91.1% of its 2022 full year revenue, up from 90.2% in 2021 and 88.2% in 2020.

| John Deere Production & Precision Ag Figures – 2021-22 | | | | | | | | |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| (\$ in millions) | | | | | | | | |
| | 1Q21 | 2Q21 | 3Q21 | 4Q21 | 1Q22 | 2Q22 | 3Q22 | 4Q22 |
| Net sales | \$3,069.0 | \$4,529.0 | \$4,250.0 | \$4,661.0 | \$3,356.0 | \$5,117.0 | \$6,096.0 | \$7,434.0 |
| Shipment volumes/mix* | \$185.0 | \$235.0 | \$325.0 | \$201.0 | (\$105.0) | \$212.0 | \$492.0 | \$894.0 |
| Price realization* | \$196.0 | \$297.0 | \$257.0 | \$280.0 | \$244.0 | \$502.0 | \$646.0 | \$873.0 |
| Production costs (loss)* | (\$38.0) | (\$139.0) | (\$248.0) | (\$391.0) | (\$407.0) | (\$627.0) | (\$535.0) | (\$586.0) |

* represent year-over-year change for that quarter

Source: Company reports

Price & Production Costs. Deere’s 4th quarter saw the manufacturer’s production and precision ag net sales come in at \$7.4 billion, a 22% year-over-year increase and a 10-year high. Shipment volumes were up \$894 million year-over-year for the quarter, another 10-year high and well above the \$492 million year-over-year increase seen in the 3rd quarter.

Deere’s price increases continue to add to its bottom line, with its total contribution to production and precision ag operating profit up \$873 million year-over-year in the quarter. This is a 35.1% increase from the \$646 million year-over-year increase seen in the 3rd quarter and 211.8% above the price realization increase seen in Deere’s 2021 4th quarter.

Deere’s production and precision ag production costs were up \$586 year-

over-year in the 4th quarter, up from its 3rd quarter but below the 10-year peak of \$627 million seen in Deere’s 2nd quarter this year.

Deere is forecasting its production and precision ag segment to see net sales up 15-20% in 2023 and price realization up 11%. **AEI**

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Producer Price Index Percentage Changes – Ag Equipment & Parts Segment

| | Unadjusted 12-Month % Change | Unadjusted 1-Month % Change | | | | |
|--|------------------------------|-----------------------------|------|-------|------|------|
| | November 2021–November 2022 | July | Aug. | Sept. | Oct. | Nov. |
| Agricultural machinery & equipment | 14.4 | 0.3 | 0.7 | 1.0 | 1.9 | -0.1 |
| Commercial turf & grounds care equipment, including parts & attachments | 10.6 | 0.0 | 2.3 | 0.0 | 0.6 | 0.4 |
| Farm plows, harrows, rollers, pulverizers, etc. & attachments | 29.3 | 0.0 | 2.5 | 3.3 | 0.0 | 0.0 |
| Farm dairy equipment, sprayers and dusters, farm blowers & attachments | 13.5 | 3.6 | 0.1 | 0.0 | 0.0 | -0.3 |
| Planting, seeding, fertilizing machinery & attachments | 14.2 | -6.2 | 0.1 | 3.4 | 0.0 | 0.0 |
| Harvesting machinery (except hay and straw) & attachments | 19.0 | 0.9 | 0.0 | 0.0 | 6.7 | 0.0 |
| Haying machinery & attachments | 16.0 | 0.0 | 0.0 | 4.7 | 0.0 | 0.1 |
| All other farm machinery & equipment, excluding parts, including attachments | 8.2 | 0.8 | 1.3 | 0.4 | -0.4 | -0.8 |
| Parts for farm machinery, for sale separately | 9.0 | 1.3 | 0.6 | 0.2 | 0.4 | 0.3 |

Farm plows, harrows, rollers, pulverizers and attachments reported the greatest year-over-year price increase in November, up 29.3% from November 2021. Commercial turf & grounds care equipment had the highest month-over-month price increase at +0.4%.

Source: U.S. Bureau of Labor Statistics, November 2022

technology if it isn't thought about in a different business model context.

"There could be an argument that that isn't how farmers want to pay for things. Though, I think farmers are savvy and just like anyone else, they don't like change, but they adapt when it is in their best interest. If CNHI hasn't modelled out how they see the payment structures working, I wonder whether they understand what actual take rates will be, churn rates, etc."

Comparing OEMs' Precision. A Dec. 8 note from analysts at J.P. Morgan compared the details from CNHI's Tech Day to the precision offerings from other OEMs. The analysts concluded that, "the common investor perception that John Deere is the clear leader in precision ag tech-

nology is likely overblown."

In comparing the tech stacks of AGCO, CNH Industrial, John Deere and Trimble, J.P. Morgan analysts said the manufacturers have more in common than not.

