



**JOHN DEERE**

**2022  
Sustainability  
Report**

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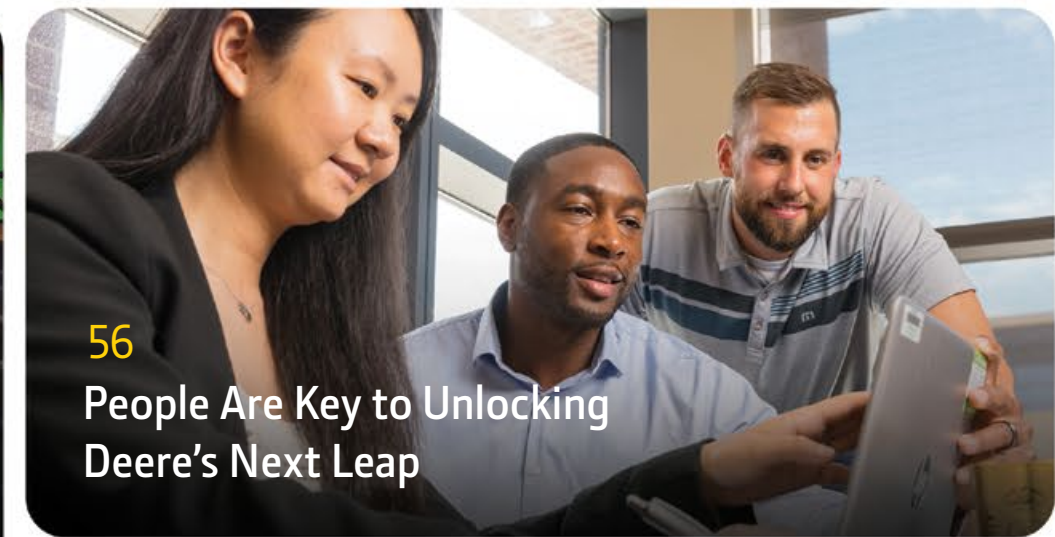
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# Chairman & CEO Letter

Early in my career, I was taught the best way to understand the value of John Deere's work was to see it through the eyes of the people we serve. And as we continue to develop deeper relationships with our customers and within our home communities, that impact only grows.

By standing with farmers in their fields we see the significance our new fully autonomous 8R Tractor and tillage solution brings to their lives. We gain an understanding of how it helps them tackle two jobs at once, allowing them to stay in their combine and monitor yield at harvest while the 8R navigates the chore of fall tillage all on its own. And our impact can be seen inside the cab of a 400 Series Sprayer as computer vision and machine learning guide See & Spray™ Ultimate to make complex decisions within the blink of an eye, reducing herbicide use by up to two-thirds. And while these advanced machines pass through the field, we're gathering vital sensor readings in the John Deere Operations Center™, enabling traceability and helping farmers earn more while becoming deeply engaged in the sustainability of every acre they manage.

We're also on jobsites, working with contractors and earthmoving crews to help increase productivity and make their hard work a little bit easier. To that end, we've introduced grade management technology innovations, which are currently available on crawlers, motor graders, excavators, and compact track loaders. In an industry battling inefficient rework, this technology helps make sure every ounce of dirt is moved precisely where it's needed without more passes than necessary. It's all part of our focus on answering the demand for smarter, safer, and more sustainable solutions.

We understand that to continue to innovate and advance technologies, we first must invest in ourselves. We're doing this through our efforts to recruit and retain diverse talent and foster an equitable workplace that maximizes unique views and lived experiences. We take pride in our workforce — including inside our factories — where ideas and innovation meet up with skilled labor and quality, serving as a key differentiator over our competitors and enabling customer success.

To make the commitment to our people more than just words, I am proud to have added a new position to my executive leadership team, hiring the company's first Chief People Officer.

All of this points to who we are as a business, but who we are as a company is equally important.

That's why it's when we stand together in service to our communities around the world that I get my greatest satisfaction. It's here that we work with food banks to distribute meals and nourishment to families in need. Currently, challenges in the food system often prevent those experiencing hunger from having ready access to food. Through investments by the John Deere Foundation and the volunteerism of our employees, we are helping create new and more equitable distribution channels, helping to get food into the hands of those who need it most.

These examples are just a few of many mapped by our Leap Ambitions — focused, measurable goals set to make our customers more efficient, profitable, and sustainable while meeting the demands of a quickly changing world. These goals include our commitment to reducing the greenhouse gas impact of our operations and products, with validated Science Based Targets covering Scope 1, 2, and 3 greenhouse gas emissions. To achieve these targets, we are pursuing the expansion of renewable fuels across multiple products and geographies and are in various stages of development and launch on battery electric pavers, rollers, excavators, turf and utility equipment, and backhoes.

Our efforts show the breadth and depth of our higher purpose: We run so life can leap forward.

That means we run for the impact we can have when our products and people are involved. We run for food, shelter, fiber, and fuel. We run for the environment and society.

In short, we run for all.

Thank you for running with us.

  
Chairman & CEO



SHAREHOLDER VALUE ADDED

**\$6.23 B  
USD**



EQUIPMENT  
OPERATIONS OROS

**17.4%**

**\$52.58 B  
USD**

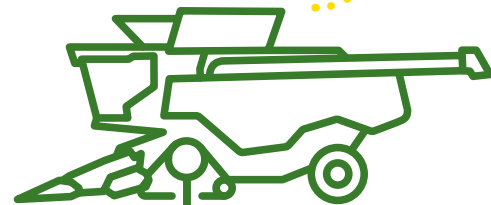
NET SALES AND REVENUES

**2022  
Highlights**



**500 K**

TOTAL CONNECTED  
MACHINES



**\$367.6 M  
USD**

REMANUFACTURING REVENUE



**9.2%**

INCREASE OF WOMEN  
IN SENIOR MANAGEMENT  
IN THE U.S. FROM 2021

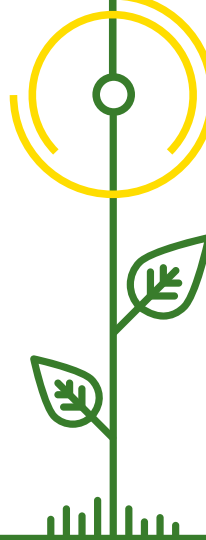


**6.6%**

INCREASE OF NON-WHITE  
SENIOR MANAGEMENT  
EMPLOYEES IN U.S. FROM 2021

**329 M**

ENGAGED ACRES



**151 M**

SUSTAINABLY  
ENGAGED ACRES

**68 M**

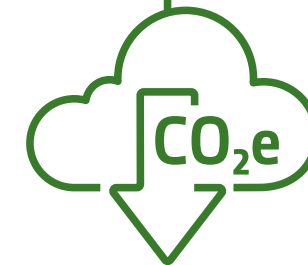
HIGHLY ENGAGED  
ACRES

**29%**

OPERATIONAL GHG  
(SCOPE 1 AND 2) EMISSIONS  
REDUCTION SINCE 2017

**\$55.5 M  
USD**

CHARITABLE CONTRIBUTIONS



SCOPE 1, 2, AND 3 GHG  
EMISSIONS REDUCTION  
TARGETS VALIDATED  
BY THE SCIENCE BASED  
TARGETS INITIATIVE

# Outcomes of 2022 Sustainability Goals



While John Deere launched its Leap Ambitions in early 2022, which define its priorities for driving sustainable outcomes over the remainder of this decade, we also continued delivering on the previous suite of 2022 Sustainability Goals. The progress the company made toward the 2022 goals set the foundation for our Leap Ambitions.

The company is proud to have not only met but exceeded its goals around operational sustainability, exceeding both the Scope 1 and 2 greenhouse gas emissions and renewable electricity goals. John Deere also proudly met its goal related to water best management practices and was within one percent of achieving its waste recycling goal, despite headwinds in recycling markets. Even with these successes, the company has challenged itself again — setting validated Science Based Targets for greenhouse gas emissions and a new focus on minimizing water and waste intensity.

John Deere's remanufacturing business saw solid growth during the goal period but remained short of its original goal. Challenges with respect to supplier capacity and material availability, impacted by the COVID-19 pandemic, hindered progress. Recognizing the importance of this segment of the business to Deere's sustainability journey, the Leap Ambitions have set this target for future growth even higher.

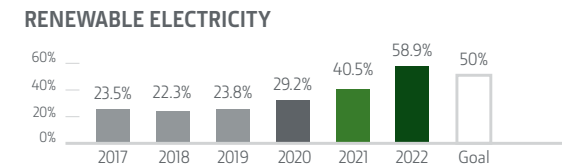
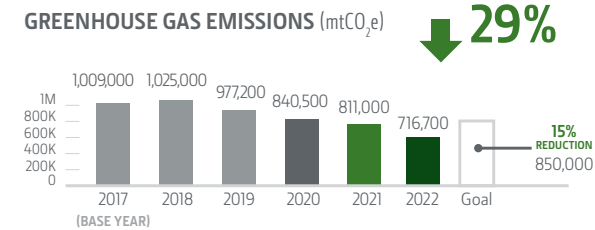
With the launch of the Leap Ambitions, Deere immediately began focusing on embedding sustainability into every part of the business. As a result, this impacted how we manage our product programs. Therefore, the goal of reducing the environmental impact of new product programs was absorbed by other initiatives, so the measurement of this goal was discontinued for fiscal year 2022. Instead, our teams are now measuring efforts on Scope 3 Category 11 GHG emissions, sustainable materials, and recyclable content as it relates to new product programs.

Lastly, we continue to prioritize our people as the most important part of our business. Over the goal suite, our facilities incorporated health and safety programs focused on leading indicators and prevention. In fiscal year 2022, Deere saw total recordable incidents rise due in part to the increased demand for products and resulting increased production workforce. Looking to the future and the Leap Ambitions, the company will continue to prioritize the safety and well-being of people by concentrating on reducing ergonomic targeted risks through increased assessment and prevention through design program implementation.



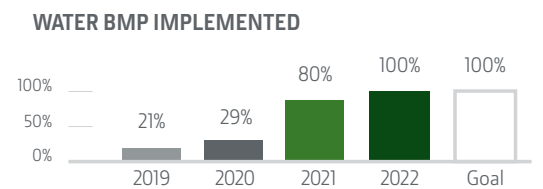
## SUSTAINABLE ENERGY USE<sup>1</sup>

Reduce greenhouse gas emissions by 15% through 50% renewable electricity supply and excellence in energy efficiency.



## USE WATER RESPONSIBLY<sup>2</sup>

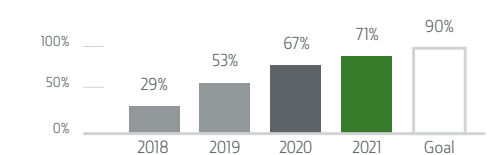
Implement water best management practices (BMP) in 100% of water-scarce manufacturing locations.



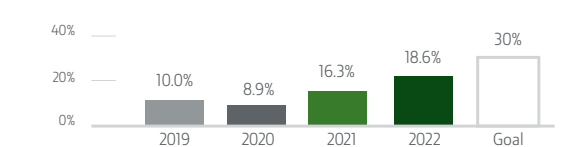
## PRODUCT SUSTAINABILITY<sup>2</sup>

Reduce environmental impact, including CO<sub>2</sub>e emissions, on 90% of new products. Increase the use of sustainable materials by growing remanufactured and rebuild sales by 30% and by increasing recyclable, renewable, and recycled content.

### NEW PRODUCT PROGRAMS WITH LOWER ENVIRONMENTAL IMPACT<sup>3</sup>



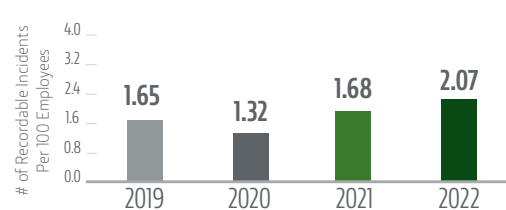
### REMANUFACTURED AND REBUILD SALES GROWTH



## OCCUPATIONAL HEALTH AND SAFETY<sup>2</sup>

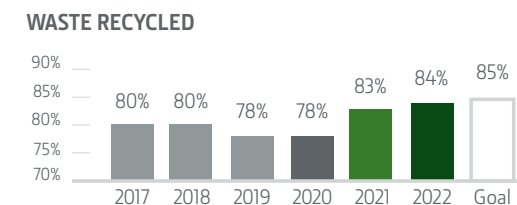
Achieve safety excellence through increased focus on leading indicators, risk reduction, health- and safety-management systems, and prevention.

### ENTERPRISE TOTAL RECORDABLE INCIDENT RATE



## INCREASE RECYCLING<sup>2</sup>

Recycle 85% of total waste.



<sup>1</sup> Data associated with the operations of Unimil is incorporated into the 2022 metric only.

<sup>2</sup> Data associated with the operation of PLA Holding Netherlands B.V., Mazzotti S.r.l., King Agro Europa, S.L., and Unimil, and their related subsidiaries, and the Wirtgen Group entities, is not included in the reported metrics. The data associated to these goals align with the sites in operation during the base year of the goal period.

<sup>3</sup> Due to the organizational shift towards prioritizing Leap Ambitions, this program goal and associated data tracking ended in fiscal year 2021.

# Sustainability Priorities and Reporting Strategy

The foundation of John Deere's sustainability strategy is a multipronged engagement strategy to continually evaluate and identify our highest-priority sustainability topics. Deere completed a formal sustainability materiality assessment in 2021.<sup>1</sup> The company utilized that assessment in numerous ways this year. Our highest-priority topics served as the focus areas for the Leap Ambitions, released in February 2022. As seen in this report, the highest-priority topics and Leap Ambitions guided our approach to sustainability reporting. And we utilize these topics to align with our internal Enterprise Risk Management process.

To proactively monitor and assess our topics on a continual basis, we engage with stakeholders that rely on Deere to deliver economic and sustainable outcomes, including our shareholders. Throughout 2022, we engaged with shareholders representing more than 40 percent of outstanding share ownership in conversations on governance, executive compensation, and sustainability, providing us valuable insights. A key focal point of our sustainability and focused outreach this year was Deere's Leap Ambitions.

In response to the feedback received this year, some of the actions included:

- Developed baselines and glide paths for our Leap Ambitions, to enable qualitative discussion within this report as to our roadmap for achieving these goals
- Validated science-based targets for our Scope 1, 2, and 3 greenhouse gas emissions with the Science Based Targets initiative
- Incorporated qualitative discussion of the innovation and partnership efforts we are undertaking to achieve our Scope 3 downstream greenhouse gas emissions reduction goal by 2030
- Highlighted employee-led efforts around biodiversity in this report
- Expanded detail on our holistic approach to talent management and strategy for embedding diversity, equity, and inclusion into the core of how we operate

We continually monitor and review developing sustainability frameworks, standards, and global regulations by incorporating those we deem most applicable to our business into our reporting. This year's reporting continues to align with the material issues identified by the Sustainability Accounting Standards Board (SASB) for the Industrial Goods and Machinery industry. We also continue to include a report in line with the Task Force on Climate-related Financial Disclosures (TCFD). Appendices connecting our disclosures to the priorities set by the Global Reporting Initiative (GRI) and the United Nations Sustainable Development Goals (UN SDGs) are also provided. Deere continues its reporting to the Carbon Disclosure Project (CDP) on an annual basis. In light of the dynamic regulatory environment around sustainability and climate change, including the Securities and Exchange Commission (SEC)-proposed climate disclosures and the European Union's Corporate Sustainability Reporting Directive (CSRD), this year we also engaged in pre-audit assessment activities to ensure we are prepared to meet the requirements of future potential regulation.

<sup>1</sup> In this report, we are not using such terms "material" or "materiality" as they are used under the securities or other laws of the U.S. or any other jurisdiction, or as they are used in the context of financial statements and financial reporting. Materiality, for the purposes of this document should not, therefore, be read as equating to any use of the word in other Deere reporting or filings, including those filed with the U.S. Securities and Exchange Commission (SEC).

## HIGHEST-PRIORITY TOPICS

### ENVIRONMENTAL

- Climate Stewardship
- Emissions & Energy
- Harmful & Hazardous Chemicals & Substances
- Land, Habitat, & Forest Conservation
- Recyclability & Product Lifecycle Impacts
- Soil Health
- Sustainable Food & Agriculture
- Waste
- Water Quality & Availability

### SOCIAL

- Diversity, Equity, & Inclusion
- Employee Health, Safety, & Wellness

### GOVERNANCE

- New Technologies & Innovations
- Urbanization & Sustainable Infrastructure

## TOPICS FOR ACTIVE MANAGEMENT AND MONITORING

### SOCIAL

- Dealership Talent
- Product Quality, Durability, & Reliability
- Product Safety & Health
- Talent Attraction, Engagement, & Retention
- Traceability, Nutrition, & Sustainable Diets
- User/Customer Experience & Satisfaction

### GOVERNANCE

- Data Privacy & Product Security
- Geopolitical Events
- Human Rights & Labor Relations
- Intellectual Property (IP)
- Market Access & Trade Barriers
- Political Participation & Advocacy
- Responsible Supply Base & Sourcing



# LEAP AMBITIONS

## INCREMENTAL ADDRESSABLE MARKET OPPORTUNITY

> \$150 BILLION USD

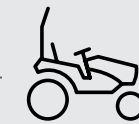
## EXECUTING OUR STRATEGY



### PRODUCTION & PRECISION AG

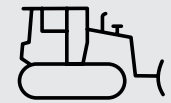
**By 2026**  
– Reach 500 million engaged acres\* with 50% highly engaged\*\*

**By 2030**  
– Ensure 75% of engaged acres are sustainably engaged acres\*\*\*



### SMALL AG & TURF

**By 2026**  
– Ensure 100% of new Small Ag equipment is connectivity enabled  
– Offer an electric option in each Turf and Compact Utility Tractor product family  
– Deliver a fully autonomous, battery-powered electric ag tractor to the market



### CONSTRUCTION & FORESTRY

**By 2026**  
– Deliver 20+ electric and hybrid-electric product models  
– Earthmoving: Increase grade management adoption to 50%  
– Forestry: Boost Intelligent Boom Control adoption to 100%  
– Roadbuilding: Increase Precision Roadbuilding Solutions adoption to 85%

DELIVER ONGOING VALUE TO CUSTOMERS IN ALL THREE BUSINESS SEGMENTS

Connect **1.5 million** machines by 2026  
Demonstrate viable low/no carbon alternative power solutions by 2026  
Grow enterprise **recurring revenue to 10%** by 2030

## FINANCIAL AND SUSTAINABLE OUTCOMES

### Equipment Operations OROS at 20% by 2030



#### Enhance Ag Customer Outcomes by 2030

- Improve nitrogen use efficiency 20%<sup>†</sup>
- Increase crop protection efficiency 20%<sup>†</sup>
- Reduce 15% of customer CO<sub>2</sub>e emissions<sup>†</sup>



#### Product Circularity by 2030

- Achieve 95% recyclable product content
- Ensure 65% of product content is sustainable material
- Grow 50% in remanufacturing revenue



#### Safety by 2026

- Improve Total Recordable Incident Rate 20%



#### Reduce Environmental Footprint by 2030

- 50% of operational CO<sub>2</sub>e emissions (Scope 1 & 2)
- 30% of upstream and downstream CO<sub>2</sub>e emissions (Scope 3)
- 15% of waste intensity
- 10% freshwater consumption intensity at water-stressed manufacturing locations

\* Engaged acres is one of the foundational measures of customers' use of the John Deere Operations Center™ (our online farm management system). It reflects the number of unique acres with at least one operation pass documented in the Operations Center in the past 12 months.

\*\* Highly Engaged Acres include documentation of multiple production steps and the use of digital tools to complete multiple, value creating activities over a 12-month period.

\*\*\* Sustainably engaged acres include incorporation of two or more sustainable John Deere technology solutions or sustainable practices over a 12-month period.

<sup>†</sup>Per unit of output.

# Sustainable Customer Outcomes



## OUR PRIORITIES



### DEVELOPING SOLUTIONS THAT DELIVER ALIGNED SUSTAINABLE AND FINANCIAL OUTCOMES FOR CUSTOMERS

- 1.5 million connected machines by 2026 is the foundation of Deere's solutions roadmap
- Partnering with customers through engaged, highly engaged, and sustainably engaged acres enables partnerships to unlock further economic and innovation opportunities for farmers
- Crop protection and nitrogen use efficiency goals to drive productivity and reduce ag customer CO<sub>2</sub>e emissions
- C&F Smart Solutions to increase productivity, precision, and profitability

## WHAT WE HAVE DONE



### FORMED KEY PARTNERSHIPS:

- Iowa State University demonstration farm
- Cargill-John Deere Carbon Tracking pilot program
- GUSS Automation joint venture



### KEY PRODUCT INNOVATIONS:

- ST Series Strip-Till
- See & Spray™ Ultimate: targeted, in-crop spraying application
- Announced ExactShot™: in-furrow liquid fertilizer system at CES® 2023
- Announced HarvestLab™ 3000: grain sensing solutions
- Announced fully autonomous 8R fall tillage solution



### EXPANDED PRECISION TOOLS FOR CONSTRUCTION, FORESTRY, AND ROADBUILDING CUSTOMERS:

- Added Intelligent Boom Control to tracked harvester product line



### ENHANCED CUSTOMER SUPPORT:

- Minority investment in Hello Tractor
- Acquired AgriSync
- Proactive support through John Deere Connected Support™

# ENGAGED ACRES

## Grow More With Less

Engaged, highly engaged, and sustainably engaged acres allow John Deere to partner with customers on a deeper level to further unlock economic and sustainable outcomes.

Engaged acres serve as the foundational measurement for Deere's Leap Ambition goals — from enhancing customer outcomes, reducing environmental footprint, and tapping into \$150 billion USD of incremental addressable market opportunities.

While engaged acres helps us understand the initial breadth of Deere technology utilization across acres, the newly launched highly and sustainably engaged acre metrics are focused on delivering opportunities to grow more with less. As more acres are highly and sustainably engaged, Deere expects to see that customer outcomes around nitrogen use efficiency, crop protection efficiency, and CO<sub>2</sub>e emissions reduction will be enhanced.



### DEFINITIONS

**Engaged Acres:** Reflects the number of unique acres with at least one operational pass documented in the John Deere Operations Center™ in the past 12 months

**Highly Engaged Acres:** Documentation of multiple production steps and the use of digital tools to complete multiple, value creating activities over a 12 month period

**Sustainably Engaged Acres:** Reflects the number of Deere & Company engaged acres that include incorporation of two or more sustainable John Deere technology solutions or sustainable practices over a 12 month period

- This is a dynamic definition as new technologies and sustainable practices are developed
- Current examples of sustainable technology solutions include AutoTrac™, Section Control, Harvest Smart™, and See & Spray™ solutions
- Sustainable practices vary by region but include practices such as cover cropping and conservation tillage methods

LEAP AMBITIONS

Reach 500 million engaged acres with

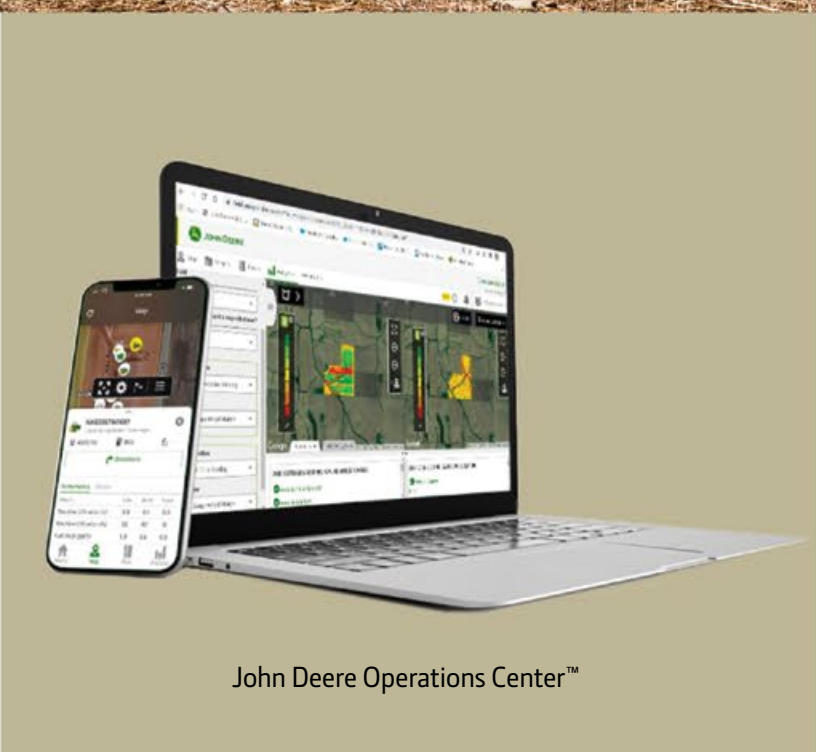
**50%**  
highly engaged by 2026

**75%**  
of engaged acres are sustainably engaged acres by 2030

### ENGAGED ACRES PROGRESS

|                           | 2021  | 2022  | LEAP AMBITION<br>2026 |
|---------------------------|-------|-------|-----------------------|
| Engaged Acres*            | 315 M | 329 M | 500 M                 |
| Highly Engaged Acres      | 66 M  | 68 M  | 250 M                 |
|                           | 2021  | 2022  | 2030                  |
| Sustainably Engaged Acres | 127 M | 151 M | 375 M                 |

\*Updated methodology for more precise measurements of an acre in 2022.





### CLASSROOM AND FIELD MERGE

To study and innovate in a real-world application setting, John Deere has partnered with Iowa State University (ISU) to create an 80-acre demonstration farm. What makes the demo farm unique is that the eight individual fields not only turn ISU science into practice, but they provide an environment that serves as a hub for data collection in a way that best mirrors a grower's applications and decision making.

"We want to demonstrate various management strategies with various levels of sustainability at commercial scale," Andy Greenlee, senior staff engineer for sustainability solutions, says.

The five-year project begins by focusing on tillage practices (conventional, reduced till, strip-till, and no-till) and how various conservation methods — such as cover crops — can impact profits and soil health.

Post-harvest metrics and soil health data will mean more than just numbers as they can provide the necessary insights to generate innovative solutions. Insights into yield gains, grain quality, weed control, carbon sequestration, moisture, erosion, soil temperatures, and nitrogen use will help inform our innovation efforts.

"When we talk about soil health, it ties into that message about what does your food eat? How well are we caring for the land that produces our food and what kind of impact can that make in the quality of what is grown?" Greenlee says. And, he adds, we are studying very closely what markets will be available for growers who sustainably produce a crop or different feedstocks for renewable fuels. Essentially, how do we unlock value creation opportunities for growers as more of their acres transition into sustainably engaged acres.

Because each tillage option brings its own set of benefits, the ability to view them side-by-side allows for direct comparison. Strip-tilling is one method that is drawing interest. Strip-till is considered a middle alternative to conventional and no-till. It leaves more than 60 percent of the field untilled.<sup>1</sup> Strip-tillage can combine nutrient and tillage applications into one pass on the field.

To help ensure we are providing our customers with all the tools they need to maximize sustainability, Deere recently introduced the [ST Series strip-till product line](#). The ST Series builds on Deere's existing technology to help reduce variability while maximizing yield, productivity, and versatility.

"We want to support growers with solutions for each tillage market segment," Steve Sporrer, tillage production manager, says. "The ST Series offers an advanced solution to serve the growing strip-till market."

### UNLOCKING THE VALUE OF SUSTAINABILITY

Reduced soil disruption is not only good for the farmer's soil health and biodiversity, but it also provides the potential to unlock additional revenue streams. Deere continues to collaborate closely with growers to help them locate more "off-farm" value opportunities that will pay them for their sustainability activities, including outcomes like carbon sequestration. Data collected from sustainably engaged acres is used to prove these outcomes.

The USDA recently awarded \$3B USD for its Partnerships for Climate-Smart Commodities program. John Deere has been working with many recipients to ensure that the John Deere Operations Center will be a key enabler for farmers to participate in new market opportunities by providing all the data they need in one place. Based on research and data-driven insights, Deere is advocating on behalf of farmers with the USDA, clean fuel markets, and elsewhere about the feasibility and benefits of paying farmers for producing grain with low carbon emissions.

In partnering with Cargill, a global food corporation, John Deere is utilizing the Operations Center to connect farmers to the carbon tracking program that will pay them \$25 USD per metric ton of carbon sequestered through approved tillage and cover cropping practices. Operations Center data from these sustainably engaged acres allows farmers to automatically document results, making it easy for growers to participate and access this new revenue stream.

<sup>1</sup> This figure is based on planting corn on 10 inch-strip on 30"-centers.

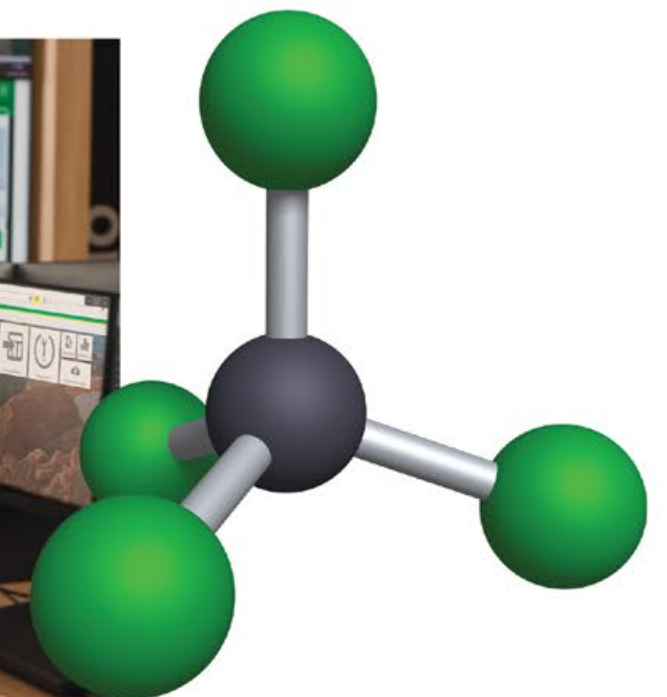
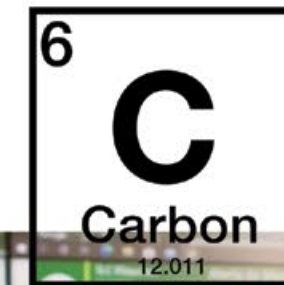


"John Deere's vision is to have the best digital ag platform for producers and trusted advisors to plan, execute, and document sustainable practices and analyze sustainable outcomes. Additionally, we want to make it easy for farmers to access credible sustainability programs that offer meaningful financial outcomes for their businesses."

**ORIANA LISKER BOSIN**  
Group Product Manager  
for Sustainability Solutions

"It's about learning and reaching positive results quicker and gaining a deeper understanding of a production system by operating one of our own. It's about showing the value of the land."

**ANDY GREENLEE**  
Senior Staff Engineer for  
Sustainability Solutions



# CROP PROTECTION EFFICIENCY


## Plant by Plant Management Increases Crop Protection Efficiency

Growers know the key to bigger and better yields starts with maximizing — and protecting — the potential of every seed. Crop protection inputs represent an estimated 20 percent of an average row crop producer’s budget, including things like herbicides, insecticides, and fungicides.<sup>1</sup> And when the traditional method of using these inputs through broadcast application results in underutilizing more than two-thirds of that expense, it becomes clear there should be a better way.<sup>2</sup>

John Deere’s revolutionary See & Spray™ technology is that solution and is the centerpiece to the company’s Leap Ambition journey of helping farmers improve crop protection use efficiency by 20 percent by 2030.<sup>3</sup>

See & Spray represents what is possible through John Deere’s integrated technology stack, allowing growers to manage their production system at the plant level.

John Deere has released two See & Spray products to date that enable application of contact herbicides at a precise, plant level. See & Spray™ Select, launched in 2021, utilizes “green-on-brown” color detection technology on unplanted ground to clear weeds while the ground is not being used to raise crops, or before the start of a production cycle. In targeted spraying applications, See & Spray Select sprays the weeds only. The result is fewer chemicals applied to places where they’re not necessary, in this case the soil, which can create an overall positive outcome for the farmer’s economics as well as the health of the soil, waterways, and biodiversity.



**20%**  
Improvement in crop protection efficiency by 2030 per unit of output

LEAP AMBITIONS

|   | 2021 | 2030 |
|---|------|------|
| Crop Protection per Yield of Crop (CPU/MT)* | 22.2 | 17.8 |

\*Estimated average pesticide usage and yield across a representative global sample of corn, soybean, wheat, canola, and cotton fields as of December 2022. CPU is amount of pesticides applied (kg) multiplied by an environmental risk factor.



See & Spray™ Ultimate takes the innovation further by going “green on green” — meaning the machine traveling at speeds of up to 12 mph through the field can scan more than 2,100 square feet continuously to determine whether each green plant is a healthy crop like corn, soybeans, or cotton, or whether it’s a weed.<sup>4</sup> See & Spray Ultimate was available to a limited number of U.S. customers for the first time in 2022. See & Spray Ultimate uses computer vision and machine learning, which includes 36 cameras across a 120-foot carbon fiber boom (the “arms” of the machine), and vision processing units (VPUs), in conjunction with Deere’s ExactApply™ nozzle control technology for targeted herbicide application.<sup>4</sup>


The giant carbon fiber boom (weighing less than steel) is a feat of engineering as it incorporates BoomTrac™ Ultimate, which enables consistent height control when traveling across uneven fields at high speeds. The result? BoomTrac allows for more spray accuracy than any other manufacturer.<sup>5</sup>

Because weed presence in a field is rarely uniform, Ultimate turns more than two-thirds input waste from broadcast methods into more than two-thirds non-residual herbicide savings.<sup>6</sup> But the budget and environmental savings don’t end there.

Ultimate’s dual tank system, allows the sprayer to apply different inputs independently at different rates over the same pass through the field. The dual tank system can also be used to broadcast fungicide and target spray herbicide combining two passes into one. Two applications in the same pass can mean fewer trips through the field, which in turn works to save fuel, time, and reduce CO<sub>2</sub>e emissions.

Data insight tools unlock additional potential with an included JDLINK™ modem that can stream sensor information to the John Deere Operations Center™. This data can build actionable mapping details that allow growers to see their applied rate and weed pressure. These two tools mean farmers can not only track applications but capture savings and allow key insights for further optimizing field management decisions.

And perhaps the most exciting fact about See & Spray is that its core technology, which enables the machine to sense, process, act, and repeat, can be transferred in the future to other crop management applications, meaning the John Deere “sense and act” journey has just begun.



- SEE & SPRAY™ ULTIMATE**
- 36 cameras to scan more than 2,100 square feet at once.<sup>4</sup>
- Vision processing units scan plants and activate sprayer nozzles within 200 milliseconds.<sup>7</sup>
- View weed density within John Deere Operations Center™.
- BoomTrac™ Ultimate ensures more consistent spray accuracy than any other manufacturer.<sup>5</sup>

**See & Spray Ultimate can reduce non-residual herbicide use by more than two-thirds.<sup>6</sup>**



## NITROGEN USE EFFICIENCY

### Optimizing Plant Nutrition With Technology

John Deere is focused on delivering technology and solutions that help improve nitrogen use efficiency by 20 percent by 2030 as part of the Leap Ambitions. Nitrogen is an essential nutrient in plant growth and development. Plants can get nitrogen from soil mineralization, fertilizer applications, and nitrogen fixing bacterial products. Research shows that nearly 50 percent of what is applied is not utilized by the crop.<sup>1</sup>

In addition, nitrogen is one of the most carbon-intensive inputs in a crop production system. In corn production, for example, fertilizer can represent an estimated 75 percent of the greenhouse gas emissions.<sup>2</sup>

Over the last several decades there have been improvements in genetics and nutrient management, but there is still more work to be done to help customers be as efficient and profitable as possible. Especially, since fertilizer has recently become a higher expense in comparison to seed and crop protection applications, like herbicides, insecticides, and fungicides.<sup>2</sup>

The timing of fertilizer application, soil type, crop rotation schedule, market and economic conditions, labor constraints, and environmental factors are examples of complicating variables farmers must consider when determining nitrogen application

needs. “Our customers don’t want to leave money on the table,” Chris Sobolik, John Deere’s partnering manager for Production and Precision Agriculture, said. “Until we understand the perfect formula, we are giving them the tools and systems to match nitrogen application to needs throughout the season based on local growing conditions. Deere’s suite of tools allows for nitrogen to be applied in the spring, summer, or fall.”

**DATA DRIVEN NITROGEN OPTIMIZATION**  
Stephen Schwartz, plant health and nutrition collaboration manager for the U.S. and Canada, said using metrics and data is helping tell the story of nitrogen use efficiency while providing customer confidence in a variety of nutrient application areas.

John Deere’s HarvestLab™ 3000 can detect key indicating components such as moisture and crude protein to determine optimal harvest times for forages (haylage, silage) and determine prescription manure application rates. In 2022, HarvestLab™ expanded these capabilities to sense grain constituents in small grains crops like wheat, barley, and canola. Corn and soybeans are soon to follow.

Using near-infrared sensors, HarvestLab 3000 provides real-time readings on key components through the John Deere Operations Center™. These reading can



**“We have a wide array of products that can apply nitrogen in different forms at different times to meet the growing needs of the environmentally or financially conscious farmer.”**

**CHRIS SOBOLIK**  
Partnering Manager for Production and Precision Agriculture

help Deere’s customers to optimize grain marketability and unlock more knowledge around nitrogen use efficiency.

In relation to nitrogen, the protein readings provide growers with a layered, subfield view of how efficient their fertilizer use can be. Proteins are made of amino acids and a major component of amino acids is nitrogen. As this data continues to be developed, Deere will be able to provide a better understanding to customers of their nitrogen efficiency based on the protein information delivered

#### HIGH-VALUED PROTECTION

While See & Spray Ultimate’s innovation is aimed at optimizing row crop protection, John Deere also is focused on optimizing each production cycle for its producers growing tree nuts, fruits, and vegetables — also referred to as high value crops (HVCs). Producing HVCs requires high levels of precision (traveling at a consistent 2.5 mph while spraying is critical) while also facing extremely tight operating windows (48 hours or less) in order to maximize productivity, efficiency, and yield.

The company announced a key step forward in this endeavor in 2022 when Deere entered a joint venture with Kingsburg, California-based GUSS Automation LLC, a pioneer in orchard and vineyard sprayers. GUSS (Global Unmanned Spray System) employs technology designed to increase precision and efficiency to significantly reduce input costs.

GUSS has the capability to detect the tree canopy and spray a predetermined amount of pesticide to efficiently cover each tree, regardless of height or canopy size. GUSS not only reduces input usage, but has the potential to reduce the amount of drift during application.

By using GUSS technology, a single operator can monitor up to eight sprayers at once. A sophisticated combination of GPS and LiDAR (light detection and ranging) technology — along with vehicle sensors and software needed to move and navigate under canopy through orchards and vineyards — means work can be completed on time while also potentially using fewer inputs (fuel, pesticides, herbicides) and reducing costs by eliminating operator error and downtime.

The growing demand among consumers for fresh fruits and vegetables, coupled with ongoing on-farm labor constraints, make GUSS a natural fit for Deere’s crop protection product line. GUSS improves overall productivity and reduces costs because it can increase the accuracy, reliability and effectiveness of crop protection products.

**In 2022, GUSS Automation introduced the semiautonomous herbicide sprayer. Height-adjustable and hydraulically controlled booms can fit between rows while also maneuvering over berms and tilting to avoid damaging trees and crops. The new semiautonomous product targets and spot-sprays individual weeds, providing farmers with a truly top-down HVC protection solution.**

**“As demand for high-value crops grow, we see significant opportunities to help growers be more productive while addressing the challenges of increasing labor costs and finding skilled labor to operate equipment.”**

**CHRIS DAVISON**  
Director for Small Tractor and HVC Production



<sup>1</sup> Estimation based on three-year average results for a model farm covering 6,500 acres producing corn and soybeans in the United States. Crop protection inputs represent an estimated 20 percent of direct expenses. Direct expenses can include seed, fertilizer, and chemical (herbicide, pesticide, and fungicide).