"All [these manufacturers] have developed technologies in-house and through acquisitions. For example, all have L3 autonomy (autonomy with operator assistance) for select applications and are currently working on L4+ solutions. Sense & act (through the use of lidar and AI technologies) is also a core capability being developed by each, albeit John Deere is likely to be the first to commercialize (beyond limited pilots) green-on-green spot spraying technology as early as 2024."

J.P. Morgan analysts also pointed out

that CNHI's estimated \$900 million in 2022 precision revenue could have been higher without supply chain constraints and that while operating margins among its precision tech is on average 1.5 times its ag segment margins, some products and services could be over 30%.

"Recall, CNHI acquired Raven in 2021, which had annual precision ag sales of around \$160 million at the time of the acquisition (CNHI has since divested its Engineered Films and Aerostar businesses) and was expected to generate around \$400 million and \$150 million run-rate sales and adjusted earnings before interest, taxes, depreciation and amortization synergies by 2025, respectively," the note from J.P. Morgan said. **AEI**

John Deere's Autonomy Plan: Late 2022 Investor Call Notes

In the Dec. 4, 2022, edition of *Upstream Ag Insights*, Shane Thomas highlighted a couple of interesting comments in the John Deere investor call.

Deere has emphasized that it will be equipping its new tractors and equipment with autonomy and autonomous functionality. But because the equipment upgrade cycle is only so fast, this could limit some of the growth potential and utilization of some of its new capabilities into its huge install base.

"The other thing that's really important with the rollout of autonomy is — and this is a little bit different than what you've seen in the past — is that we will roll out this technology, really retrofit first or field kit first as opposed to most of our technologies have

gone factory installed first," said Brent Norwood, director of investor relations, Deere & Co.

Referencing his October 2022 analysis on [AGCO and John Deere surrounding retro-fit kits](#), Thomas noted that as Deere moves further into new revenue models for its business, one area it needs to ensure stays top of mind is its dealer network. Today, the dealer incentives are strongly aligned with Deere's: sell more equipment, make more revenue. As Deere shifts toward a service based model for some of its "intelligent" capabilities on the tractor, that could lead to misaligned incentives for the OEM and the dealers, leading dealers not to invest in understanding how to sell those enhanced capabilities

to the farmer nor enabling farmers to derive the most value from them.

"We've also made a change to our dealer pay for performance. So we're including precision ag execution in that pay for performance," said Josh Jepsen, CFO, Deere & Co. "And that's a really important step as we think about continuing to drive the outcomes that we wanted to deliver and really a shift from adoption to utilization to make sure we're delivering on that and we're showing and demonstrating the incremental addressable unlock that we can create, which we think is differentiated for Deere."

John Deere has also reinforced a vision to have entirely autonomous soy and corn cropping systems available by 2030. **AEI**

South American Ag Equipment Intelligence

Argentinian Company Agrometal Expands Factory

Agrometal, a major seeder manufacturer from Argentina, is expanding its factory located in Monte Maiz by 21,528 square feet. The expansion includes new offices, improvements for production and more space for storage of raw materials.

Parts Distributor to Open 5 New Units in Mato Grosso

Rech, an agricultural machinery parts distributor, has announced an investment of over \$1 billion in the Brazilian state of Mato Grosso. The investment will add 5 new stores

in the state. In Brazil, Rech has 50 stores currently. Fabiola Montelmi, marketing manager at Rech, said the goal is to strengthen the company's presence in all the Brazilian regions, but especially in promising producing states like Mato Grosso. "In the next 3 years we will be in more states of the country. We use e-commerce, but physical stores are still important," said Montelmi. Since 2018, when Rech was acquired by Aqua Capital, the largest agribusiness fund in Brazil, it has expanded from operating in Mato Grosso only to 17 other states. **AEI**

Majors Plan for Electric, Alternative Fuel-Powered Equipment

During the Major line OEM panel at this year's [Ag Equipment Intelligence 2023 Executive Briefing](#) on Dec. 9, executives from 5 of the majors spoke about the main challenges impacting the ag equipment industry in the next 5 years. One topic they discussed was electric equipment and where they see its potential in the ag equipment industry.

Kubota. "Like everyone, we're working very diligently on electrification," said Alex Woods, vice president, sales operations, supply chain & parts, Kubota Tractor Corp. "We just had a meeting with our dealers in late October and showed them some concept prototype machines in several different segments — excavators, zero turns and tractors. Obviously the key is how to find value proposition for the customer and how to make sure we have an appropriately priced machine that is actually going to be saleable. With that in mind, we told our dealers we like to corner ourselves as 'smart followers' instead of 'early adopters.' We're looking at technologies being developed in other industries like the car industry and how we can start to adapt that. And you'll see us taking a pretty phased approach to how we move into electrification.

"We'll start with basically a 'first phase,' removing the diesel engine and then putting electric motors in machines. The next phase, we'll get more innovative and start to incorporate electric drives and so forth. What we're working diligently on is what that third phase will look like — a fully developed electric built machine. We're probably going to be 5-10 years out before we get to that phase, but I think you'll see us moving pretty quickly here within the next 1-2 years in getting into that first phase. And we'll probably start with a simpler machine, probably around zero-turn lawnmowers."

Case IH. "I'm not an electrification engineer, but I've spent a lot of time sitting around the boardroom table seeing where this technology could go, and it comes down to duty cycles, the time to charge and the infrastructure," said Kurt Coffey, vice president of North America Case IH. "A machine that runs 3-8 hours a day, has 40-80 horsepower

and stays within a certain distance of the home can fit within the duty cycle. There's infrastructure to recharge or to battery swap. But when you start talking about 400-600 horsepower tractors that leave the farm and come back a month later, the infrastructure is not there. The density of the power in a battery stack is not there, so you might look at other alternative fuels.

"It's exciting to see where electrification is going to go on rudimentary implementation control up to 80 horsepower, but where it's going to be in 10 years is difficult for me to telegraph."

Claas. "Infrastructure is something we're really going to have to pay close attention to, given the remote nature of a lot of the machines," said Eric Raby, senior vice president of Claas Americas region. "One thing that Kurt hit that we're looking at from the standpoint of Claas, is trying to determine what functions on a machine [we can address]. So

"Infrastructure is something we're really going to have to pay close attention to..."

if I take a combine for instance, instead of electrifying the power source only, are there certain aspects of a combine harvester that can be electrified? This would allow us to reduce the size of the diesel engine and have a battery on board. Are there certain parts of that machine that we can take away from each other, de-segregating those different things, and what power sources can we use for that?

"When we start looking at other implements on the seeding side of the market in general, we can translate some of the requirements for those machines to run blower fans, help with the seed metering, etc. Hydraulic capacity is only going to take us so far. We as an industry are at a crossroads again where we're looking at the interactivity of the different machines. What role does a tractor play, and what role does an implement play?"

AGCO: "AGCO's leaning hard into these areas, especially into alternative fuels, because without a doubt there's a benefit to the farmer," said Bill Hurley,

vice president of distribution Americas AGCO. "We just announced a new line this year of AGCO power engines called Core. Those engines are in place today in some of our products, and they're designed to be compatible with renewable fossil-free diesel fuels. With their base design, we've got the availability, as these things become reality, to operate those on other alternative fuels with some additional development.

"We have been public with our Fendt E100, which is an all-electric tractor that's in the advanced pilot stage. Our expectation is we'll see a commercial launch on that before 2025. We're working on other things, such as prototype tractors powered by hydrogen based fuel cell technology. The advancements of what our farmers will see over the next 5 years will be significant."

John Deere. "Across the customer segments we serve, the energy requirements from a lawnmower to production ag, the density is vastly different," said Joel Dawson, director, production & precision ag marketing John Deere. "We look at it in two different buckets. The first is battery electrification, the power of propulsion. And the second and more important for ag is electrically enhanced implements. When I say implements, it could also be a self-propelled machine that has electrified features. So often today we think about it in the terms of the implements, like an electrified row unit on a planter. But near-term opportunities for us are going to be on turf and small horsepower tractors.

"We plan to have battery electric options in each of those categories, but we do not plan to have a battery electric power propulsion in large ag equipment. We would look at 130 horsepower and below as opposed to the production ag propulsion business. There's a lot of other alternative fuels and alternative propulsion opportunities out there for ag, and we're certainly looking at that, but we really are going to see the small 130 horsepower and below segment lead the way for electrification."

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German Tractor Registrations Down in November, UK Registrations Up

According to a Dec. 12 note from J.P.Morgan, tractor registrations were down in October in Germany but up in the UK. Germany's over 100 horsepower registrations were up 14% year-over-year in November and up 1% year-to-date. In the UK, 50-plus horsepower tractor registrations were up 34% year-over-year and down 2% year-to-date.

CEAT Increases Radial Tire Production

CEAT Specialty Tires increased its production capacity of ag radial tires by 50% this year to meet growing demand in North America, according to a Nov. 28 report from *Modern Tire Dealer*. CEAT reportedly plans to increase radial ag tire production to 160 tons per day within the next 2 years.

Canadian Bill Addresses Majors Locking Shortlines Out of Their Equipment

According to the Dec. 12 *SwiftCurrent Online*, Canada's Private Members Bill C-294, which addresses shortline manufacturers' ability to access majorline equipment for ensuring interoperability, has passed a second reading in the House of Commons. Member of Parliament Jeremy Patzer, said, "[They are] locking them [shortline manufacturers] off the platform using these technological protection measures (TPMs), and it's under the guise of the Copyright Act that they're doing this. What we're doing is creating an exemption, so that these manufacturers have the certainty to be able to go around that TPM, get the information they need to make their product work on the platform of another company and be able to do so legally."