<sup>2</sup> Crop Protection Efficiency is based on the maximization of the crop output and quality from applied crop protection products with minimum environmental impact. Crop protection products consist of tools, products, and best agronomic practices used to prevent and protect crops from the negative impact of weeds, pests, and disease.

<sup>3</sup> Deere, Deere launches See & Spray™ Ultimate: in-season targeted spray technology combined with dual product solution system for corn, soybeans, and cotton, <https://www.deere.com/en/news/all-news/see-spray-ultimate/> (2022).

<sup>4</sup> See & Spray Ultimate can reduce non-residual herbicide use by more than two-thirds. Results based on internal John Deere strip trials in corn, soybeans, and cotton in Iowa, Mississippi, Texas, and Illinois, in typical growing conditions, with varying weed size, crop canopy, and field conditions, using targeted spray of non-residual herbicide only, and using current software/algorithm at time of trials. Results vary based on crop; for details see <https://www.deere.com/en/sprayers/see-spray-ultimate/>. Weed-control results based on dual-tank operation, adding an additional herbicide that could not be added to an existing herbicide mix in a single tank. Individual results will vary.

<sup>5</sup> Internal testing composite score over a variety of terrains. Operating within range measured at the tip of the boom. BoomTrac Ultimate tested on a John Deere 412R Sprayer with 36.6-m (120-ft.) truss-style carbon fiber boom, NORAC installed on a John Deere 4 Series Sprayer with 36.6-m (120-ft.) steel boom, and Raven AutoBoom XRT installed on a 4 Series Sprayer with 36.6-m (120-ft.) steel boom. Data is based on factory-calibrated settings. Performance varies based on user-specified settings and adjustments.

<sup>6</sup> Results based on internal John Deere strip trials in corn, soybeans, and cotton in Iowa, Mississippi, Texas, and Illinois, in typical growing conditions, with varying weed size, crop canopy, and field conditions, using targeted spray of non-residual herbicide only, and using current software/algorithm at time of trials. Results vary based on crop; for details see <https://www.deere.com/en/sprayers/see-spray-ultimate/>. Weed-control results based on dual-tank operation, adding an additional herbicide that could not be added to an existing herbicide mix in a single tank. Individual results will vary.

**20%**  
Improvement in nitrogen use efficiency by 2030 per unit of output

|   | 2021 | 2030 |
|---|------|------|
| Nitrogen Applied/Yield of Crop (kg/MT)* | 26.5 | 21.2 |

\*Estimated average nitrogen usage and yield across a representative global sample of corn, wheat, canola, and cotton fields as of December 2022.



**“We’ve just never had this data before. This provides a very good understanding of how much nitrogen we’re removing because of what we know about protein.”**

**YANCY WRIGHT**  
Small Grain Test Lead

through mapping. Yancy Wright, small grain test lead at John Deere, said, “Once you know how much protein you have in your yield, you can calculate the nitrogen you’re removing — and the difference between your nitrogen application and removal can tell you about the effectiveness of your fertilizer practices and the soil mineralization of nitrogen that year.” HarvestLab 3000’s measurement and mapping capability is just one step Deere has taken to unlock tools to develop higher nitrogen efficiency.

**THE POWER OF TIME**

A key component of optimizing nitrogen usage is applying what the seed needs when it can utilize it most. Revealed in early 2023 at CES, ExactShot™, Deere’s newest on-planter fertilizer system, is designed to optimize starter fertilizer usage.

ExactShot comes from Deere’s family of “exact” application products — ExactApply™ and ExactRate™. It was ExactRate — another on-planter fertilizer system — that allowed growers to do two jobs at once, combining fertilizer application and planting.

**Across the U.S. corn crop, ExactShot could save over 93 million gallons of starter fertilizer annually.<sup>4</sup>**

**ExactShot will spray only the amount of fertilizer needed, about 0.2 ML, directly onto the seed at the exact moment as it goes into the ground.<sup>4</sup>**

ExactShot operates in two in-furrow modes, continuous or dosing. The dosing option targets only the seed during the planting pass. By operating in a two-inch dose in dosing mode, ExactShot can reduce the amount of in-furrow starter fertilizer by more than 60 percent when compared to ExactRate.<sup>3</sup>

As an on-planter fertilizer system, productivity can be increased since the seed and fertilizer tank can be refilled at the same time. This aids in labor usage and helps eliminate extra trips to the field, additionally reducing vehicle fuel consumption and time away from other critical tasks.

“By optimizing the fertilizer rate, we can better align tendering seed and fertilizer to the planter. We make it easier with ExactShot,” said Stephen Schwartz, plant health and nutrition collaboration manager for the U.S. and Canada.

**EXACTSHOT CAN REDUCE THE AMOUNT OF IN-FURROW STARTER FERTILIZER BY MORE THAN**

**60%<sup>3</sup>**



<sup>1</sup> EOS, *Index Suggests that Half of Nitrogen Applied to Crops is Lost*, <https://eos.org/articles/index-suggests-that-half-of-nitrogen-applied-to-crops-is-lost> (2022).

<sup>2</sup> Estimation based on three-year average results for a model farm covering 6,500 acres producing corn and soybeans in the United States. Results will vary.

<sup>3</sup> Initial tests of a prototype ExactShot system resulted in more than 60% reduction in fertilizer use compared to ExactRate with no material impact to yield.

<sup>4</sup> Deere, *John Deere Debuts New Planting Technology & Electric Excavator During CED 2023 Keynote*, <https://www.deere.com/en/news/all-news/deere-debuts-new-planting-technology-and-electric-excavator-ced-2023/> (2023).

**CUSTOMER CO<sub>2</sub>e EMISSION REDUCTION**

**Enhancing Ag Outcomes by Reducing Customer CO<sub>2</sub>e Emissions**

Many of John Deere’s Leap Ambition goals are designed to support, connect to, and enhance one another. They help illustrate the power of Deere’s data-driven technology stack, our understanding of each production system, and the necessity that every product or solution we deliver must demonstrate economic and sustainable value.

An example that illustrates this approach, is the 2030 goal to enhance our ag customer outcomes by reducing 15 percent of their CO<sub>2</sub>e emissions per unit of output. Deere believes it can have an impact beyond its own Scope 1, 2, and 3 CO<sub>2</sub>e emissions. Through precision technology, data-driven insights, and traceability enablement, Deere can impact on-farm greenhouse gas (GHG) emissions, scaling the magnitude of its impact beyond its own footprint.

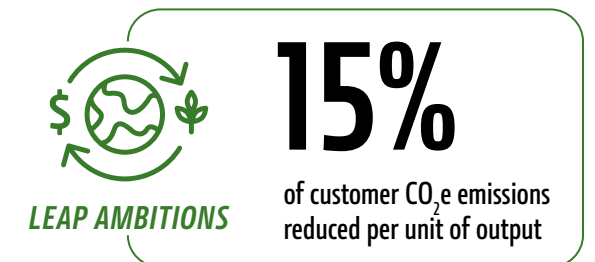
This goal is tied to inputs, equipment, and practices in the field — from nitrogen use and crop protection efficiency to renewable fuels and alternative power solutions. Deere is not only seeking to reduce emissions from equipment but unlocking opportunities for customers to reduce emissions of their operations as well. Products such as See & Spray™ Ultimate and ExactShot™ are designed to decrease pesticide and fertilizer inputs while reducing passes in the field, which increases fuel economy and works to lower CO<sub>2</sub>e emissions.



When it comes to being stewards of the land, we are committed to building relationships through research and academic partnerships, whether that’s our work toward sharply reducing tailpipe emissions from our equipment through electrification, hybridization, biofuels, and hydrogen or creating the Iowa State University demo farm that explores the relationship between tillage, carbon capture, and soil health.

By smartly connecting machines through satellite guidance and using artificial intelligence and machine learning, we believe we will be able to provide fully autonomous solutions that help maximize labor and help growers to do more with less — less inputs, less passes, and ultimately less GHG emissions.

By utilizing data-driven solutions, Deere aims to continue to unlock opportunities for customers to achieve CO<sub>2</sub>e emissions reduction by focusing on equipment emission reduction, crop protection efficiency, and nitrogen-use efficiency.

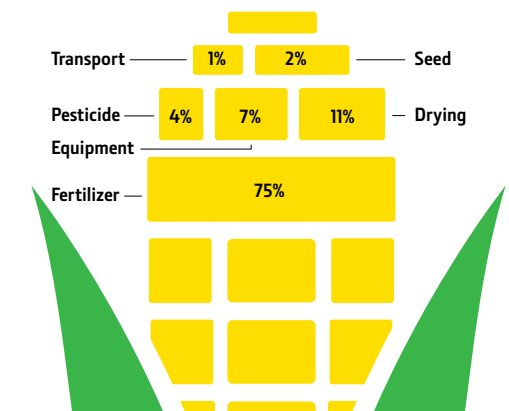


|  | 2021 | 2030 |
|--|------|------|
| CO <sub>2</sub> e Emissions/Yield of Crop (MT/MT)* | 0.36 | 0.30 |

\*Estimated average CO<sub>2</sub>e of fertilizer, pesticide, and fuel emissions across a representative global sample of corn, soybean, wheat, canola, and cotton fields as of December 2022.

**U.S. CORN PRODUCTION SYSTEM GHG EMISSIONS\*\***

\*\*Estimations based on three-year average results for a model farm covering 6,500 acres producing corn and soybeans in the United States. Results will vary.



# AUTONOMOUS SOLUTIONS

## Nothing Runs Like a Deere. *Autonomously.*

Of all the inputs on a farm, time and labor are two of the most critical; both are in short supply.

On average, during a typical North American corn crop cycle from spring through fall, there are nine passes through a field and seven passes on average for a typical soybean crop cycle.<sup>1</sup> This includes spring tillage, planting, multiple sprayer applications, harvest, and fall tillage. And many farmers cannot do them all on the day they need to be done.

In addition, many times there are multiple jobs on the farm that need to be executed on the same days for a similar stretch on the calendar, creating high demand with limited supply.

In January 2022, John Deere revealed an industry-changing solution designed to enable farmers to execute two jobs at once, while not sacrificing optimal timing or quality of the job.

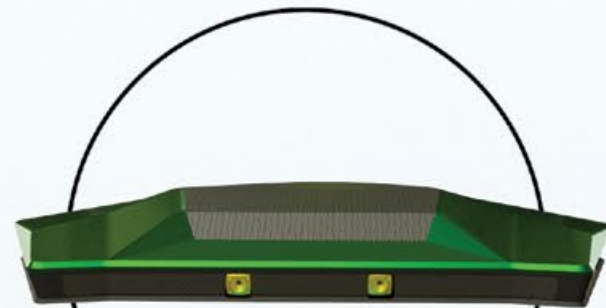
“That machine – [John Deere’s fully autonomous 8R tractor and tillage solution](#) – was not designed around farms but people,” said Willy Pell, senior director of autonomous systems at Blue River Technology.

“Because people have limits,” he said. “It’s why we don’t have fuel tanks big enough to run a machine for 24 straight hours because humans can’t work like that. With autonomy, all of that changes.”



Obstacle Detection

6 Stereo Cameras



The 8R builds on existing Deere GPS and guidance technology plus adds six stereo cameras that provide a 360-degree view of the field and obstacle detection. The tractor starts, moves, works, allows for adjustments, and sends updates with the swipe of a finger across a mobile device. In short, it’s the magic farmers have been looking for.

Currently, the 8R addresses fall tillage, the time when a grower would rather solely focus on being in their combine monitoring the bushels that become the bottom line to their business.

“What farmers ultimately understand”, Pell said, “is the price of autonomy and the price of labor is not an equal equation of work completed. Autonomy doesn’t call in sick. It doesn’t need rest after 12 or 16 hours. And fully autonomous means there is no one in the cab, allowing, in essence, for two jobs to get done at one time.”

“The value is certainty. Certainty of labor,” Pell said. “It’s there every day. It’s ready to work when you need it most and will perform that

work to the standard the farmer wants and needs. That value, we’ve proven, solves a lot of problems and offers sustainability in the truest sense.”

Pell emphasizes “when you need it most” because getting the work done at the right time means maximizing yields, which in turn maximizes productivity and profitability. “Farmers are getting the most efficient use of the land,” he said. “And it’s about the sustainability of the farmer’s business and time away from work. Because it shouldn’t always be about the work.”

### AUTONOMY’S FUTURE

Jahmy Hindman, chief technology officer at John Deere, said three things happened in the last five years to make full autonomy in farming possible: connectivity, computational capability, and advanced algorithms.

Pell said establishing trust around “leaving the equipment to work” took some time, but not much. “The value of the data showed pretty quickly that what was being done was of quality, and it was certainly efficient.”

That trust was built through the data generated with each engaged acre as the grower was able to monitor the 8R through the John Deere Operations Center™, providing access to live video, images, and metrics on how the machine was doing.

Hindman said Deere is already looking at adding more operations beyond fall tillage to its autonomous capabilities. Next steps are expected to include spring tillage, planting, and grain carts at harvest.

“I think what’s important is this is not a gadget,” Pell said. “Autonomy makes the most of time and people, and with all the demands placed on agriculture today and in the coming years, that’s an incredible value to unlock. We believe it’s only going to build from here.”

<sup>1</sup>Based on three-year average results for a model farm covering 6,500 acres producing corn and soybeans in the United States. Results will vary.



**“Artificial intelligence and machine learning create a continuously evolving, more efficient farming operation. It allows growers to run their businesses better because they can pay more attention to other tasks. Autonomy is not only a game changer, it’s a life changer.”**

**JAHMY HINDMAN**  
Chief Technology Officer

# C&F SUSTAINABLE TECHNOLOGY ADOPTION

## Making Tough Work More Efficient Through Roadbuilding, Earthmoving, and Forestry Solutions

In John Deere's Construction & Forestry Division, a series of Leap Ambition goals highlights how smart connected technology allows customers to do more with less by making the work within earthmoving, roadbuilding, and forestry more productive, efficient, and sustainable.

No matter the jobsite — whether in the woods, on the road, or in the dirt — each of these customers face very similar challenges around maximizing workday hours and resources, both in skilled labor and from nature. Innovations that enhance communication between machines and people help unlock value while increasing productivity. These advancements help lessen harsh environments, making the work easier to complete and track.

What makes this all so critical are the global population growths and shifts that continue to stress urban environments and the roads and bridges that link our communities. For example, the worldwide infrastructure gap — the monetary math showing the

divide between what is needed and what is budgeted — is estimated to reach \$15 trillion USD by 2040.<sup>1</sup>

### PAVED WITH ANSWERS

Dr. Günter Hähn, Senior Vice President WIRTGEN GROUP, said precision roadbuilding is “a highly orchestrated blend of technology that’s working together in harmony.”<sup>2</sup>

The goal for the Wirtgen Group is to increase precision roadbuilding solutions adoption to 85 percent by 2026. Precision roadbuilding solution adoption was at 82.5 percent in 2022. Wirtgen’s suite of available precision roadbuilding solutions today includes [automated leveling technology](#) on Wirtgen milling machines, [automated grade and slope controls](#) on Vogele pavers, and automated steering controls and [autopilot functionality](#) on Wirtgen slipform pavers. These technologies deliver the benefits of enhanced accuracy, improved productivity, and optimized inputs to deliver more sustainable outcomes for our roadbuilding customers.




### INTELLIGENCE IN THE WOODS

John Deere also continues to work on making forestry operations more efficient, productive, and sustainable. The goal of achieving 100 percent Intelligent Boom Control (IBC) adoption by 2026 is one solution.

With a current adoption rate of 78 percent on all machines eligible for IBC, the technology drives efficiencies and helps address labor constraints. As a key step on the journey toward full customer adoption of IBC, Deere made IBC available on tracked harvesters for the first time in 2022.

“Imagine your arm is the boom,” said Jim O’Halloran, product marketing manager. “You don’t have to think about it, you just reach for and grab the bottle. Your arm is IBC, and the tree is the bottle.”

“IBC provides smoothness of control and allows an inexperienced operator to be more productive, efficient, and consistent in their work. It solves a lot of their problems,” he said.

 For more on IBC, see the [2021 Sustainability Report](#).

### MAKING THE GRADE(S)

In an industry where labor shortages and tighter deadlines are increasing, the opportunity for Precision Construction to significantly impact efficiency is more important than ever.

This is why John Deere is focused on increasing grade management adoption to 50 percent by 2026 as part of its Leap Ambitions. In 2022 the adoption rate was 32 percent.<sup>3</sup>

What grade control does is control the vertical axis of a blade machine like a motor grader — or boom and bucket of an excavator — to enhance the machine performance as it aligns to the job’s design plan. Currently on four products, grade management solutions are available on crawlers, motor graders, excavators, and compact track loaders. Increasing the efficiency of work performed can improve productivity as much as 30 percent — which means fewer hours and resources, like fuel burn, to get the job done while also improving the overall cost structure for performing the work and driving positive margins for customers.<sup>4</sup>



 To learn more about Grade Management, see the [2020 Sustainability Report](#).



“When we have a 3D model for a jobsite, SmartGrade™ uses GNSS guidance (a linked constellation of satellites more accurate than GPS) to control what the machine is doing to cut to grade accurately the first time.”

**KEVIN VERY**  
Director for C&F Production Systems and Technology

<sup>1</sup> Global Infrastructure Hub, *A future of inadequate infrastructure is closer than ever*, <https://www.gihub.org/news/new-report-challenges-assumptions-on-infrastructure-investment-flows-and-performance/> (2022).  
<sup>2</sup> The Wirtgen Group was acquired by Deere in 2017.  
<sup>3</sup> Grade management adoption rate is based on crawlers, motor graders, and excavators.  
<sup>4</sup> Outcomes based on customer experience, feedback, and machine data. Results will vary.



**EARTHMOVING**  
**50%**

Grade Management adoption<sup>3</sup> by 2026

Grade management adoption<sup>3</sup> 32% in 2022

**FORESTRY**  
**100%**

Boosted Intelligent Boom Control adoption by 2026

Intelligent Boom Control adoption 78% in 2022

**ROADBUILDING**  
**85%**

Precision roadbuilding solutions adoption by 2026

Precision roadbuilding solutions adoption 82.5% in 2022

## UNLOCKING PRODUCTIVITY THROUGH CONNECTED SOLUTIONS



### Hello Tractor

Smallholder farmers across Africa and Asia will play a vital role in increasing productivity of agricultural land to meet the growing global needs for grains and oilseeds. Hello Tractor, an ag-tech company based in Nairobi, Kenya, is providing these farmers with innovative solutions for self-sufficient agricultural production.

That is why John Deere made a minority investment in Hello Tractor, whose farm equipment sharing app connects tractor owners with smallholder farmers. This app enables farmers to track and manage their fleet, book customers, and access

financing options. By so doing, they can have the potential to boost crop yields, and greatly optimize their operations.

“Hello Tractor’s work aligns with the John Deere strategy and the Leap Ambitions to ensure 100 percent of new Small Ag equipment is connectivity enabled by 2026,” said Jason Brantley, director, Ag & Turf Sales & Marketing — Africa and Asia.

Hello Tractor was among the first group of companies to participate in John Deere’s Startup Collaborator program, an initiative launched in



“Deere sees this as an opportunity to support Hello Tractor’s innovative work to provide technologies and solutions to agricultural entrepreneurs in Africa and Asia.”

**JASON BRANTLEY**  
Director, Ag & Turf Sales & Marketing — Africa and Asia

2019 to enhance and deepen Deere’s interactions with startup companies whose technology could add value for customers.

“The partnership between Hello Tractor and John Deere has been building since our participation in John Deere’s Startup Collaborator program,” said Jehiel Oliver, Hello Tractor founder. “We look forward to continuing to work together to ultimately help drive better economic outcomes for smallholder farmers.”

## Dealer Connected and Proactive Support

John Deere and dealers all over the world are providing more proactive support than ever before through John Deere Connected Support™.

In Latin America, John Deere is transforming the traditional customer-dealer experience by establishing more than 100 Connected Solutions Centers at dealerships throughout the region. Today, around 350 highly trained professionals are leveraging a full suite of cutting-edge Connected Support tools and processes such as remote assistance, Expert Alerts, and machine monitoring alerts to unlock greater value for customers and take their businesses to the next level.

“Here, tropical weather allows farmers to have two and even three crops a year, which is great for them,” said João Pontes, director, Aftermarket & Customer Support, region 3. “At the same time, however, we must deliver machine uptime because even one day of delays for our customers may mean irreversible losses.”

The combination of John Deere technology, machines, people, and intelligence continues to generate value for those we serve. In 2022, five dealer Connected Solution Centers addressed 89 percent of customer calls remotely and 26 percent of the customer calls were proactive, meaning the dealers prevented larger disruptions in equipment maintenance. Overall, these indicators show how effective the centralized and connected support strategy is in delivering customer service remotely and more proactively.

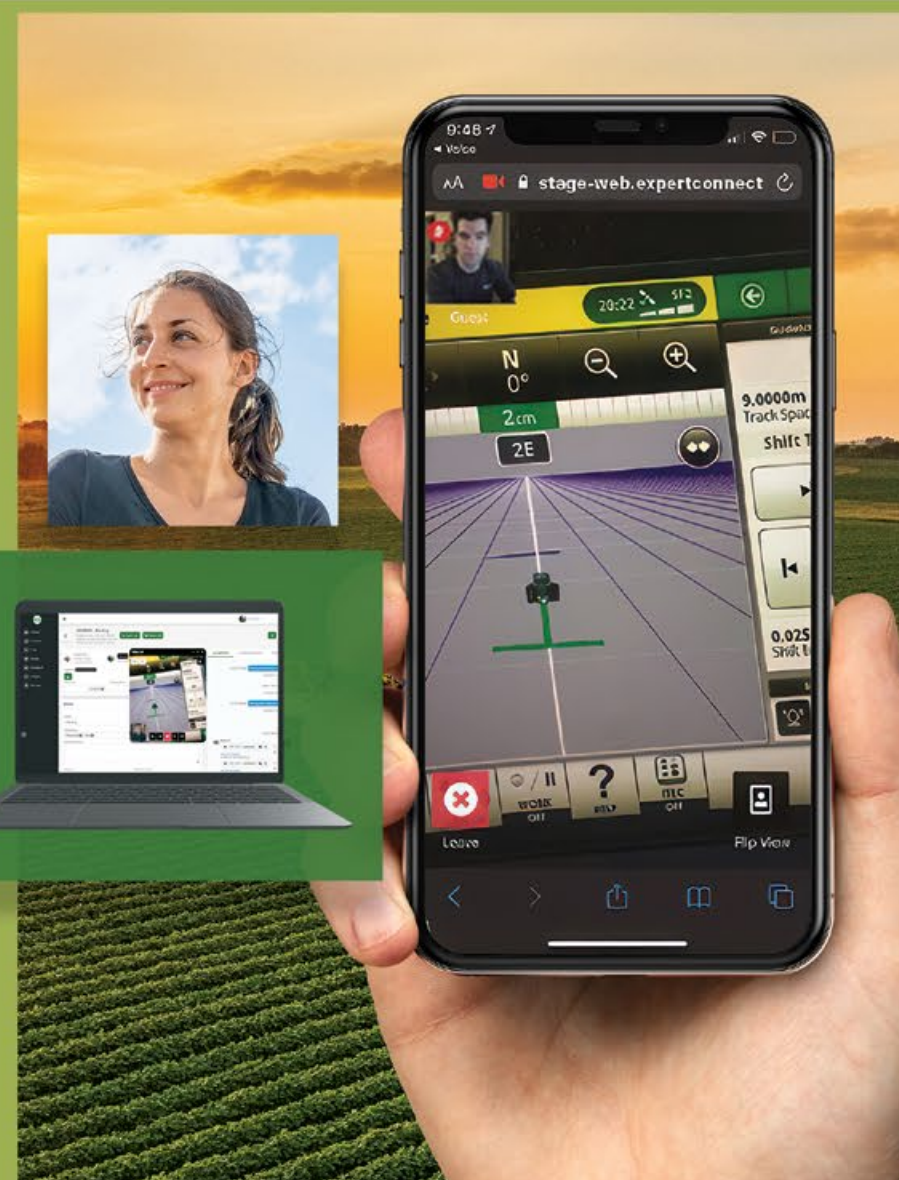
John Deere Connected Support helps customers not only in Latin America but all around the globe to maximize machine performance and uptime to ensure every hour, every drop, and every seed counts, unlocking greater economic and sustainable value across the lifecycle.

### AgriSync® Acquisition

John Deere’s acquisition of AgriSync, a technology services provider whose innovative software platform enables dealers and customers to connect via real-time multichannel communications, further positions Deere to deliver economic value through advanced technology and solutions. Today, the AgriSync platform operates as ExpertConnect™ and serves as a digital hub for centralized and connected support.

Agriculture and construction customers now have one-touch access to their local dealer for parts, service, and aftermarket support. For dealers, ExpertConnect helps provide more consistent customer interactions, faster response times, and increased efficiency.

“ExpertConnect is well aligned with the Smart Industrial strategy and will be an integral part of our support processes moving forward,” explained Luke Gakstatter, senior vice president, Aftermarket & Customer Support. “In addition, this technology allows dealers to drive better utilization of their people — the most constrained part of their aftermarket business. Finally, for customers, ExpertConnect helps drive greater uptime and an enhanced customer experience.”



# Sustainable Product Development



## OUR PRIORITIES

DEERE PRODUCTS WILL SET THE STANDARD FOR SUSTAINABILITY BY 2030 THROUGH:



Integrating circularity principles into product development lifecycle:

- Incorporating 95% recyclable content into our products
- Ensuring 65% of content going into our products is sustainable
- Grow remanufacturing revenue by 50%



Reducing Scope 3 greenhouse gas emissions 30% by:

- Partnering with our supply chain
- Developing a roadmap of low/no carbon alternative power solutions
- Investing in engine efficiency, hybridization, electrification, and renewable fuels
  - Delivering battery-electric turf and compact utility tractor options
  - Delivering electric and hybrid-electric Construction & Forestry solutions

## WHAT WE HAVE DONE



SET VALIDATED SCIENCE BASED TARGETS FOR REDUCING SCOPE 3 GREENHOUSE GAS EMISSIONS



INTRODUCED AND REVEALED SUSTAINABLE POWER SOLUTIONS TO HELP ACHIEVE SCOPE 3 REDUCTION FOR PRODUCTS:

- Electrified tandem rollers from Hamm
- Electrified MINI Pavers from Vögele
- Concept equipment showcase for electric options for Turf and Compact Utility Tractors product families
- Electric excavator prototype at CES® 2023



ENGAGED WITH PARTNERS:

- Investment in battery technology through acquisition of majority interest in Kreisel Electric



IDENTIFIED KEY OPPORTUNITIES FOR ENHANCING SUSTAINABLE MATERIALS AND RECYCLABLE CONTENT




# PRODUCT EMISSION REDUCTION STRATEGY

John Deere has set a validated Science Based Target of reducing its Scope 3 greenhouse gas (GHG) emissions from its vehicles 30 percent by 2030. In achieving this goal, Deere is committed to ensuring that the products it brings to market deliver incremental economic value and sustainability for its customers.

As a result, we believe the first step on the path to 2030 is demonstrating viable low/no carbon alternative power solutions by 2026 across Deere's various customer segments. The viability aspect is key — the solutions must meet the needs of Deere's customers. One thing we know for sure — this journey will require multiple solutions across our portfolio, including efficiency, hybridization, electrification, and renewable fuels.

Given the demonstrated need to provide the company's construction, roadbuilding, and forestry customers with a variety of propulsion options that go beyond traditional internal combustion engines, Deere set a Leap Ambition goal specifically for its Construction & Forestry Division to deliver 20 or more electric and hybrid-electric product models by 2026, which will be an important first step on the path to 2030.

In order to deliver options to the small agriculture and turf sector, Deere aims to offer an electric option in each turf and compact utility tractor product family by 2026 as well as deliver an autonomous, battery-powered electric utility tractor to the ag market by 2026.



**LEAP AMBITIONS**

**30%**

Reduction in upstream and downstream CO<sub>2</sub>e emissions (Scope 3) by 2030

|   | 2021        | 2022       | LEAP AMBITION<br>2030 |
|---|-------------|------------|-----------------------|
| Scope 3 Emissions — Category 1 and Category 11 (metric tons CO <sub>2</sub> e) <sup>1,2,3</sup> | 100,456,000 | 97,353,000 | 70,319,000            |
| Scope 3 Category 11 Emissions (metric tons CO <sub>2</sub> e) <sup>1,3</sup>                    | 93,120,000  | 89,902,000 |                       |



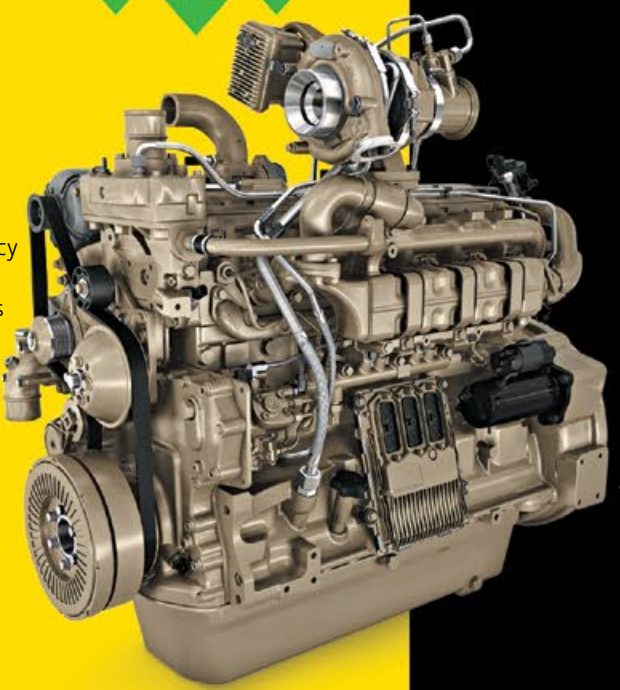
## Engine Efficiency

The future of low-carbon propulsion will encompass many different solutions. And we see that solutions involving an internal combustion engine will continue to be critical for the types of equipment that John Deere produces for many years to come. Therefore, as part of our journey to reducing greenhouse gas emissions from Deere products, we will continue to focus on the most fundamental part of engine development — efficiency.

Driving more efficiency in John Deere engines not only has the immediate impact of making a machine more efficient — burning less fuel, and emitting less — it also serves as a building block for further alternative propulsion innovation. For example, by building upon our expertise in making engines more efficient, we can incorporate technologies like electrification and hybridization to make the system more efficient. In addition, making an engine more efficient means not only less emissions when running on petroleum fuels, but also less emissions when running on biofuels.

Advanced technologies in these areas have also proven to reduce operating and maintenance costs. When it comes to engine efficiency, gains — and losses — come from three key areas: combustion, air movement, and friction. John Deere Power Systems (JDPS) experts continue to develop new products that will improve upon its already best-in-class fuel efficient engines. For example, JDPS has proven faster combustion delivers improved engine efficiency when aided by reduced heat transfer. By using advanced computational fluid dynamics, analysis has demonstrated up to five percent less fuel burned per unit of work.<sup>4</sup>

One recent example of Deere's leadership in engine innovation is the new 13.6L and 18L engines found in Deere's X9 combines and self-propelled forage harvesters, respectively. Deere's 13.6L update has demonstrated up to 30 percent improvement over previous models in overall performance and reduced fuel consumption.<sup>5</sup>



<sup>1</sup> Apex Companies, LLC has verified greenhouse gas (GHG) emissions data in accordance with the ISO 14064-3: Greenhouse gases — Part 3: Specification with guidance for the validation and verification of GHG statements assurance standard.

<sup>3</sup> Scope 3 Category 11 (Use of Sold Products) methodology was updated to drive consistency across the enterprise in the way product line data is reported. 2021 data is restated from previous reporting in accordance with the updated methodology. Reduction in Scope 3 Category 11 greenhouse gas emissions from fiscal year 2021 to fiscal year 2022 was volume driven.

<sup>4</sup> Based on internal studies, there is an estimated 5% fuel savings on a research single cylinder engine when compared to a 6.8L engine.

<sup>5</sup> The JD14 engine update in the X9 and S750 combines show 30% less Scope 3 GHG emissions per harvested plant based on internal studies.



## Hybridization: Propulsion Options

Hybridization's benefits are most often linked to productivity and fuel consumption. And both lead to greener, more sustainable business outcomes for customers.

Hybridization is used to drive vehicle efficiency two ways. The first is about utilizing the engine's power to generate electrical energy to more effectively power various loads. The second is more traditional and is about off-loading some of the engine's energy demands with a second power source, a battery, and using that source to run other functions traditionally tied to the engine.

Will Cross, supervisor for electrification architecture and systems engineering, said many Construction & Forestry use cases are transient in nature, making those product lines ideal for hybridization.

"Our larger equipment will continue to have internal combustion engines for the foreseeable future due to energy density, so the question is how will we reduce carbon emissions for those systems" Cross said. "Reducing the carbon content of the fuel itself is one important path, but we can also make our power generation and vehicle systems utilize that fuel more efficiently. We can start by electrifying vehicle systems to

utilize engine power more effectively. Mechanically decoupling of loads from the engine, as well as inherent efficiency of electric drives, all contribute to improved vehicle efficiency. This will continue to be fundamental to many of our products across the Deere portfolio."

C&F's shining example in this conversation is its 944K Loader, known for its fuel efficiency and productivity. With over a million operating hours in the field, the 944K offered an engineering and component foundation for future development that was tapped into with Deere's newest E-Drive offering, the 850 Dozer.<sup>1</sup>

The dozer, set to be showcased at the CONEXPO/CON-AGG 2023, offers different modes — giving customers the choice of optimizing productivity or fuel economy depending on the job.

"The 850 is used in many earthmoving applications including site development and roadbuilding," said Kat Roberts, product manager for dozers and crawler loaders. "Deere is still in the process of validation and testing, but we are seeing improvements in both fuel efficiency and productivity over traditional machines."

**MINIMIZING IDLE TIME**  
Deere can further improve efficiency and productivity by adding a secondary energy source, a battery, to help minimize machine idle time.

Led by electrification advancements and hybridization opportunities, John Deere Power Systems (JDPS) is developing technologies to turn off the engine when minimal power is needed, while still providing power to loads such as cab heating and air conditioning.

This helps deliver the benefits of less fuel burned, reduced greenhouse gas emissions, retained machine value, lower operating costs due to fuel and oil consumption, and reduced hour accumulation. This also contributes to reduced regular maintenance and repair costs overall.

**THE ROAD AHEAD**  
We believe hybrid equipment will not only provide near-term carbon and productivity benefits but develop Deere's vehicle architectures to reduce alternative fuel usage and costs when they arrive. Deere will continue to aim to engineer systems that most effectively utilize engine power to provide operating cost and productivity benefits to customers.

<sup>1</sup>Deere, *The Dirt* Winter 2021, <https://www.deere.com/assets/pdfs/common/industries/construction/publications/the-dirt-winter2021-dmag259c-us.pdf> (2022).



## Electrifying Alternative Solutions

John Deere's drive toward full battery-electric powered products is as much about creating a sustainable solution as it is about the company's relentless commitment to solving customer challenges.

Battery-electric vehicles (BEV) enhance precision controls and ease of use, while helping reduce greenhouse gas emissions and required maintenance.

"Segments of our customer base are starting to ask for it and, in some cases, demand these sustainable solutions," said Aaron Wetzel, vice president of Production Systems.

In the construction space, some local governments are requiring low-emission equipment and reduced noise. Equipment owners, often dealing with skilled-labor shortages, seek ease of use and a better overall experience. And the residential customer is asking for simplicity, especially when it comes to maintenance and total cost of ownership.

To meet this increasing demand, John Deere has mapped out several bold goals through its Leap Ambitions, most notably along multiple product lines in Small Ag & Turf and Construction & Forestry.

– By 2026, Deere aims to:

- Offer an electric option in each turf and compact utility tractor product family
- Deliver an autonomous, battery-powered electric utility tractor to the ag market
- Deliver 20+ electric and hybrid-electric C&F product models

"Electrification solves a lot of challenges for a lot of customers," said Will Cross, supervisor for electrification architecture and systems engineering. "It allows them to be more precise, productive, and sustainable."

### BATTERY INNOVATION

John Deere is focused on ensuring that battery power remains comparable to, or even exceeds, internal combustion alternatives.

Deere's acquisition in 2022 of a majority ownership interest in Kreisel Electric Inc., an Austrian-based battery technology provider, is an essential step in achieving many of Deere's goals. Kreisel develops battery modules packed with high performance and durability. Patented immersion cooling technology allows battery pack cells to operate within optimal temperature ranges.

In addition, Kreisel has developed an innovative charging infrastructure that utilizes patented technology and could prove key in servicing the many unique and often rural environments Deere customers work in. The acquisition allows Deere to optimally integrate vehicle and powertrain designs around Kreisel's technology while also utilizing its charging infrastructure to aid in solving one of the most common pain points to customer adoption.



### E-POWER 145X EXCAVATOR:

• Estimated product lifetime emissions savings<sup>3</sup> of up to 155 metric tons CO<sub>2</sub>e

### Z370R ELECTRIC ZTRAK™ MOWER:

• Estimated product lifetime emissions savings<sup>3</sup> of up to 1.7 metric tons CO<sub>2</sub>e

### DELIVERING SOLUTIONS

John Deere is focusing its BEV development efforts on those product segments with highest customer demand and where battery technology is a viable alternative, most notably residential and commercial turf equipment and within the construction infrastructure market.

As a start, in 2022 Deere revealed four battery-electric concept vehicles: a residential zero-turn mower, commercial stand-on mower, full-size utility vehicle, and compact utility tractor. The purpose behind concept products is to test out the designs and gather customer feedback. This enables Deere to learn and innovate quickly. The company anticipates the Z370R Electric ZTrak™ Mower will be available to customers in 2023. The Z370R will be able to mow up to two acres (under most mowing conditions) powered by a full charge on its 3.2kWh battery.<sup>1</sup>

### Wirtgen Group's Hamm revealed electric battery-driven tandem rollers in 2022.

At Hamm it is more than a singular product, it is an eight-vehicle tandem roller product line including an electric combination roller with oscillation.

### In 2022, Vögele revealed its MINI Paver line, in diesel and electric.

The wheeled and tracked electric MINI Paver models operate fully battery-electric with a gas heated screed. The battery-electric options help meet the demands of customers who face governmental requirements around CO<sub>2</sub>e emissions within city centers in some European countries and manual labor issues for asphalt jobs currently done by hand. The compaction and operating performance of these electric models is on par with their diesel alternative.

The Vögele electric mini pavers provide a sustainable, battery-electric production system for small-scale construction

projects when used in conjunction with the Hamm battery-electric tandem rollers. Marcio Cavalcanti Happle, who leads sales and marketing for Vögele, said, "We are showing the market that we are focused on not only electrification but providing innovative solutions helping customers to meet all market requirements."

In early 2023 at CES®, Deere revealed an electric excavator prototype. The electric excavator, powered by a Kreisel battery, will provide construction workers and roadbuilders with lower daily operating costs, reduced jobsite noise, enhanced machine reliability, and zero emissions, without sacrificing the power and performance they need in a machine.<sup>2</sup>

<sup>1</sup> Actual acres may vary depending on conditions.