Dana Inc. Secures Long-Term Semiconductor Agreement

Powertrain manufacturer Dana Inc. announced Dec. 7 it had signed a long-term agreement with Semikron Danfoss to secure the supply of silicon-carbide semiconductors, which are designed to be scalable in multiple-chip formats. The semiconductors will be used in Dana's silicon-carbide inverter designs, including in off-highway markets.

Analysts Call EPA's Latest Biofuel Mixing Mandates 'Disappointingly Low'

A Dec. 6 note to investors from J.P. Morgan broke down the implications of the EPA's recently announced biofu-

els volume mandates for the next 3 years. The portion of the biofuels mixing mandate that is mainly fulfilled by biodiesel and renewable diesel will increase by only 300 million over the next 3 years vs. an annual average increase of 320 million renewable identification numbers over the last 7 years. "The EPA's volume mandates assume that total biomass-based diesel consumption increases by only 123 million gallons over the next 3 years, which could quite abruptly change the outlook for renewable diesel growth in the U.S.," the note said.

CEMA Business Climate Index Up in December

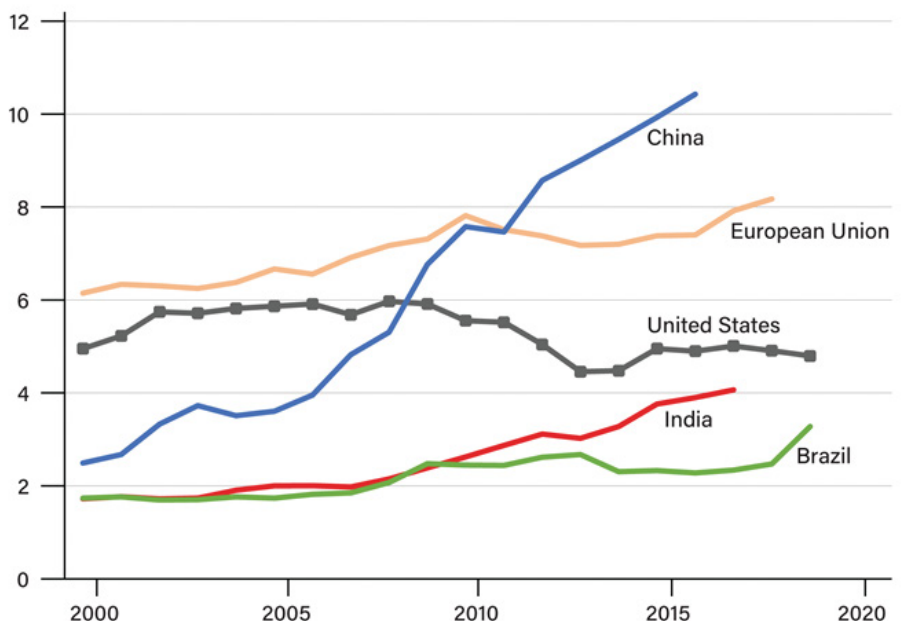
In its Dec. 14 update, CEMA's Business Climate Index rose to a reading of +30, showing the EU ag equipment industry has "solidified its first significant upward trend since the sharp declines in the course of the Russian war against Ukraine." Survey responses indicated supply chain issues have become more prevalent only in tractor and harvesting equipment production vs. other market segments "increasingly able to realize their orders."



Ag Equipment Data Points[©]

Investment in Public Agricultural Research and Development – 2009-19

Inflation-adjusted 2015 U.S. dollars, billions



Notes: R&D spending is presented in constant 2015 purchasing power parity (PPP) dollars by first deflating by national Gross Domestic Product (GDP) price indexes and then converting into dollars using the 2015 PPP exchange rate, allowing for comparisons over time and across countries.

Source: USDA, Economic Research Service (ERS) using data from the ERS data product *Agricultural Research Funding in the Public and Private Sectors (U.S. expenditures)*; ERS *Economic Research Report 249. Agricultural Research Investment and Policy Reform in High Income Countries (European Union expenditures)*; *International Food Policy Research Institute's Agricultural Science and Technology Indicators (expenditures for China, India and Brazil)*; and the World Bank's *World Development Indicators (GDP price indexes and PPP exchange rates)*.