<sup>2</sup> Deere, John Deere Debuts New Planting Technology & Electric Excavator During CES 2023 Keynote. <https://www.deere.com/en/news/all-news/deere-debuts-new-planting-technology-and-electric-excavator-ces-2023/> (2023).

<sup>3</sup> Results will vary.



### MINI PAVERS-MINI 500E AND MINI 502E:

• Estimated product lifetime emissions savings<sup>3</sup> of up to 16 metric tons CO<sub>2</sub>e



### HAMM TANDEM ROLLERS-HD10E AND HD12E:

• Estimated product lifetime emissions savings<sup>3</sup> of 17 metric tons CO<sub>2</sub>e

# Renewable Fuels Approach

We expect the availability of low-carbon fuel sources will be an important part of John Deere's journey to 2030. Deere builds equipment that can require high horsepower, may operate for long hours, and can work in isolation in some of the planet's most extreme environments with limited infrastructure. For many of those machines, the internal combustion engine, carrying the benefits of power density, extended operating times, and existing infrastructure for refueling, will remain the primary propulsion source for the remainder of this decade and beyond.

But just because there is an engine does not mean running it cannot be sustainable or low carbon. In fact, many renewable fuels being produced today have emission factors that rival battery-electric vehicles, given that many electric grids are not 100 percent renewable.<sup>1</sup> And with continued advancements in precision agriculture technology, as well as refining infrastructure, there is ample opportunity to further reduce the carbon intensity of renewable fuels.

The challenge for renewable fuels is a shared experience, driven primarily by current supply limitations and the need for exponential growth to meet demand.

While ethanol and biofuel (grains and oilseeds) feedstock production unlock an opportunity for our customers to be part of the solution and the growing market, there are hurdles to clear especially regarding infrastructure and global supply. Deere is partnering with industry leaders to unlock opportunities that make our customers' businesses more profitable, proficient, and environmentally less disruptive.

These partnerships help support ongoing studies and collaboration efforts in the areas of viability and quality to understand fuel alternatives for Deere machines. They also are aimed at advancing policy, infrastructure, and capacity for these additional renewable fuel productions.

## CAN ETHANOL POWER A DIESEL ENGINE?

U.S. corn-based ethanol is approximately 40 percent less greenhouse gas intensive than gasoline.<sup>2</sup> Ethanol is a common biofuel utilized in the on-road automotive space today but isn't thought of as frequently for the off-road and heavy-duty user. In North America, ethanol is commonly made from corn, while in South America, and particularly Brazil, it is commonly made from sugar cane.

Given the usage in the on-road sector today, there is already meaningful infrastructure in place for ethanol production and distribution in the U.S. and Brazil. In addition, and particularly important to Deere, is that these primary feedstocks are grown by the company's customers.

"There is already a very large capacity in place to produce ethanol," said Craig Lohmann, renewable fuels engineering manager for engines at John Deere. "And it provides our ag customers with the ability to grow their own fuel."

As a liquid fuel, current customers can handle and store ethanol more easily than other options, like hydrogen or methane. Yet, the limitation is that ethanol has 60 percent of the energy content of diesel, Lohmann said.<sup>3</sup>

But, he added, "The technology exists to modify our existing diesel powered equipment to use ethanol, which is a liquid fuel, and get the necessary energy on board to meet the needs of our customers." The company is collaborating with the Department of Energy, Marquette University, and the University of Wisconsin to further advance the ethanol engine technology among other technology company engagements.

## FUELING THE FUTURE WITH SOYBEANS AND OTHER OILSEEDS

Renewable diesel and biodiesel are two other forms of renewable fuels John Deere is pursuing. These options can be produced from a variety of feedstocks, including oilseeds like soybeans, used cooking oils, and animal fats.

Additionally, they work in existing diesel engines with little modifications needed, and they are 50–80 percent less carbon intensive than petroleum-based fuels.<sup>4</sup>

We believe renewable diesel and biodiesel can be viable alternatives, but the challenge of availability remains. Infrastructure for production is extremely limited globally. And feedstocks are a key challenge to additional production.

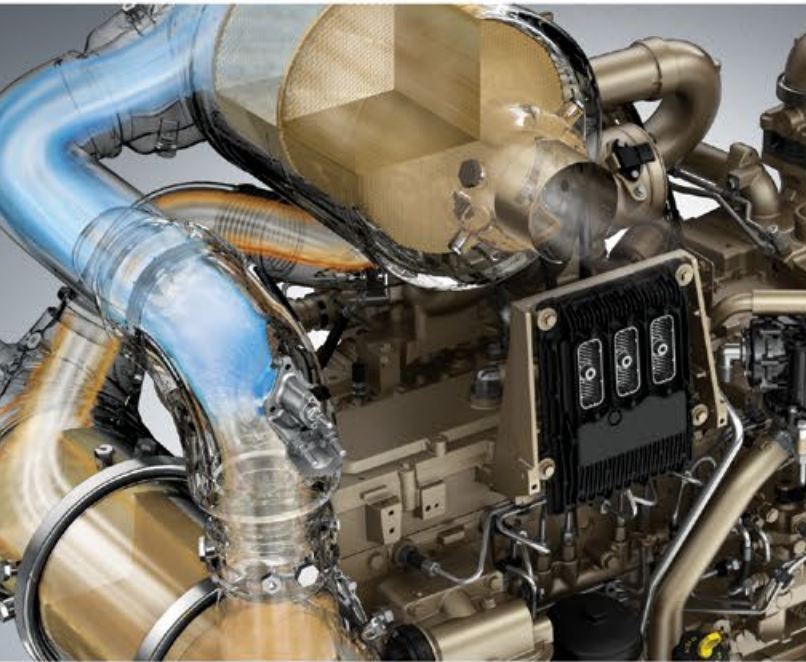
Based on data from BloombergNEF (BNEF), estimated U.S. renewable diesel capacity could increase nearly three times from approximately 2.2B gallons/year in 2022 to approximately 6.3B gallons/year in 2026.<sup>5</sup> To meet this capacity increase, fat, oil, and grease feedstocks will have to grow significantly from their current level.

Deere is working on both challenges by joining with companies across the fuel value chain to identify solutions. The company is currently engaged in a partnership in an exploratory pilot with customers for a pathway for winter oilseed crops to be used as

a new source of feedstock for renewable diesel production. Deere is aiming to better understand the challenges around integrating the existing production cycles for these crops and the necessary logistics and infrastructure needed for transporting these new crops from the field to the refinery.

The ability to scale up winter oilseed crops as a key feedstock source is positive from multiple perspectives. First, it creates a completely new source of feedstocks for fuel production instead of competing with grains and oilseeds needed for food. Second, growing a new feedstock as a winter crop has the benefits of enhancing root structure in the soil, promoting overall soil nutrient density, and reducing the carbon intensity of the farming operation. And third, by providing an avenue for these crops to be revenue generating for the grower, it can help eliminate a barrier to adoption by taking what is typically a cost and making it an additional revenue source.





### EARLY DAYS FOR METHANE, BIOMETHANE

Finally, Deere is exploring biomethane but views this option as longer term and lower in scalability for powering its equipment based on current technology. These fuels are of particular interest for the U.S., European, and South American markets due to sugar availability in South America and livestock operations that have installed bioreactors for manure in the U.S. and Europe. However, these fuel options are hindered by the inability to get enough energy on-board machines without losing power and efficiency.

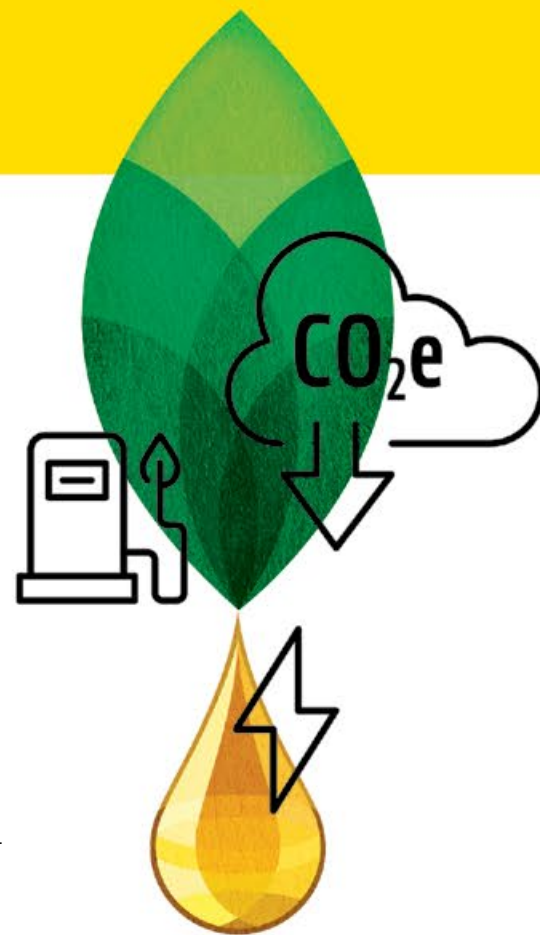
While these fuels would require extensive engine modifications and capital investment, Deere continues to monitor and analyze the viability of this technology for heavy-duty off-highway applications.

### HYDROGEN

As a global company, John Deere and its machines operate in all corners of the world, which means that this journey requires our teams to consider the types of fuel that will be available across these geographies to support our customers' operations. In Europe, for example, hydrogen capability as a primary renewable fuel source leads many discussions.

Hydrogen combustion produces zero carbon emissions, making it an attractive low-carbon power source. But there are many technical hurdles for using hydrogen as a fuel in internal combustion engines, including storage capacity and refueling infrastructure issues.

Not to be deterred, John Deere is helping lead innovation in hydrogen as well, participating in a project that includes the French government and the University of Orléans. Nicolas Marie, manager for European engine engineering at Deere, said "Our first step is to demonstrate its performance on a Deere engine, then on a generator set application, and finally on a Deere machine."



<sup>1</sup> EIA.Gov, *U.S. energy facts explained*, <https://www.eia.gov/energyexplained/us-energy-facts/> (2022).

<sup>2</sup> Energy.Gov, *Ethanol vs. Petroleum-Based Fuel Carbon Emissions*, <https://www.energy.gov/eere/bioenergy/articles/ethanol-vs-petroleum-based-fuel-carbon-emissions>

<sup>3</sup> U.S. Dept. of Energy, *Fuels Properties Comparison*, <https://afdc.energy.gov/fuels/properties> (2022).

<sup>4</sup> CA.gov, *Renewable diesel is increasingly used to meet California's Low Carbon Fuel Standard*, <https://www.eia.gov/todayinenergy/detail.php?id=37472>, (2022).

<sup>5</sup> BNEF, (2022).

## PRODUCT QUALITY, DURABILITY, AND RELIABILITY

At John Deere, we understand how product quality directly impacts customer experience. That's why our four-part focus on quality spans the life of each product.



### PRODUCT DEVELOPMENT

During product development, quality processes include significant reliability and durability testing, validation of new parts and procedures, and tracking, to help ensure products are ready for our customers at launch. Cross-functional teams, both internal disciplines and critical suppliers, track results, adjust as needed, and manage programs to meet customer expectations throughout the product lifecycle.



### MANUFACTURING

Quality processes, audit checks, and automated controls are built into each station of operation. Teams validate and audit the final product using a customer-focused machine runoff, a final set of inspections, and smart testing tools, helping them proactively find and address product issues prior to shipment.



### PROBLEM RESOLUTION

When we identify problems or issues, we work to address them quickly and completely, following a rigorous problem-resolution process. We work to find the root cause, validate solutions, and employ preventive actions. Virtual validation and lab analysis tools help us quickly find solutions and make improvements. Access to performance data from connected machines, as well as from those at our production facilities, helps us rapidly identify and resolve customer problems.



### CUSTOMER SATISFACTION

Leveraging customer insights and experiences helps us deliver Distinctive Product Quality in both our products and our total technology-enabled solutions. We work to track performance of all products in relation to our quality goals.

### DIGITAL STRATEGY

We believe our goal of onboarding 1.5 million connected machines by 2026 will strengthen John Deere Distinctive Product Quality development. We'll be better able to unlock the cause and effect behind failures. John Deere will leverage advanced telematic data from a machine to develop proactive insights and alerts to help improve uptime.

By developing a "digital twin" strategy, John Deere will track parts through manufacturing, testing, and equipment operation. By using intelligent measurement tools coupled with advanced analytics, Deere will be able to identify markers that could indicate a potential problem and take preventive action before it impacts the customer.

## PRODUCT SAFETY

### SAFE PRODUCTS HELP KEEP CUSTOMERS SAFE

Our product safety department works with factory product safety committees during product development to help ensure our general rule for product safety is followed. This rule defines that an acceptable design must not present an unreasonable risk of injury to a product user or others nearby. In applying this rule, we consider the people, environmental conditions, and other products likely to be involved.

Beyond this rule, we strive to meet or exceed the intent of standards published by the International Organization for Standardization (ISO), the American National Standards Institute (ANSI), the American Society of Agricultural and Biological Engineers (ASABE), and others.

We have IT applications utilized to collect suppliers' part-level chemical compliance information related to the European Union's Registration, Evaluation, Authorization, and Restriction of Chemicals Regulations (EU REACH), California Proposition 65, and the European Union's Restriction of Hazardous Substances Directive (EU RoHS).

We develop and use product repair and recall processes, which include specific activities and procedures for product recall reporting and notification. Consumer product recalls are posted on the John Deere website and the website of the appropriate government agency.

Our incident reporting system collects incident information involving Deere equipment from numerous sources, including our dealers, the customer call center, and public information. Incident reports are forwarded to the corporate product safety department and entered into a central repository. A formal report of the incident is sent to the factory and marketing groups responsible for the product, where it is reviewed by the factory product safety committee.

Safety information appears in pre-delivery instructions, operator's and technical manuals, and other service publications according to the activities to which they apply. In addition, safety instructions in the form of safety signs are affixed to the product to appropriately warn an operator of potential hazards.



# DESIGNING FOR THE FULL PRODUCT LIFECYCLE

A circular economy looks to eliminate waste through the superior design of materials, products, systems, and business models. To be successful, John Deere is striving for using less, using better, using longer, and using again. Deere's recently completed 2022 Sustainability Goals helped provide the footing needed to execute on its 2030 Leap Ambition goals focused on product circularity.

In 2022, the company transitioned from its previous design for environment goal (DfE) to the Leap Ambitions. The DfE goal focused on achieving a lower environmental impact on 90 percent of new product programs, which included multiple types of initiatives, such as fuel efficiency and product circularity. With the Leap Ambitions we now have separate goals that focus on these areas, including our goals around Scope 3 Category 11, sustainable materials and recyclable product content. In addition, while the company saw positive growth in its remanufacturing business throughout the 2022 goal period, headwinds related to supply chain, the pandemic, and inflation prevented John Deere from achieving its original 30 percent revenue growth goal. Therefore, because remanufacturing will continue to be a critical part of our circularity journey, we know that the progress we've made and meaningful initiatives we've embarked on are setting us on the path to achieve our circularity goals over the remainder of this decade.

Looking forward, Deere is focused on ensuring 65 percent of material content at the start of product lifecycle is sustainable material and 95 percent of content is recyclable at the end of product lifecycle, along with growing remanufacturing revenue 50 percent by 2030.



## SUSTAINABLE CONCEPT GATOR

The world of sustainability is often driven by change while the world of innovation is often driven by the introduction of something new. Now imagine what happens when those two intersect and are applied to a signature product with a 30-year history.

"John Deere's Sustainable Concept Gator turns some of that imagining into reality. This Gator shows how innovative thinking and innovative partnerships can provide invaluable insight into how we can apply sustainable material use in the future," said Jill Sanchez, John Deere director of sustainability.

Many of the utility vehicle's traditional parts were replaced with recycled and recyclable materials, including options taken right from a farmer's field. The joint venture project with Ford Motor Company includes materials made from soybeans, flax fiber, sugar cane, hemp fiber, plastic bottles from the Mississippi River, ground coconut, and even fishing nets taken from the Indian Ocean.

The Sustainable Concept Gator demonstrates and reinforces John Deere's commitment to achieving its 2030 product circularity goals, such as ensuring 65 percent of product content comes from sustainable materials.



"The goal was to explore a variety of materials to be used for possible adoption across product lines to support our goals around increasing our use of sustainable materials."

**KEITH SHANTER**  
Senior Materials Engineer  
for Polymers



# Sustainable and Recyclable Content

John Deere’s sustainable content goal incorporates two material types into product parts and components: recycled and renewable. Recycled material is that which has been reintroduced as a new material and therefore been given a second life, like recycled steel. Renewable content is biobased and represents a recurring source found in nature, including options such as soybean oil and plant fibers like rice hull or hemp.

The recyclable content goal is aimed at increasing the number of parts that have an avenue for recyclability at the end of the machine’s useful life and thus can be used again as a different product.

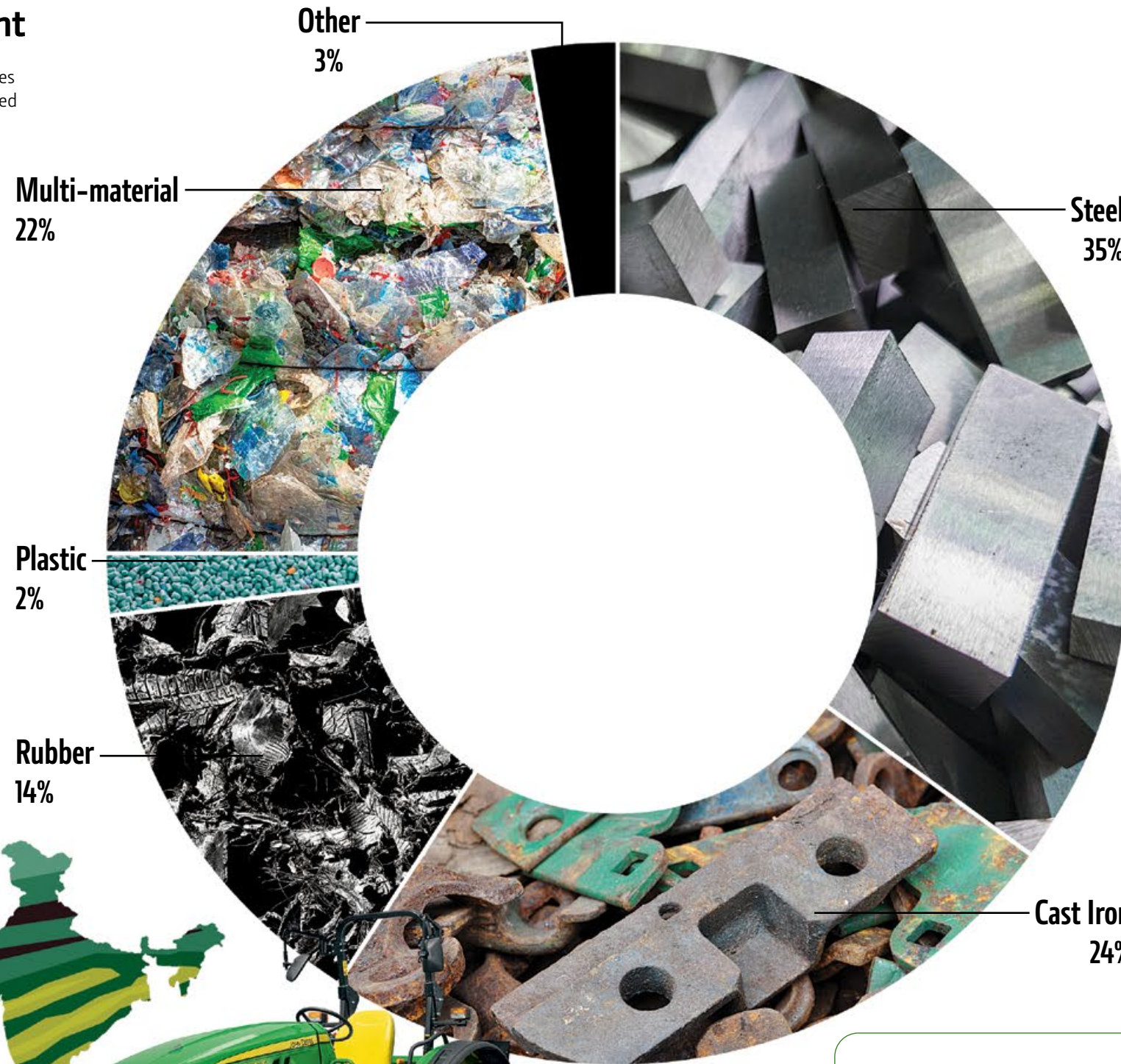
To determine our starting point, the company has examined the renewable and recycled content within a subset of products based on material weight, type, and geographic mix. This included highly detailed integration of material data and supplier source data. This same material breakdown was then reviewed to estimate recyclability on global and regional scales.

From the initial phases of product analysis, Deere has estimated its current products incorporate 40 percent sustainable content by weight and 90 percent recyclable content by weight.

These early results have allowed the company to identify potential areas of focus for its strategy on sourcing sustainable versions or alternatives for specific materials such as steel, cast iron, plastic, and tires — the most common in its machines — to maximize the impact of this effort.

As far as recyclable content, steel and cast iron represent the most significant materials, based on weight. But both already are nearly 100 percent recyclable. Conversely, plastic, rubber, and electronics are high in opportunity but low in weight, meaning the company’s goal will be challenging. But not impossible.

Supply management and product design teams will play essential roles in sourcing and designing for increased incorporation of sustainable materials and recyclable content.



The above represents a bill of material breakdown of a 5-Series Tractor.



**65%**

Product content comprised of sustainable material by 2030

2022 baseline estimated at 40% sustainable product content

LEAP AMBITIONS



**95%**

Recyclable product content by 2030

2022 baseline estimated at 90% recyclable product content

LEAP AMBITIONS

## SUSTAINABLE MATERIALS

| Lever                       | Impact |
|-----------------------------|--------|
| Electric Arc Furnace (EAF)  |        |
| Postconsumer Recycled (PCR) |        |
| Sustainable Content Tires   |        |

## RECYCLABILITY

| Lever                    | Impact |
|--------------------------|--------|
| Types of Plastic Used    |        |
| Increase Tire Recycling  |        |
| Expand Plastic Recycling |        |

## OPPORTUNITIES AND CONSIDERATIONS

Because steel is such a significant proportion of vehicle composition, Deere has been exploring solutions to procuring more recycled steel. One promising opportunity involves steel made through the utilization of electric arc furnace (EAF) technology. This process uses higher recycled content than a standard blast furnace, which uses iron ore. EAF usage varies worldwide, with more presence in the U.S., while in Asian markets its availability is more limited. Therefore, working closely with our supply chain partners will be critical to identifying key levers for optimizing this technology in parts going into Deere machines.

John Deere dealers around the world play a key role in recycling significant portions of our vehicles during maintenance cycles and at end of life. Examples include lead acid batteries and steel panels. Major components including engines, transmissions, axles, and electronics are returned to Deere Reman annually for remanufacturing and reuse. Because of their close connection with our products throughout the lifecycle, further engaging our dealers will be critical to achieving our product circularity-focused Leap Ambitions.

# Options, Innovations Lead Reman's Road Ahead

The concept and practice of remanufacturing revolves around providing customers with choices. It's about connecting decisions to both financial and natural resources. And by providing remanufactured parts and components, John Deere Reman allows for more sustainable outcomes in a customer's business while maintaining product circularity.

John Deere's 2030 Leap Ambitions goal to grow 50 percent in remanufacturing revenue from a 2021 baseline illustrates the company's commitment to its Lifecycle Solutions strategy — the belief in adding value to the life of a product while maximizing uptime, addressing dealership labor shortages, and minimizing costs.

Reman operations are focused on remanufacturing engines, electronics, drivetrain, and hydraulic components. The portfolio also includes turbos and mid-rollers, leveraging resources around the world to meet customer needs. In 2022, nearly 27.6 million pounds of material were recycled through remanufacturing.

Reman's sustainability message is a powerful one. By not having to make a new engine, axle, or cylinder head from scratch means that natural resources like iron ore are preserved, melting furnaces aren't fired up, and carbon footprints are smaller.

To reach the Leap Ambitions goal, John Deere has a variety of methods to access, including the integration of innovative processes to increase the reuse of material, designing with intent to remanufacture, the use of performance upgrades, and partnering with its dealership network to perform product rebuilds.

## STANDARD UNITY

To help ensure remanufacturing principles are top of mind, Deere internally published standards for remanufacturing design. The scope of the document defines requirements related to the remanufacture of used parts, provides guidance for new parts or product designs with features that are favorable to be remanufactured, and is intended to be applied during development of all major components and product programs to ensure that remanufacturing was considered in the initial design phase.

"This gives remanufacturing a seat at the table early on," James Krasselt, senior product engineer, said. "We can make some small-scope but high-impact decisions that really help us several years down the line after this program's gone into production, had its first life, and then comes to Reman."

## NEW IDEAS, REMADE

REMADE is a nonprofit organization that works with the U.S. Department of Energy and acts as a facilitator through industry innovators, national labs, and academic research.

According to the REMADE Institute, manufacturing accounts for 25 percent of U.S. energy use at a cost of more than \$150 B USD and trails only transportation and electricity as a greenhouse gas emissions contributor.

One exploratory REMADE Institute project underway at Deere Reman involves low heat repair of cast iron with cylinder heads utilizing new weld techniques that include cold metal transfer. The intent of those practices is to be as least invasive as possible in disturbing the base cast iron of the part.

The weight of parts is a significant driver when measuring environmental impact in remanufacturing, making cylinder heads an ideal area for further innovation.



LEAP AMBITIONS

# 50%

Growth in remanufacturing revenue by 2030

| 2021          | 2022          | LEAP AMBITION<br>2030 |
|---------------|---------------|-----------------------|
| \$360.4 M USD | \$367.6 M USD | \$540.6 M USD         |

## REBUILD IT AND THEY WILL COME

John Deere's Powertrain ReLife Plus program is a unique alternative that takes a machine that's getting close to the end of its life — perhaps even failed in some cases — and replaces the powertrain (among other things), basically giving it new life.

"The story is in the steel," Mark Wagner, John Deere service business manager, said. "And I think that's really where the sustainability piece is. We're taking a 30-ton piece of construction equipment, reusing around 80 percent of it and basically putting in a new powertrain component and other remanufactured parts. By doing this work we're getting the maximum life out of those larger, heavier components, getting them back to zero hours. The benefits are immense, all around."

Dealerships and customers are seeing the value. In Deere's Construction & Forestry dealer network, for example, nearly 80 percent of the ownership groups in the U.S. and Canada have achieved the rebuild certification designation.

Wagner said, "We have seen ReLife volumes nearly double in the past year and expect that trend to continue into 2023."



To learn more about how Deere has extended product's life, see more on product upgrades in the [2021 Sustainability Report](#).



"By designing our products in such a way that makes re-manufacturing more efficient, John Deere is helping the planet by reducing carbon emissions when compared to the process of making a new part."

**MANI SUBRAMANI**  
Director of Engine Engineering,  
Power Systems

# Operational Sustainability



## OUR PRIORITIES



**BUILDING UPON THE SUCCESS OF 2022 SUSTAINABILITY GOALS WITH LEAP AMBITIONS**

**Making Deere's operations more sustainable by 2030:**

- Reducing fresh-water consumption intensity by 10 percent at water-stressed manufacturing locations
- Reducing waste intensity by 15 percent
- Reducing Scope 1 and 2 CO<sub>2</sub>e emissions by 50 percent

## WHAT WE HAVE DONE



**VALIDATED SCIENCE BASED TARGETS FOR SCOPE 1 AND 2 GREENHOUSE GAS EMISSIONS**



**REDUCED SCOPE 1 AND 2 GREENHOUSE GAS EMISSIONS BY NEARLY 29 PERCENT AGAINST A 2017 BASELINE THROUGH NEARLY 59 PERCENT RENEWABLE ELECTRICITY SUPPLY AND ENERGY EFFICIENCY PROJECTS**



**INCREASED WASTE RECYCLED ACROSS DEERE UNITS TO 84 PERCENT**



**IMPLEMENTED WATER BEST MANAGEMENT PRACTICES AT 100 PERCENT OF WATER-SCARCE MANUFACTURING LOCATIONS**



**INTEGRATED BIODIVERSITY INTO FACILITIES AND OUTREACH EFFORTS**



# REDUCING OPERATIONAL GREENHOUSE GAS EMISSIONS

As John Deere closes out its 2022 sustainability goals, it adds another impressive year of operational greenhouse gas (GHG) emissions reductions, increased renewable energy use, and environmental stewardship.

In 2021, Deere exceeded its 15 percent absolute Scope 1 and 2 GHG reduction goal one year early, achieving nearly 20 percent reduction. As the company closes out its 2022 goals, it achieved a total reduction in operational GHG emissions of nearly 29 percent between 2017 and 2022.

Deere also surpassed its 2022 renewable electricity goal by achieving nearly 59 percent renewable electricity as of the end of 2022. Deere's participation in the Mesquite Sky Wind project was a major contributor to both of these goals. As with its other goals, despite these successes, the company has challenged itself yet again to do better.

Deere has validated Science Based Targets to reduce its Scope 1 and 2 GHG emissions by an additional 50 percent by 2030, with fiscal year 2021 serving as the baseline. We'll aim to accomplish this through efficiency gains in operations and facilities processes, and by leveraging renewable electricity and fuels.

## HIGHLIGHTS



John Deere-Saran implemented an updated strategy in production test cells to reduce GHG emissions from diesel fuels by 8.5% in 2022. We expect the broader deployment of this technology will enable a reduction of 40% by the end of 2024 and 45% by 2026.



John Deere-Horizontina improved its paint process to reduce outside interferences and heat loss, reducing liquified petroleum gas consumption. This reduced GHG emissions by 43.2% in 2022 compared to 2021.



Deere's 2015 global LED lighting and control initiative is now mature and implemented at most sites, saving a cumulative 250-million kWh through 2020.



Deere has secured many long-term agreements through 2030 for projects to harness wind and solar energy. These projects will achieve more than 50% global renewable electricity including in the U.S., Germany, Spain, the Netherlands, India, Mexico, and Brazil.



In the U.S., Mesquite Sky Wind project, the largest renewable energy project in John Deere history, represents a major long-term piece of our renewable energy strategy. It is equivalent to more than 20% of our global electricity footprint.



**50%**  
Reduction in operational CO<sub>2</sub>e emissions (Scope 1 and 2) by 2030

|  | 2021    | 2022    | LEAP AMBITION<br>2030 |
|--|---------|---------|-----------------------|
| Scope 1 and 2 Emissions <sup>1</sup> (metric tons CO <sub>2</sub> e) | 811,000 | 716,700 | 405,500               |

<sup>1</sup> Apex Companies, LLC has verified greenhouse gas (GHG) emissions data in accordance with the ISO 14064-3: Greenhouse gases — Part 3: Specification with guidance for the validation and verification of GHG statements assurance standard. Data associated with the operations of Unimil is not included in 2021 metric.

# REDUCING UPSTREAM EMISSIONS

Engaging our supply base is crucial to our success in reducing upstream greenhouse gas (GHG) emissions. From strategically analyzing product materials and supplier data, John Deere has identified the opportunities where partnering with our supply chain can have the most significant impact on GHG emissions. Many of these priority areas have a significant overlap with the materials that will be critical to achieving Deere's Leap Ambitions around product circularity. For fiscal years 2022 and 2023, we're focusing on collaborating with energy-intensive suppliers in the following industries: steel, castings, rubber, glass, packaging, data centers, batteries, and power systems.

To encourage and recognize supplier excellence in sustainability and innovation, John Deere expanded its Supplier Achieving Excellence program. This year-round company program measures, recognizes, and rewards exceptional supplier performance. With changes implemented in 2022, a supplier can no longer reach the highest level of recognition without incorporating sustainability initiatives into their business, including criteria such as EcoVadis participation, setting goals for reductions in GHG emissions, reporting GHG emissions, and improving workforce diversity. Expanding the value creation portion of this program to include sustainability initiatives and expectations is a critical early step in unlocking the collaborative potential between John Deere and our supply chain partners to achieve the Leap Ambitions outcomes.

Aligned with our new Leap Ambitions, Deere updated its strategic sourcing approach, considering sustainability a key action area, balanced with ongoing expectations for quality, cost, and delivery. In fiscal year 2022, Deere communicated its supplier sustainability strategy to all suppliers in the John Deere Supplier Network (JDSN) platform. This strategy guides our search for supplier opportunities that further our 2030 goals, including emissions reduction and increased usage of sustainable and recyclable materials.

Some of Deere's supply chain partners are leading the way in sustainability innovation. In fiscal year 2022, SSAB (a global steel company) received a Supplier Sustainability Award from Deere & Company for its sustainability initiatives. SSAB's facility in Iowa uses 88.5 percent renewable energy to power its facilities as certified by the utility provider and produces steel using 97 percent recycled scrap content.



**30%**  
Reduction in upstream and downstream CO<sub>2</sub>e emissions (Scope 3) by 2030



To see more on Deere's Downstream Scope 3 Category 11 Emissions see the [Product Emission Reduction Strategy on page 35](#).

|   | 2021        | 2022       | LEAP AMBITION<br>2030 |
|---|-------------|------------|-----------------------|
| Scope 3 Emissions — Category 1 and Category 11 (metric tons CO <sub>2</sub> e) <sup>1,2,3</sup> | 100,456,000 | 97,353,000 | 70,319,000            |
| Scope 3 Emissions Category 1 (metric tons CO <sub>2</sub> e) <sup>1,2</sup>                     | 7,336,000   | 7,451,000  |                       |

<sup>1</sup> Apex Companies, LLC has verified greenhouse gas (GHG) emissions data in accordance with the ISO 14064-3: Greenhouse gases — Part 3: Specification with guidance for the validation and verification of GHG statements assurance standard.

<sup>2</sup> Scope 3 Category 1 (Purchased Goods and Services) data does not account for any Deere acquisitions.

<sup>3</sup> Scope 3 Category 11 (Use of Sold Products) methodology was updated to drive consistency across the enterprise in the way product line data is reported. 2021 data is restated from previous reporting in accordance with the updated methodology. Reduction in Scope 3 Category 11 greenhouse gas emissions from fiscal year 2021 to fiscal year 2022 was volume driven.

# WASTE RECYCLING AND REDUCTION

John Deere recycled 84 percent of total waste generated in 2022.<sup>1</sup> Although a bit short of the 2022 Sustainability Goal of recycling 85 percent of total waste, Deere has made significant gains in its waste program.

Deere's recycling rate improved through enhancement of operations' waste packaging segregation methods, and refining specific waste recycling processes, like foundry furnace slag.

Deere continues to seek to optimize disposal methods but shifted focus to reduce waste generation from operations. By 2030, the company aims to reduce waste intensity by 15 percent.

To minimize waste intensity, teams intend to focus on reducing waste from processes and engage with supply management to reduce packing materials.



**15%**  
Reduction in waste intensity by 2030

## Highlights

Since Deere first established waste improvement goals in 2012, the company has progressed from recycling 56 percent of total waste generated to 84 percent in 2022.

- John Deere Tianjin Construction Works reduced the amount of hazardous waste by an estimated five tons in 2021 by adding a purification and recycling system to the coolant circulation system
- In 2020, John Deere Mannheim implemented waste container color coding together with a digital logistics tool, leading to increased waste-segregation performance throughout the facility
- John Deere Cylinder-Moline installed a briquetting machine in 2019, diverting 64.5 tons per year of grinding sludge waste from landfill to a concrete manufacturer as a raw material
- John Deere Iberica, S.A. completed an on-site recycling project in 2019 utilizing magnetic filtration to recover 68,000 liters of machining oil annually
- In 2017, John Deere Thibodaux reduced hazardous waste generation in the paint department by 46 percent through improvements to the paint mixing system and reducing solvent usage with a single-color primer

<sup>1</sup> Apex Companies, LLC has verified waste data in accordance with the ISAE 3000 Revised, Assurance Engagements Other than Audits or Reviews of Historical Financial Information assurance standard.

# WATER

At John Deere, water is important to our global manufacturing operations, and areas faced with the potential for water scarcity are the main focus.

Using the World Resources Institute Aqueduct Water Risk Atlas tool, certain Deere manufacturing sites were determined to be in water-scarce areas, mainly in Mexico, India, and China. Deere achieved the water 2022 Sustainability Goal by successfully implementing 100 percent of water best management practices at these water-scarce manufacturing sites.<sup>1</sup>

Implementation of water best management practices provided a systematic approach for reducing water use by eight percent at water-scarce manufacturing sites from 2017 to 2022.<sup>1</sup> Projects that contributed to Deere's success include efficiencies in rinsing and cleaning operations, reduced use in paint systems, and optimized use for cooling purposes.

Beyond our water-scarce locations, other manufacturing operations across Deere also implemented water-management strategies. These strategies focused on increasing employee awareness of water use, reviewing current water use, and identifying water use efficiency opportunities.

Deere will continue to focus on water conservation and reduction with the Leap Ambitions. By 2030, the company aims to reduce freshwater consumption intensity by 10 percent at water-stressed manufacturing locations. Deere plans to achieve this goal by optimizing water reuse, developing more process efficiencies, improving infrastructure maintenance, and increasing gray water use.



**10%**  
Reduction in freshwater consumption intensity by 10% at water-stressed manufacturing locations by 2030

|  | 2021  | 2022  | LEAP AMBITION<br>2030 |
|--|-------|-------|-----------------------|
| Water Intensity <sup>2</sup><br>(cubic meters/<br>production<br>output hour) | 0.070 | 0.071 | 0.063                 |



## Mexico – Water Conservation

John Deere Mexico facilities utilized a variety of projects to produce not only noteworthy results but increase employee engagement in water conservation. Cooling towers gave way to dry systems. Pretreatment maintenance helped optimize reverse osmosis and softener systems. Leak detection efforts included preventive maintenance, treasure hunts, and visual inspections on shop floors. Sweeper machines used HVAC condensation and most facilities have installed waterless urinals. John Deere Mexico facilities have saved 74-million gallons of water in fiscal year 2022 compared to the 2017 baseline.

<sup>1</sup> Data associated with the operation of PLA Holding Netherlands B.V., Mazzotti S.r.l., King Agro Europa, S.L., and Unimil, and their related subsidiaries, and the Wirtgen Group entities, is not included in the reported metrics.

<sup>2</sup> Apex Companies, LLC has verified water data in accordance with the ISAE 3000 Revised, Assurance Engagements Other than Audits or Reviews of Historical Financial Information assurance standard.

## BIODIVERSITY

The industries John Deere serves — agriculture, turf, earthmoving, forestry, and roadbuilding — are intricately linked to the land. We understand that preserving a thriving natural ecosystem is foundational to the future of our business, and that of our customers and stakeholders. Through precision technology, we believe we can have a positive impact on biodiversity by enabling our customers to do more with less. In addition, through the John Deere Foundation and employee-led groups, Deere has promoted biodiversity at certain facilities and through outreach efforts.



### Reforestation With Profaua

John Deere proudly gives back to communities where its employees live and work. One of the important ways that the company gives back is to support efforts that strengthen the ecosystem services and biodiversity in these regions.

In Mexico, the Zapalinamé Mountain overlooks Saltillo and Ramos Arizpe where Deere has manufacturing facilities. This habitat on the mountain has been damaged by forest fires. Over time, damaged areas calcinated, leaving behind unstable, highly acidic soils more susceptible to erosion and increased mortality rates for wildlife. This damage also threatens a key water supply for the region.

To help rehabilitate fire-damaged areas across the Zapalinamé Mountain, 298 Deere volunteers have replanted 860 native trees since 2018.

During the next five years, Deere intends to join numerous world partners working with Profaua, a nonprofit organization specializing in the management of natural protected areas, including wildlife management and conservation education. Together we aim to help recover and reforest 320 hectares of land damaged by fires.