Combine Sales Growth Strong in November

Large ag equipment unit sales rose 7.2% year-over-year in November. Combined U.S./Canada large ag equipment unit sales rose 7.2% in November vs. rising 29.6% in October. U.S. large ag equipment sales were up 6.7% (October: +33.5%), Canada large ag equipment sales were up 9.8% (October: +10.2%). U.S. dealer inventories were up 89.8% year-over-year in 2WD, down 19.2% year-over-year in 4WD, and up 34.3% year-over-year for combines. “Large vs. small ag equipment divergence continues, a key element to watch in 2023. USDA selling price estimates lowered \$0.10/bushel for corn and wheat, unchanged for soybeans,” said RW Baird analyst Mig Dobre.

U.S. sales of 4WD tractors were up 7.1%, row-crop tractors were up 6.2% and combines were up 8.3%. Canada 4WD tractors were up 170.6%, row-crop tractors were down 14.5%, combines were up 105.3%.

- 4WD tractor sales were up 23.4% year-over-year in November following a 10.5% increase in October (L3M sales +0.5% year-over-year vs. -1.3% in October). U.S. dealer inventories of 4WD tractors were down 19.2% year-over-year in October.

- Row-crop tractor sales were up 2.5% year-over-year in November following a 21.1% increase in October; November L3M sales were up 15.2% vs. a 17.2% increase in October. U.S. row-crop tractor inventories were up 39.7% year-over-year in October, the 7th consecutive month of inventory growth and the highest growth since June 2013.

- Combine sales were up 19.5% year-over-year in November after a 64.7% increase in October. November L3M sales were up 42.6% year-over-year vs. 41.1% in October. U.S. combine inventories were up 34.3% year-over-year in October.

- Mid-range tractor sales were down 10.4% year-over-year in November (October +0.8%, September -8.3%) while compact tractor sales fell for the 9th consecutive month, down 26.3% year-over-year (October -22.1%, September -16%).



NOVEMBER U.S. UNIT RETAIL SALES



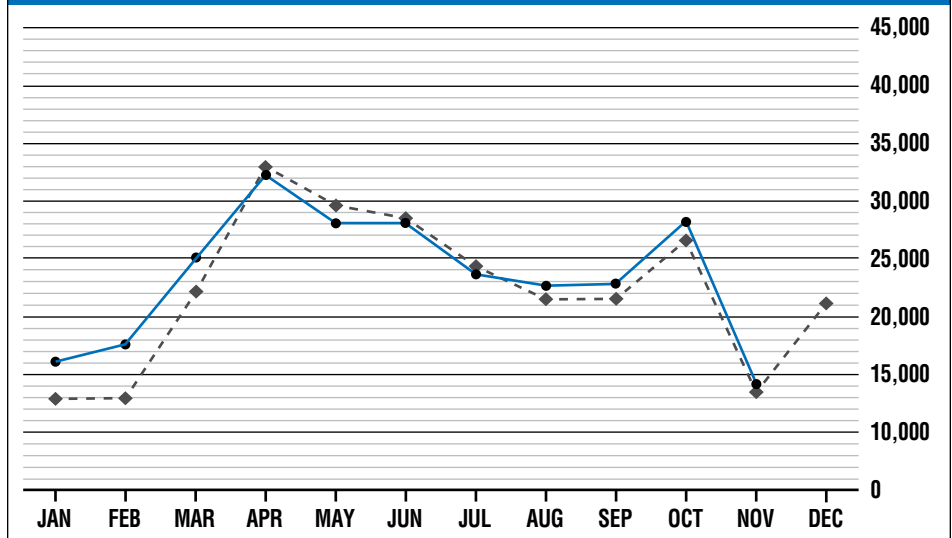
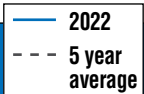
| Equipment | November 2022 | November 2021 | Percent Change | YTD 2022 | YTD 2021 | Percent Change | Beginning Inventory November 2022 |
|-------------------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------------------------|
| Farm Wheel Tractors-2WD | | | | | | | |
| Under 40 HP | 8,266 | 11,470 | -27.9 | 163,105 | 200,768 | -18.8 | 82,707 |
| 40-100 HP | 4,055 | 4,542 | -10.7 | 60,969 | 68,316 | -10.8 | 27,499 |
| 100 HP Plus | 1,278 | 1,203 | +6.2 | 23,665 | 20,878 | +13.3 | 7,337 |
| Total-2WD | 13,599 | 17,215 | -21.0 | 247,739 | 289,962 | -14.6 | 117,543 |
| Total-4WD | 165 | 154 | +7.1 | 2,949 | 3,137 | -6.0 | 311 |
| Total Tractors | 13,764 | 17,369 | -20.8 | 250,688 | 293,099 | -14.5 | 117,854 |
| SP Combines | 314 | 290 | +8.3 | 6,535 | 5,646 | +15.7 | 670 |

NOVEMBER CANADIAN UNIT RETAIL SALES



| Equipment | November 2022 | November 2021 | Percent Change | YTD 2022 | YTD 2021 | Percent Change | Beginning Inventory November 2022 |
|-------------------------|---------------|---------------|----------------|---------------|---------------|----------------|-----------------------------------|
| Farm Wheel Tractors-2WD | | | | | | | |
| Under 40 HP | 1,274 | 1,482 | -14.0 | 18,102 | 19,952 | -9.3 | 7,938 |
| 40-100 HP | 646 | 703 | -8.1 | 6,247 | 6,534 | -4.4 | 2,676 |
| 100 HP Plus | 224 | 262 | -14.5 | 3,409 | 3,357 | +1.5 | 1,406 |
| Total-2WD | 2,144 | 2,447 | -12.4 | 27,758 | 29,843 | -7.0 | 12,020 |
| Total-4WD | 46 | 17 | +170.6 | 669 | 679 | -1.5 | 45 |
| Total Tractors | 2,190 | 2,464 | -11.1 | 28,427 | 30,522 | -6.9 | 12,065 |
| SP Combines | 78 | 38 | +105.3 | 1,812 | 1,654 | +9.6 | 165 |

U.S. UNIT RETAIL SALES OF 2WD & 4WD TRACTORS & COMBINES



— Assn. of Equipment Manufacturers

Private Equity Companies & Ag Equipment Holdings

Presented below is *Ag Equipment Intelligence's* fourth rendition of its Private Equity Companies & Ag Equipment Holdings list, newly updated after the last publishing in December 2021. This edition features new firms, including some involved in the recent fundings of Sabanto and Verdant Robotics.

Below is an abbreviated version of a much longer list

including company descriptions, key contacts, assets under management (AUM), years founded, etc.

For comments regarding companies that are or are not cited, or to submit your feedback on additional lists and how they may be helpful to you in your business, send an email to bthorpe@lessitermedia.com. **AEI**

| Company | Ag Equipment Category | Portfolio (Current & Previous Holdings) | Headquarters | State |
|------------------------------------|----------------------------|---|----------------|---------|
| AEA Investors | Manufacturers | Olson Irrigation Systems (2017) | New York City | NY |
| Ag Solutions Group Holding Company | Dealerships | Livingston Machinery (2021), Ag Solutions Group (2021) | - | - |
| AgFunder | Manufacturers | Verdant Robotics (2022), Aigen, Tevel, Bear Flag Robotics, Solinftec | San Francisco | CA |
| Alumni Capital | Manufacturers | Art's Way Manufacturing (2022) | New York City | NY |
| Anthos Capital | Manufacturers | Carbon Robotics (2021) | Menlo Park | CA |
| Arable Capital Partners | Manufacturers | Hydratec, Lodi Pump & Irrigation (2018), Universal Irrigation (2018), U.S. Irrigation | Bakersfield | CA |
| Argonne Capital Group | Dealerships | Belkorp Ag, LandPro Equipment, Lakeland Equipment and Z&M Ag and Turf (2017) | Atlanta | GA |
| Astanor Ventures | Manufacturers | Monarch Tractor (2021) | Brussels | Belgium |
| At One Ventures | Manufacturers | Monarch Tractor (2021) | San Francisco | CA |
| Aurelius | Manufacturers | Moveero (2020) | Munich-City | Germany |
| AutoTech Ventures | Manufacturers | Verdant Robotics (2022) | Menlo Park | CA |
| B12 Capital Partners | Manufacturers | Arrow Material Handling Products (2013) | Kansas City | MO |
| BDC Capital Inc. | Dealers | JLD Lague Group (2019) | Montreal | QC |
| Black Cliff Partners | Dealerships | BCP Equipment, Cache Equipment, Sunset Kubota, Valley Kubota (2020) | Salt Lake City | UT |
| Black Diamond Capital Management | Manufacturers | Arclin (2010) | Greenwich | CT |
| Blackthorne Partners | Manufacturer | Berlon Industries (2012) | Delafield | WI |
| BMO Capital Partners | Dealerships | JLD Lague Group (2019) | - | - |
| Catapult Ventures | Manufacturers | Advanced Farm Technologies (2021) | Los Altos | CA |
| Cavallo Ventures | Manufacturers | Verdant Robotics (2022), Agtonomy, Sabanto, Bountiful Ag | San Francisco | CA |
| Champlain Financial Corp. | Dealerships | JLD Lague Group (2011) | Montreal | QC |
| Charlesbank Capital Partners | Manufacturers | GSI (2005-07) | Boston | MA |
| Cibus Fund Enterprise | Manufacturers | Burro (2021), Connecterra (2020) | London | UK |
| Cooperative Ventures | Manufacturers | Sabanto (2022) | - | - |
| Cyprium Partners | Dealerships | United Ag & Turf (2018) | Cleveland | OH |
| DCVC Bio | Manufacturers | Verdant Robotics (2022), Sabanto, Halter, Blue River Technology (exited) | Palo Alto | CA |
| Dyson, Dyson & Dunn Inc. | Manufacturers | Roto-Mix | Winnetka | IL |
| EverWatch Financial | Dealerships | Booth Machinery (2014) | Providence | RI |
| F-Prime Capital | Manufacturers | Burro (2021) | Cambridge | MA |
| Fernandez Holdings Inc. | Dealerships, Manufacturers | Green Source Automation, United Ag & Turf | Los Angeles | CA |
| ffVC | Manufacturers | Burro (2021) | - | - |
| Fondaction CSN | Dealerships | JLD Lague Group (2019) | Montreal | QC |
| Fonds de Solidarité FTQ | Dealerships | JLD Lague Group (2019) | Pointe-Claire | QC |
| Forage Capital Partners | Manufacturers | S3 Enterprises (2021) | Calgary | AB |
| Fuse Venture Capital | Manufacturers | Carbon Robotics (2021) | Bellevue | WA |
| Future Ventures | Manufacturers | Verdant Robotics (2022) | Los Altos | CA |