Deere has committed \$100,000 USD to Profaua's efforts, which will be used to support reforestation efforts, including installation of a fourth nursery garden where we expect 40,000 plants will be grown.



### Pollinator Plot Addresses Declining Bee Population, Food Production

John Deere's Sustainability Impact Group (SIG) defines its purpose as promoting a culture of sustainability for colleagues, customers, dealers, suppliers, and communities.

With one simple biodiversity project — a pollinator plot — the Cary, North Carolina, SIG chapter involved nearly every stakeholder mentioned above.

Another employee-led biodiversity initiative at Deere included converting 4.5 acres of land to a pollinator habitat at the company's combine factory located in Zweibrücken, Germany. These projects can help play a role in reversing a trend threatening the planet's smallest farmers.

According to the United Nations, nearly 40 percent of pollinators, like bees and butterflies, face global extinction due to inadequate "forage resources" or other feeding options.<sup>1</sup> All of this threatens the longevity of the pollinating insects that cover nearly 75 percent of the world's plants.<sup>1</sup> Bees pollinate one of every three bites of food we eat.<sup>2</sup>

Other examples of ways that Deere supports biodiversity include maintaining natural prairies at some of its global facilities and financial and volunteer support.

**"The Cary project demonstrates that Deere is willing to do the right thing in the name of sustainability, even if it's just a small project led by a few passionate individuals. Every time I walk by these plots, I see bees or butterflies buzzing around our flowers and as a Deere employee, I think they are my absolute favorite customers."**

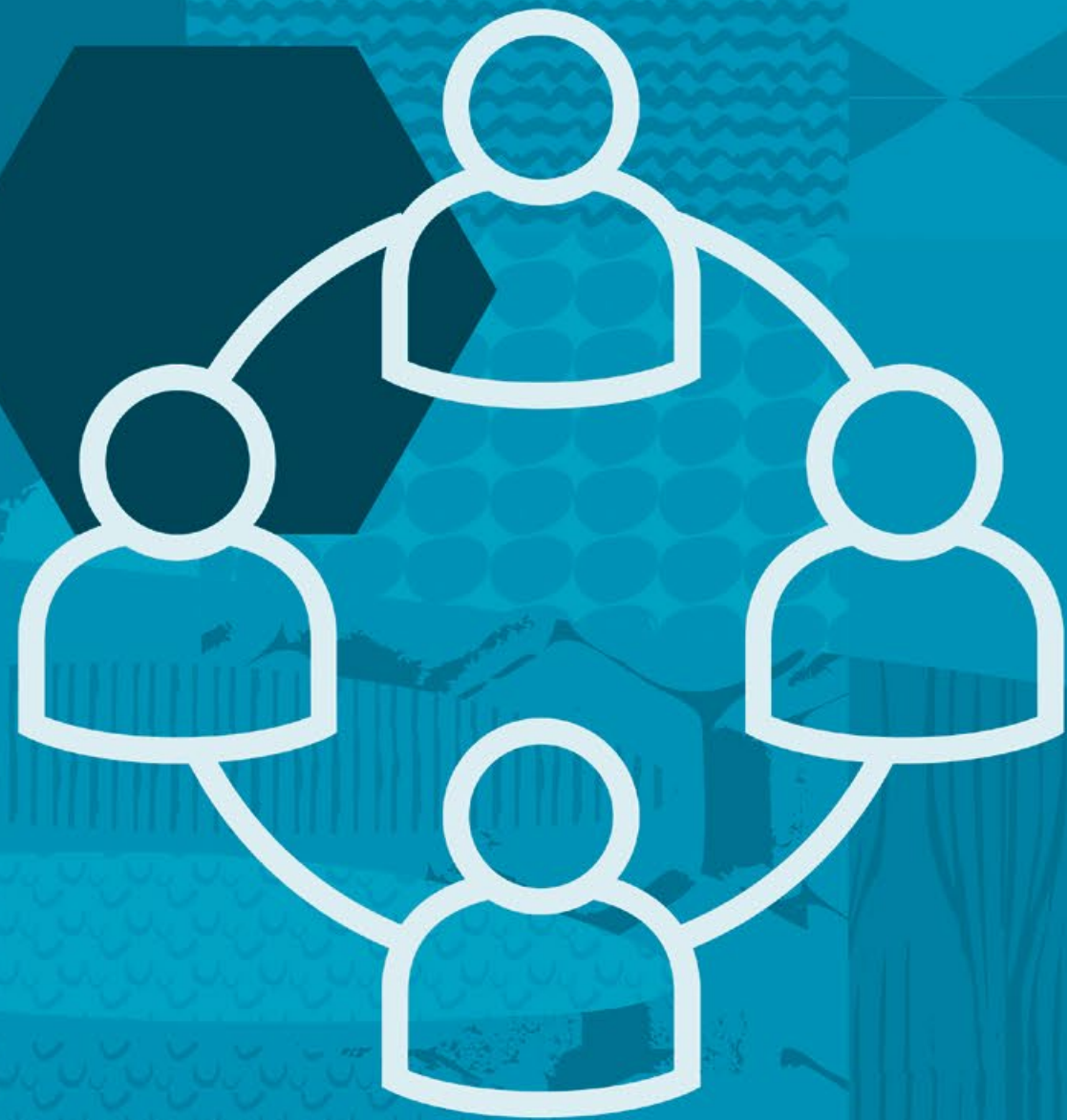
**MEREDITH BIECHELE**  
SIG site lead and member and advanced R&D engineer at Turf and Compact Utility



<sup>1</sup> Food and Agriculture of United Nations, *Pollinators vital to our food supply under threat*, <https://www.fao.org/newsroom/detail/Pollinators-vital-to-our-food-supply-under-threat/en> (2022).

<sup>2</sup> The Bee Conservancy, *The Bee Conservancy — Est. 2009 in Response to the Bee Crisis*, <https://thebeeconservancy.org> (2022).

# People and Communities



## OUR PRIORITIES



Embedding Diversity, Equity, and Inclusion (DEI) principles into all aspects of how we run



Maintaining a safety focused mindset by improving total recordable incident rate 20 percent by 2026



Uplifting smallholder and resource-constrained farmers, home communities, and our workforce

## WHAT WE HAVE DONE



NAMED JOHN DEERE'S FIRST CHIEF PEOPLE OFFICER



INCORPORATED DEI AS A REQUIRED COMPONENT OF ANNUAL PERFORMANCE EVALUATIONS



EXPANDED DEVELOPMENT AND LEADERSHIP PROGRAMS AND OPPORTUNITIES



OPENED NEW OFFICES TO ACHIEVE TALENT STRATEGIES



DEVELOPED KEY PRIORITIES FOR ACHIEVING WORKPLACE SAFETY GOALS



PARTNERED WITH GLOBAL FOOD BANKING NETWORK TO ADDRESS FOOD INSECURITY



AIDED THOSE AFFECTED BY THE RUSSIA-UKRAINE WAR

# PEOPLE ARE KEY TO UNLOCKING DEERE'S NEXT LEAP

The core of John Deere's Smart Industrial Strategy, launched in fiscal year 2020, is to revolutionize the agriculture and construction industries through the delivery of new technologies that unlock economic and sustainable value for its customers. The Leap Ambitions are how the company measures its progress. The key to creating real and measurable value lies with Deere's most valuable asset, its people — who we believe hold the diverse skills, perspectives, and passion required to fuel this vision.

John Deere will only accomplish this vision with a highly engaged workforce that has passion to change the way customers are served and the agility to pivot as new technologies rapidly advance. This means each of John Deere's global employees — from those building the equipment in Deere factories, to those creating cutting-edge technology in research labs — must operate as one team with a common goal, where every voice and diverse perspective is valued. For this reason, the company is taking steps to embed DEI principles into the foundation of how the company does business every day. The diversity, equity, and inclusion of our people propels our ability to innovate and strengthens the foundation of John Deere's business.

Deere is working on developing sustainable DEI practices through the integration of principles and objectives into company policies, procedures, and the human capital management lifecycle. In 2022, Deere aligned its DEI strategy with the framework provided by ISO:304151. The company will plan to measure the impact of its DEI strategy through employee experience survey results and performance against



the United Nations Sustainable Development Goals (UN SDGs). Strategic alignment with the UN SDGs provides methodologies to reduce inequalities, drive decent work and economic growth, and strive for gender equality. We intend for accountability to be held by measuring the impact of our actions to increase representation, opportunities, and access for women and underrepresented groups in our work environments, business relationships, and communities. This holistic approach serves to honor our higher purpose: to advance life and sustain the world for generations to come.

From naming its first-ever chief people officer, taking an intentional approach to weave DEI as a common thread into our strategy, redefining hiring processes, engaging with early career talent in new ways, enhancing workplace benefits, and opening offices in strategic locations, Deere took significant actions in 2022 to put the company in a position to have top talent working to solve hard challenges for its customers.

## Talent Recruitment Strategy That Develops Future Leaders

### RECRUITMENT AND HIRING

This year, John Deere's Talent Acquisition Team expanded the diverse candidate slates and interview panels initiative by making it a requirement for every open position in the U.S. This effort allowed us to reach a broader range of talented candidates and help ensure fairness and inclusivity in recruitment, interviewing, and hiring.

Further, leveraging of advanced technologies has allowed Deere to expand this approach. These technologies help to mitigate unconscious bias in hiring, encouraging a focus on what matters — candidates' skills, experience, and education — rather than considering age, gender, race, sexual orientation, or disability status. The software suggests leads for open jobs, allowing recruiters to actively engage with candidates. This past year, Deere expanded the use of this software to look beyond early talent— Deere now uses it with all U.S.-based positions and will roll it out globally starting in 2023.

### INVESTING IN FUTURE LEADERS

John Deere's commitment to growing a diverse, engaged workforce requires helping communities thrive. And by targeting the structures that create systemic differences in opportunities, Deere can help address DEI at the root — beginning with students.

Increasing diversity in industries with historically low levels of underrepresented groups remains critical. Helping students from underrepresented groups cultivate the knowledge, interest, and skills early on can prepare them for careers in areas like STEM (science, technology, engineering, and mathematics), technical programs, and agriculture, boosting representation in the industry.

At the high school level, John Deere partnered with the Chicago High School for Agricultural Sciences (CHSAS) to award eight scholarships totaling \$25,000 USD, supporting students from diverse backgrounds. This magnet high school provides a unique opportunity for students to pursue interests in agribusiness and agriscience, solving a gap in the education system.



The CHSAS partnership also is focusing on providing impact through nonfinancial support. An AgriTech Apprenticeship program is in development to provide students with future job shadow and mentorship opportunities in the industry.

**CHSAS Administrator Lucille T. Shaw said, "We are very thankful for John Deere and this initiative to bring real-life opportunities in the form of apprenticeship programs, job shadows, field trips, and classroom resources to underrepresented students. The perspective and advocacy they can add to the agriculture industry is invaluable. A diverse workforce promotes diverse ideas and problem solving to help support feeding growing populations."**

Since 2019, John Deere has participated in Department of Labor High School Registered Apprentice Programs providing paid work-based learning opportunities for students after they have completed their junior year. These programs have included providing work-based opportunities for welders, machinists, and IT software engineers. Approximately two-thirds of the students who graduated from the program have gone into further career opportunities at John Deere.

At the university level, John Deere invested in the future of the industry by supporting Native and Indigenous students in 2022. Along with the Native American Agriculture Fund, the Foundation for Food & Agriculture Research, and others, Deere's financial support of \$250,000 USD helped launch the Tribal Agriculture Fellowship (TAF). This singular program supports Native American, Alaska Native, and Native Hawaiian students pursuing degrees in agriculture. TAF selected its first class of 10 fellows in 2022. By supporting the next generation of indigenous agriculture leaders, Deere hopes to sustain the deep traditions of farming and ranching that have existed among Native and Indigenous people for millennia.

## New Chief People Officer Felecia Pryor Q&A

**Q: What excites you about the opportunity to lead the people function at Deere?**

A: Connecting our people back to our higher purpose and our business strategy. We have a great foundation and we need to continue connecting the threads of how people can enhance our strategy.

**Q: How do you view people and culture playing a role within our Leap Ambitions?**

A: Our people are the key to achieving the Leap Ambitions. To be able to create and add value, we need to have all the right players on the team. And those players need to know they can bring their best selves every day to help us solve the immense challenges ahead of us.

**Q: Can you elaborate more on the critical actions for DEI to be engrained in talent attraction, engagement, and retention at Deere?**

A: We must continue to provide an environment where all feel welcome and can thrive. This starts with testing and refreshing our core values to ensure they resonate with our people, no matter where they are in their employment journey. Understanding how their values and purpose are aligned to ours is key to attracting and retaining our people.

**Q: What role do leaders around the world play in improving the employee experience?**

A: Leaders are the front line and play the most critical role in improving the employee experience. Our leaders must embrace vulnerability in order to empower their teams and unlock the passion and innovation within our workforce.



**FELECIA PRYOR**  
Senior Vice President  
and Chief People Officer

# Fostering and Measuring Development

## GLOBAL LEADERSHIP DEVELOPMENT

Equipping employees to lead where they are in the organization is essential to the company's success. Equitable, scalable, and global leadership development solutions are available, including We Lead Monthly Development Series, John Deere Leadership Development Curriculum, and just-in-time resources on the John Deere Leader Portal. Additionally, targeted leadership development solutions are offered depending upon development need and audience. In 2022, Deere offered the McKinsey Management Accelerator Program, which features relevant content specifically for Black, Asian, and Hispanic emerging leaders.

Women leadership representation is vital to creating a more diverse, equitable, and inclusive workplace. Through initiatives such as Women Unlimited LEAD, IMPower, the Smith Senior Level Executive Program, and Leading Women Executives, women at Deere are receiving leadership development opportunities to help them to achieve success at all levels of the company.

The 23rd class of the Global Leadership Program (launched in September 2022) included seven executives who were selected for the program. In partnership with the Tuck School of Business, the consortium program provides John Deere executives the opportunity to learn from executives from noncompeting companies.

## INTEGRATING DEI AND LEADERSHIP PRACTICES INTO PERFORMANCE MANAGEMENT

In 2022, John Deere introduced new "How We Work" expectations into its Global Performance Management process that define the standards of how employees collaborate with each other to deliver for those who depend on us. These new expectations embed DEI into every aspect of how John Deere does business by requiring everyone — from senior leaders to early career hires — to fully engage with and participate in activities that cultivate a culture where every voice is heard. DEI is the only global behavioral performance metric upon which all salaried employees are evaluated.

## INVESTING IN EMPLOYEES

John Deere offers robust training and innovative development opportunities so every employee can build a rewarding career and achieve their full potential.

Deere made a strategic investment in Compass, a groundbreaking talent experience program offering personalized, on-demand innovative learning resources. Today, salaried employees have access to over 100,000 learning opportunities and educational content. Employees can now learn on their terms, earn credentials, master in-demand skills, share content, and more. It is all designed to give employees a competitive edge for roles that fuel their passions as they grow at Deere.

Leveraging innovative technology to propel development, Deere piloted a virtual-reality learning platform to help mid-level managers become DEI champions. The program offered 55 participants an immersive learning experience to improve workplace equity and inclusion. The pilot's indicators of success were stronger than the traditional e-learning or in-person classroom training, with 76 percent of participants reporting an increase in empathy, 73 percent reporting an increase in their ability to identify factors of inequity, and a record 72 percent reporting an increase in confidence to act. Due to the program's success, Deere intends to expand it in 2023 by integrating it into the Leadership Development Suite through a new path called JD Learn Labs. Deere anticipates an additional 400 participants in 2023.

Deere launched an updated job swap program this year to provide further development opportunities across the company. This program enables employees to gain new skills and increase business acumen, and allows them to experience new responsibilities by exchanging positions with a colleague in the same salary grade. A job swap can broaden an employee's expertise, competencies, and perspectives while enabling new ideas and fresh strategic insights for the company.

# Building an Ecosystem Where Employees Thrive

## EMPLOYEE RESOURCE GROUPS CONNECT EMPLOYEES

John Deere's Employee Resource Groups (ERGs) are vital to fostering an inclusive culture. ERGs are a key driver of inclusion and a critical component of Deere's Global DEI strategy. Deere's 13 ERGs build organization-wide networks, enabling employees to come together.

This year, we expanded our ERGs to the U.S. production workforce to help ensure all our people experience opportunities to connect and benefit from the support offered by these networks.

Deere's newest ERG, N8V — launched in November 2022 — aims to bring together Indigenous people and the John Deere employee community. Despite its recent launch, N8V has already identified important aspirations, such as celebrating Indigenous Peoples Day and other significant dates and building relationships with reservations to share farming practices, support STEM education, and build skills and knowledge.

The ABLEd ERG — focused on Advocacy Benefitting Leaders and Employees touched by Disabilities — held events focused on mental health and well-being. The events centered on suicide awareness and prevention. These sessions engaged 250 employees including 200 production workers.

## EMBRACING THE FUTURE OF WORK

At John Deere, the future of work will incorporate flexibility and innovation to empower employees' creativity to deliver high-value outputs.

For salaried employees, the introduction of Flex@Work in 2022 is John Deere's commitment to providing a modern workplace experience. Depending upon the needs of the organization, salaried employees now have greater opportunities to pursue flexible schedules and work locations, a condensed workweek, fully remote work options, and job share opportunities. We believe this flexibility allows Deere to access and engage talent that may have been previously excluded.

In addition to flexibility, Deere also recognizes that having office locations in areas where diverse pools of talent want to live is an important part of talent engagement going forward. Collaboration and the ability to connect in person will continue to be critical for technological innovation. For this reason, Deere expanded its IT and technology footprint in the U.S. by opening a new office in the vibrant Fulton Market neighborhood just west of downtown Chicago and an innovation and collaboration hub in Austin, Texas. These new locations build upon Deere's initial footprint expansion that started in India, where an office was opened in Bangalore in 2020 to serve as a core IT hub for the company. These investments further strengthen Deere's global tech leadership by enabling greater access to highly skilled talent.

At our factories, an employee driven continuous improvement (CI) process has been part of the John Deere innovation culture for more than two decades. Over the past year, we created a standardized digital tool. Digital CI pilot teams were launched at three factories in Iowa — Des Moines, Ottumwa, and Davenport. During the pilots, our production and maintenance employees provided ongoing feedback indicating the tool elevated the employee experience through improved transparency, real time data, and enabled project execution. It also provides more robust analytics.



**"Our teams are not immune from statistics around brain health and suicide. Normalizing the conversation, talking openly about available resources, and supporting each other are critical to helping people see that things can get better. The ABLEd ERG has been a big win to enable these open discussions."**

**MARY PAT TUBB**  
Factory Manager, Davenport Works

LEFT TO RIGHT:

**ANDREZ CARBERRY**  
Director of Global HR Operations

**JOHANE DOMERSANT**  
Global Director of Talent Supply & DEI

**RAJARAM RAJAMANI**  
Global HR Director — India,  
John Deere Asia & SSA





**COLLECTIVE BARGAINING AGREEMENTS**

Building the best equipment starts with having the best people.

In November 2022, Deere successfully negotiated a new six-year labor agreement with the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW), covering approximately 10,000 employees across several U.S. facilities.

In July 2022, a new four-year collective bargaining agreement was reached between the International Association of Machinists and Aerospace Workers (IAM) and Deere & Company. The vote was passed with an overwhelming majority of over 80 percent of John Deere Horicon Works (Horicon, Wisconsin) production employees voting to ratify the contract.

**Approximately 84.4% of John Deere's active global production and maintenance workers are covered by collective bargaining agreements.**

This collective bargaining agreement was developed following a similar philosophy to the UAW collective bargaining agreement by including a similar market-leading pay and benefits package. With this agreement, Deere continued to build flexibility with our manufacturing operations to meet customer demands.

"Together, Deere & Company and IAM have reached a collective bargaining agreement that provides economic progress for our employees, maintains John Deere's competitiveness, and ensures Horicon Works employees will continue to produce products that contribute to the livelihoods of our customers and to the Horicon community," Carol Lewis, vice president of Labor Relations, said.