| Company | Ag Equipment Category | Portfolio (Current & Previous Holdings) | Headquarters | State |
|---|-----------------------------------|---|-----------------|---------|
| GENNX360 Capital Partners | Manufacturers | Salford (2013) | New York City | NY |
| Genstar Capital | Manufacturers | Arrowhead Engineered Products (2021), Stens (2021) Tiger Lights (2021) | San Francisco | CA |
| GV | Manufacturers | Agtonomy (2022) | San Francisco | CA |
| Hanover Partners Inc. | Manufacturers | Westside Equipment Co. | San Francisco | CA |
| Hico Capital | Manufacturers | Sabanto (2022) | – | CA |
| Idaho Legacy Fund | Manufacturers | Double L (2021) | Boise | ID |
| Ignition Partners | Manufacturers | Carbon Robotics (2021) | Los Altos | CA |
| Impact Ventures | Manufacturers | Advanced Farming Technologies (2021) | Dallas | TX |
| Kinderhook | Suppliers | All Stages Ag Parts (2018) | New York | NY |
| KPS Capital Partners | Manufacturers | Briggs & Stratton (2020) | New York | NY |
| LFM Capital LLC | Manufacturers | Fecon (2018-21), IronCraft (2022), Construction Implement Depot (2022) | Nashville | TN |
| Lifco | Manufacturers | Solesbee's (2017) | Enköping | Sweden |
| Lineage Capital | Manufacturers | Diamond Mowers (2018) | Boston | MA |
| Liquid2 Ventures | Manufacturers | Carbon Robotics (2021) | San Francisco | CA |
| Little Engine Ventures | Manufacturers | Stable'N (2018) | Lafayette | IN |
| Mason Wells Inc. | Manufacturers | L.B. White (2017) | Milwaukee | WI |
| McCombie Group | Dealerships | Atlantic Tractor (2017) | Coral Gables | FL |
| Midwest Growth Partners | Manufacturers, Dealerships | Jack Rabbit (2019), Maytag Dairy Farms (2019), Van Becelaere Machine Works (2018), Fast Ag Solutions (2020), Livingston Machinery (2021), Ag Solutions Group (2021) | West Des Moines | IA |
| Mutares SE & Co, | Manufacturers | Japy (2020), Royal de Boer (2020) | London | England |
| Northcreek Mezzanine | Dealerships | Ag Solutions Group, Livingston Machinery (2021) | Cincinnati | OH |
| October Capital | Equipment Sharing Solutions | MachineryLink | Kansas City | MO |
| ONCAP | Manufacturers | Ingersoll (2015), Bellota (2015), Venanpri Group (2015) | Toronto | ON |
| One Equity Partners (OEP) | Manufacturers | Walterscheid Powertrain Group (2019) | Chicago | IL |
| Paine Schwartz Partners | Manufacturers | Rivulis (2018) | New York City | NY |
| Prospect Partners | Manufacturers, Dealerships | Irrigation Components International (2012), Landmark Irrigation | Chicago | IL |
| Radicle Growth | Manufacturers | Burro (2021) | San Diego | CA |
| Riverside Company | Manufacturers | Arrowhead Engineered Products (2015-21), Stens (2016-21), Tiger Lights (2021-21) | New York City | NY |
| Rockmont Capital | Manufacturers | Timpte, SpeeCo | Denver | CO |
| Roynat Equity Partners | Manufacturers, Dealerships | S3 Enterprises (2021), JLD-Lagué | Calgary | AB |
| S2G Ventures | Manufacturers | Burro (2021), Arable, | Chicago | IL |
| SeaX Ventures | Manufacturers | Verdant Robotics (2022) | Millbrae | CA |
| Summit Equity Group | Manufacturers, Dealerships | Ag Solutions Group (2021), Dalton Ag Products, Fast Ag Solutions | Des Moines | IA |
| SVG Ventures (THRIVE Accelerator Program) | Manufacturers, Software Solutions | Arable, farm(x), VeriGrain, Tensorfield, Burro, MagGrow | Los Gatos | CA |
| Syngenta Group Ventures | Manufacturers | Greeneye Technology | – | – |
| TA Associates | Software Solutions | e-Emphasys Technologies (2022) | Boston | MA |
| Tecum Equity Partners | Dealerships | Tidewater Equipment Company (2018) | Wexford | PA |
| Toyota Ventures | Manufacturers | Burro (2021), Agtonomy (2022) | Los Altos | CA |
| Trimble Ventures | Manufacturers | Monarch Tractor (2021) | Sunnyville | CA |
| Trivest | Manufacturers | Northfield Industries (2014) | Coral Gables | FL |
| True Wind Capital | Software Solutions | e-Emphasys Technologies (2022) | San Francisco | CA |
| TVV Capital | Manufacturers | Bigham Brothers (2013), Pityonak Machinery Corp. (2013) | Nashville | TN |
| Voyager Capital | Manufacturers | Carbon Robotics (2021) | Seattle | WA |

| Company | Ag Equipment Category | Portfolio (Current & Previous Holdings) | Headquarters | State |
|---|----------------------------|---|--------------|-------|
| W3 LLC | Manufacturers | Ingersoll (previous) | Boulder | CO |
| Westcap Management | Manufacturers, Dealerships | Degelman (2020), Riteway, Rocky Mountain Dealerships (2021) | Saskatoon | SK |
| Windjammer Capital | Manufacturers | Fecon LLC (2022) | Waltham | MA |
| Yamaha Motor Ventures & Laboratory Silicon Valley | Manufacturers | Advanced Farm Technologies (2019), Verge Ag (2022) | Palo Alto | CA |
| Yorkville Advisors Global LP | Manufacturers | Future Farm Technologies (2019) | Mountainside | NJ |

AG EQUIPMENT INTELLIGENCE LISTS

Equipment Dealers' Top Concerns for 2023

The 2023 *Ag Equipment Intelligence Dealer Business Outlook & Trends* report included survey data that shared what issues are keeping North American dealers “up at night” along with how those same concerns ranked on the list in 2022. **AEI**

Dealers' Issues & Concerns – 2023 (% of all dealers)

| | Most Concerned | Not Concerned | Least Concerned | 2022 rank |
|--|----------------|---------------|-----------------|-----------|
| 1. Increasing Cost of New Equipment | 64.8% | 34.3% | 0.9% | 4 |
| 2. Technician Availability | 73.3% | 25.7% | 1.0% | 2 |
| 3. Interest Rate Increases | 49.0% | 46.1% | 4.9% | NA |
| 4. Farm Input Costs | 46.1% | 49.0% | 4.9% | 5 |
| 5. New Equipment Inventory | 56.3% | 35.0% | 8.7% | 3 |
| 6. Energy/Fuel Costs | 36.4% | 52.5% | 11.1% | 10 |
| 7. All Other Employee Availability | 30.1% | 58.3% | 11.7% | 1 |
| 8. Farm Commodity Prices | 28.0% | 55.0% | 17.0% | 8 |
| 9. Cybersecurity/Ransomware | 10.0% | 70.0% | 20.0% | NA |
| 10. Shrinking Farm Customer Base | 25.0% | 54.8% | 20.2% | 6 |
| 11. Product Reliability | 31.6% | 47.4% | 21.1% | 11 |
| 12. Health Care Affordability | 20.6% | 56.9% | 22.6% | 9 |
| 13. Used Equipment Inventory | 26.7% | 48.6% | 24.8% | 7 |
| 14. Labor Regulation | 10.1% | 59.6% | 30.3% | 12 |
| 15. Financing Availability – Retail | 10.7% | 48.5% | 40.8% | 17 |
| 16. Dealer Succession Requirements | 13.5% | 45.2% | 41.4% | 15 |
| 17. Dealer Consolidation | 20.4% | 34.0% | 45.6% | 16 |
| 18. Dealership 'Purity' Efforts by Majors | 18.5% | 35.0% | 46.6% | 14 |
| 19. Financing Availability – Floorplanning | 11.7% | 38.8% | 49.5% | 18 |
| 20. Business Loss from Right-to-Repair | 6.8% | 42.7% | 50.5% | NA |
| 21. Manufacturer Consolidation | 6.1% | 37.8% | 56.1% | 19 |

In its first time on the survey, interest rate increases became North American dealers' #3 issue for 2023, with 95.1% “concerned” or “most concerned” about it (topics were ranked by percentage of dealers who were least concerned).

Source: *Ag Equipment Intelligence Outlook & Trends* surveys