See the [2021 Sustainability Report](#) for more details on the UAW collective bargaining agreement.

**BENEFITS THAT MEET THE NEEDS OF AN EVOLVING WORKFORCE**

Deere is committed to providing comprehensive and competitive pay and benefits to its employees. Deere's total rewards for global employees include a variety of components that aim to support sustainable employment and the ability to build strong financial futures.

Over the last several years Deere has expanded benefits and well-being initiatives in the U.S.

Starting in June 2021, paid parental leave for birth or adoption was expanded to eight weeks for all parents. Infertility coverage and fertility solutions also were expanded in 2022 for salaried employees.

Starting in January 2023, expanded health care benefits are offered to same-sex and

different-sex domestic partners of salaried employees, including benefits for children of domestic partners.

The Employee Assistance Program (EAP) increased the number of free counseling visits from five to eight, per incident, to all salaried employees and members, effective August 1, 2021. The EAP provides treatment and counseling sessions for a variety of needs such as financial, mental health and well-being, grief, marriage, substance abuse, and crisis support. Deere facilities can also leverage over 50 courses from experts on topics ranging from suicide prevention and managing workplace stress to maintaining well-being during change.

In a continued effort to prioritize mental health, Deere has enrolled our occupational health teams, labor relation leads, and designated UAW-represented production employees in Mental Health First Aid training programs. The National Council for Mental Wellbeing teaches through the Mental Health First Aid program how to identify, understand, and respond to signs of mental health and substance abuse challenges. Deere has trained 61 employees in this program and has targeted training for 25 leaders at Horicon and Augusta scheduled for 2023.



Visit [wellbeing.deere.com](http://wellbeing.deere.com) and [deere.com](http://deere.com) for more details.

**GAUGING IMPACT**

As John Deere intentionally aims to create an environment where the best talent in the industry is highly engaged to deliver innovative solutions for its customers, we believe the impact of these efforts must be monitored. To assess the impact, John Deere has transitioned away from an employee "engagement" survey in favor of an employee "experience" survey in 2022.

In addition, an attrition risk dashboard and expanded demographic questions provide a better understanding around the various segments of the employee population, allowing for insights into similarities and differences of opinion.

The Employee Experience (EX) Index measured employees' sense of their personal accomplishment, sense of belonging, feeling valued, and intent to remain with the company. Overall, Deere

scored 75 percent (78 percent for salaried and 71 percent for production employees) on the EX Index, which was six points below the external global top quartile benchmark.

The company also measured diversity, equity, and inclusion progress through a DEI Index. Overall, Deere scored 74 percent on the DEI Index (80 percent for salaried and 66 percent for production employees).

Finally, to measure our attrition risk, we asked employees if they intended to stay with the organization for at least the next 12 months. All totaled, 84 percent of employees globally responded favorably to this question. For those employees who answered the question unfavorably, the top reason indicated for seeking employment elsewhere was for career/job opportunities for salaried employees and benefits/compensation for production employees.



**75%**  
EMPLOYEE EXPERIENCE INDEX SCORE OVERALL

**74%**  
DIVERSITY, EQUITY, AND INCLUSION INDEX SCORE

**84%**  
ATTRITION RISK SCORE

## Aligning Values With External Actions

### JOHN DEERE AND THE AKANA GROUP

In 2020, Deere entered into an authorized reseller agreement with The Akana Group, a Native American-owned small business enterprise. Through this agreement, The Akana Group purchases Deere equipment for resale to tribal entities and the U.S. Government. "Akana," which means "ally" in the Choctaw language, perfectly captures the commitment that The Akana Group brings to its work with Native American customers and communities, a commitment Deere proudly shares.

This commitment was fully on display in 2022 when Deere and The Akana Group hosted Chairman Timothy Rhodd and the Iowa Tribe of Kansas and Nebraska for a Gold Key Tour of the Harvester Works factory. During Gold Key Tours, customers meet with the employees who designed and manufactured their machine, experience how their machine is actually made, and even start their machine at the end of the production line.

What makes these tours so special for Deere is the opportunity to honor and become inspired by our customers. In addition to being the first Tribal leader hosted for a Gold Key Tour, Rhodd shared his leadership in using Deere technology to drive agricultural practices. Rhodd said, "We have smart farm initiatives, a lot of practices and decisions that we're making on our day-to-day operations are data driven, and that's just one more piece of the puzzle that we can track through technology, all of the different things we're doing across our land."



### LEAPING FORWARD

John Deere's pledge to advance life and sustain the world for generations to come holds true for its employees, customers, and communities. An example of how Deere lives this pledge is its continued commitment to Black farmers through LEAP (Legislation, Education, Advocacy, and Production Systems), formed in 2020.

In November 2022, the Center for Heirs' Property Preservation joined LEAP as its newest member. The Center provides legal education and direct legal services, helping families reach agreement or clear title to family land and probate estates. Having a clear title places full autonomy of the property in the farmer's hands. For example, farmers can use the land to grow and sell timber and put the profits earned back into their land, themselves, and their families. They're able to realize the true value of their farms — reestablishing a foundation for creating generational wealth.

**"Land is the most valuable asset to a farmer. With Black farmers owning less than five million acres of land in the U.S., Deere's resources will help families gain title to their land and create a legacy for the next generation."**

**THARLYN FOX**  
LEAP Manager

### SPONSORING THE JUNETEENTH FREEDOM FESTIVAL

The John Deere sponsorship of the official Juneteenth Freedom Festival in Washington, D.C., offers another example of how we drive positive outcomes in communities. This year, Deere hosted a booth at the event's virtual career fair. Our sponsorship allowed us to support students attending Historically Black Colleges and Universities through the Juneteenth Freedom Festival's scholarship fund, while holding career development conversations with future leaders. As part of the sponsorship, \$10,000 USD in scholarships were offered to three students.



## EMPLOYEE SAFETY

At John Deere, the safety and well-being of our people is a top priority. We made significant progress on implementing best practices and leading indicators for enhancing employee safety over recent years. However, in fiscal year 2022, Deere saw total recordable incidents rise due in part to the increased demand for products and resulting increased production workforce. We are committed to reducing our total recordable incident rate (TRIR) 20 percent by 2026, with 2021 as our baseline. To improve our TRIR, we will prioritize risk and injury-reduction strategies, improved ergonomic programs, and additional focus on prevention through design.

Factory and large parts distribution centers have ergonomic and employee training programs in place that reduce common ergonomic risks that could impact TRIR. We also implemented ergonomic guidelines and standards to improve employee safety.

A tool John Deere utilizes to measure the level of implementation of ergonomic programs is the Ergonomic Program Scorecard. This tool allows units to self-assess their ergonomic programs and identify opportunities for improvement. In fiscal year 2022, 100 percent of manufacturing operations and large parts distribution centers completed this scorecard, and 71 percent have programs that can proactively identify and address risks.

The Prevention Through Design (PtD) program encourages best management practices and ensures alignment with company requirements by early identification of safety and ergonomic risks in product and workstation design. Ninety-one percent of the John Deere Safety Professional Team completed PtD Training in fiscal year 2022. Seventy-two percent of manufacturing units set new PtD goals for new product programs in 2022.

In fiscal year 2022, we continued activities to improve our safety management and system tools. We updated our Health and Safety Audit Program to improve objectivity and increase our focus on in-country regulatory requirements. We expanded John Deere technical tools to include a new training registration system and a global system solution for identifying and tracking regulatory and John Deere requirements. We continue the use of a global platform for incident management for injury and near-miss tracking.

### INDIA'S SELF-INTERLOCKING PALLET

Deere logistics and ergonomics team collaborated to successfully reduce the ergonomic strain employees were experiencing while preparing to ship cabs. The previous process to prepare the cabs for shipment could cause muscle fatigue or joint pain due to the 75 strikes per pallet to nail them to blocks and the harsh angle required for applying lashing belts.

The solution from the teams was a self-interlocking pallet, removing the need for nailing and lashing, thereby removing the source of ergonomic strain from the shipping process.



**20%**

Improvement in Total Recordable Incident Rate by 2026

|  | 2021 | 2022 | LEAP AMBITION<br>2026 |
|--|------|------|-----------------------|
| Total Recordable Incident Rate (TRIR)* | 1.98 | 2.18 | 1.58                  |

\*Rate is per 100 employees. Data associated with the operation of Unimil is not included in the reported 2021 metrics.



# JOHN DEERE FOUNDATION FOCUSED ON ADDRESSING FOOD INSECURITY

## Getting Food to the Hungry Takes a Global Approach

In the last 20 years, growers worldwide have increased primary crop production by more than 50 percent and meat production by 45 percent.<sup>1</sup> Yet the number of people classified as hungry has grown by 150 million since 2019.<sup>1</sup>

So, how can producers keep pace? It's a delicate problem where addition seems like the only solution. Yet solving the need to feed an ever-increasing global population may not be as obvious as growing more food.

That's because solving a hunger crisis affecting more than 828 million people begins by dispelling a common misconception: People don't experience hunger because the world's growers don't produce enough; they experience hunger because they don't have equitable access to food.<sup>2</sup> Gaining access can help solve hunger by reducing the waste associated with a lack of equitable food distribution channels.

According to the World Food Programme, one-third of all food grown globally is waste — roughly 1.3 billion tons worth about \$1 trillion USD annually.<sup>3</sup> That waste means we are feeding landfills instead of each other. Environmentally, it also means that food rot adds to increased carbon emissions.

"By investing in food banks around the world, we create new and more equitable distribution channels for food," said Laura Eberlin, global social responsibility lead at John Deere. "Food bankers optimize the large-scale delivery of vital nutrition from farmers, retailers, and others to those experiencing hunger. Food bankers and their agencies can save and rescue food and then tailor its distribution to meet the needs of their guests with the dignity they deserve."

And it's with that realization that nonprofit organizations like the Global Food Banking Network (GFN) and One Acre Fund continue to flourish. It's also where the [John Deere Foundation's bold commitment of pledging to invest \\$200M USD over 10 years makes a difference.](#)

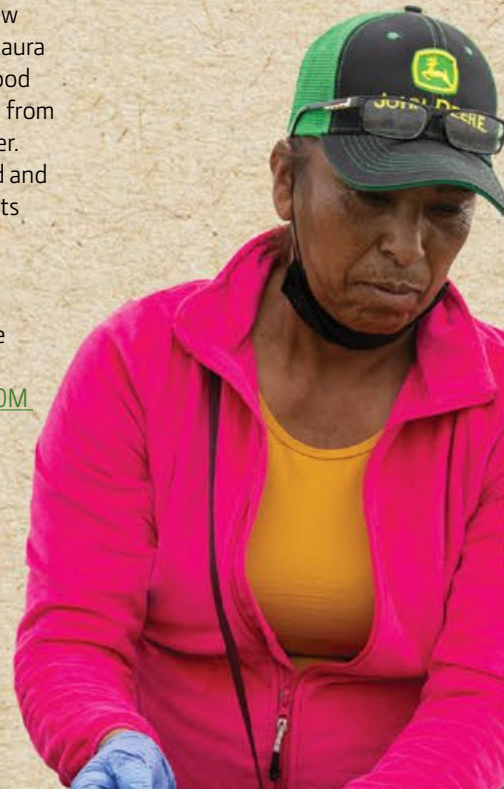
The foundation focuses its investments on three groups of people: marginalized families and youth in our home communities, smallholder and resource constrained farmers, and the company's workforce. The foundation also directs its work to helping achieve the United Nations Sustainable Development Goals, including "zero hunger" by 2030.<sup>4</sup>



**"This is important to John Deere, because one of the ways we can honor our growers and ranchers is to make sure everything they grow and raise for human consumption is used. GFN's mission to save and distribute the food to those who need it is a powerful complement to our work."**

**LAURA EBERLIN**  
Global Social Responsibility Lead

Maria Teresa Garcia Plata, director general for Bancos de Alimentos de México (BAMX), an organization which brings food banks around Mexico together, said her organization is working to "rescue more food from the value chain." In working with 53 food banks across Mexico, that means taking the food to where it's needed most, so none of it is wasted.<sup>5</sup>



This is where GFN helps by working in Deere home communities in Mexico and Argentina. Lisa Moon, GFN's president and CEO, said GFN considers itself an "accelerator" for the process of distribution and works with local food banks in its network. In 2021, 39 million people, across 44 countries, relied on GFN member food banks for meals.<sup>6</sup>

Food bank networks can not only help recover food for hunger relief, but can also mitigate environmental impacts from food wasted. In 2021, food banks recovered 514,356 metric tons of wholesome, surplus food to feed 39 million people.<sup>7</sup> These actions collectively mitigated 1.695 billion kilograms of CO<sub>2</sub>e emissions, which is equivalent to reducing emissions from more than 365,000 passenger vehicles.<sup>7</sup>

But it's not only food banks that contribute to this acceleration. It's the world's farmers, too.

One Acre Fund, focused on helping smallholder farmers in nine African countries, has developed a powerful model that places "farmers first" through financing, farm input distribution, agricultural training, and post-harvest support.<sup>8</sup>

The organization has integrated sustainable and regenerative agricultural practices like crop diversification and cover cropping. Cover cropping is considered a form of regenerative agriculture aimed at improving soil health and increasing carbon capture.

One Acre Fund is also scaling up an agroforestry platform to plant one billion trees in the coming decade.<sup>9</sup> In 2021, the group enabled smallholders to plant 40 million trees.<sup>10</sup> In addition to being a critical

on-farm asset for smallholder farmers, trees also are an important carbon sink, helping to mitigate climate change.

What makes One Acre Fund unique, Arun Pandey, global social responsibility lead for John Deere, said "is the scale and impact at which they operate."

One Acre Fund works with 1.4 million farmers directly and another 1.8 million indirectly.<sup>11</sup> In 2021, client harvests fed 20 million people within the communities where they operate.<sup>10</sup> In addition, farmers saw a 45 percent profit increase.<sup>10</sup> This means an extra \$104 USD a year of additional income<sup>10</sup> in a region of the world where farm families live on less than \$1 USD a day, putting them below the international poverty line.<sup>11</sup> That increase can take farmers from the state of hunger to self-sufficiency to advancement and prosperity.





“The success of One Acre Fund helps prove what we’ve believed at John Deere all along,” Pandey said. “Farmers are critical to sustainable global development because they can create economic, social, and environmental benefits for the entire world.”

The John Deere Foundation proudly supports organizations like GFN, having donated over \$2.3M USD in 2022 to food banks around the world — helping to provide nearly 13.6 million meals — and by making a five-year, \$5M USD commitment to One Acre Fund. To make these donations even stronger, the foundation invests the vast majority of them either wholly unrestricted or for capacity building chosen by the nonprofit organization.

This type of commitment has not gone unnoticed as The Civic 50, an initiative of Points of Light, recognized John Deere as one of the 50 most community-minded companies in the United States.

The impact and involvement also stretch beyond the foundation as John Deere’s workforce also gets involved in the hunger fight. In 2022, employees recorded 174,518 hours of volunteerism in their home communities.

<sup>1</sup> Food and Agriculture Organization (FAO), *World Food and Agriculture – Statistical Yearbook 2022*, <https://doi.org/10.4060/cc2211en> (2022).

<sup>2</sup> World Health Organization, *UN Report: Global hunger numbers rose to as many as 828 million in 2021*, <https://www.who.int/news/item/06-07-2022-un-report-global-hunger-numbers-rose-to-as-many-as-828-million-in-2021> (2022).

<sup>3</sup> World Food Programme, *5 facts about food waste and hunger*, <https://www.wfp.org/stories/5-facts-about-food-waste-and-hunger> (2022).

<sup>4</sup> United Nations, *Sustainable Development Goals – Goal 2: Zero Hunger*, <https://www.un.org/sustainabledevelopment/hunger/> (2022).

<sup>5</sup> BAMX, *What Do We Do?*, <https://bamx.org.mx/datos-que-alimentan/> (2022).

<sup>6</sup> The Global Food Banking Network, *Explainer: The Global Cost-of-Living Crisis*, <https://www.foodbanking.org/blogs/explainer-the-global-cost-of-living-crisis/> (2022).

<sup>7</sup> The Global Food Banking Network, *Food Banks for People and the Planet*, <https://www.foodbanking.org/resources/food-banks-for-people-and-the-planet/> (2022).

<sup>8</sup> One Acre Fund, *Farmers are the key to achieving food security and prosperity*, <https://oneacrefund.org/> (2022).

<sup>9</sup> One Acre Fund, *Trees – One Acre Fund farmers have planted 100 million trees to date, and we aim to see one billion trees planted by 2030*, <https://oneacrefund.org/what-we-do/areas-focus/trees> (2022).

<sup>10</sup> One Acre Fund, *Cultivating New Frontiers 2021 Annual Report*, [https://oneacrefund.org/sites/default/files/2022-10/2021\\_Annual\\_Report.pdf](https://oneacrefund.org/sites/default/files/2022-10/2021_Annual_Report.pdf) (2022).

<sup>11</sup> One Acre Fund, <https://oneacrefund.org/> (2022).

## UKRAINE RELIEF EFFORTS

### Planting Seeds of Hope From Emergency Grants and Employee Giving Programs

The heroic efforts of John Deere employees helped dozens of Ukrainian colleagues flee their war-torn homeland.

Oleksandra Romaniuk, area aftermarket manager for John Deere Ukraine, was forced to leave her Kyiv home shortly after the conflict began.

“It is hard to put into words the emotions we felt while leaving family members without understanding when or if we will meet again,” said Romaniuk. “We traveled by train from Kyiv to Uzhgorod with around 200 passengers in each train car, then crossed into Hungary on foot.”

When she and other employees arrived in countries along Ukraine’s western border, they were greeted by teams of volunteers ready to assist. In Hungary, John Deere dealer personnel helped secure temporary housing. In other locations, vans were waiting to provide safe transport to Mannheim, Germany — headquarters for the company’s European operations.

“We had an all-employee call with Ukraine employees on day two of the invasion,” explained Mark von Pentz, president, Worldwide Agriculture & Turf Division, Small Ag & Turf, Regions 1 & 2. “After looking into their eyes and hearing their stories, it became clear that we had to act fast to do something for them and their families.

“Our HR team had already organized accommodations in a nearby hotel. We helped them get registered and provided them health care, and we are now helping them find long-term accommodations to stay during the months ahead. It feels good to see what the John Deere family has done for colleagues from Ukraine.”



#### RELIEF EFFORTS EXTENDED FAR BEYOND MANNHEIM

In Zweibrücken, Germany, employees collaborated with the city of Zweibrücken to renovate apartments to house Ukrainian refugees. John Deere Iberica employees donated over \$22,000 USD to the Red Cross to support refugees from Ukraine. In Italy, John Deere Italia provided truckloads of vital supplies. And John Deere Poland raised money and collected food, clothing, and hygiene products.

In addition, John Deere donated \$100,000 to the HALO Trust, an organization that deploys specially equipped John Deere tractors to assist in clearing landmines and disposing of explosive ordinance in Ukraine.

The John Deere Foundation bolstered these local efforts by immediately awarding \$250,000 USD to the World Food Programme (WFP) when the conflict began to address hunger in Ukraine and the surrounding region. It awarded another \$1M USD to WFP later in 2022 to address the increasing impact on the conflict on hunger globally. Working with United Way Worldwide, the Foundation awarded an additional \$140,000 USD to support organizations serving refugees in Poland and Germany.

John Deere employees around the world used the foundation’s employee giving programs to magnify their personal responses to the humanitarian crises caused by the war. With the help of the foundation’s programs, employees raised over \$200,000 USD. In addition, through a special collaboration with WFP’s Share the Meal initiative, employees helped donate nearly 90,000 meals.

“I have worked at John Deere for almost nine years. I could not believe our company would provide such care and support for each Deere employee and his or her families,” Romaniuk said. “The Deere team led us through all required steps to settle in Germany for this period of time. Living in one location with John Deere Ukraine families helped us to create a little Ukrainian community in Mannheim.

“Each step of the way, we have felt empathy and care from every one of our colleagues, and it is an experience we will never forget. For us, there is only hope — the end of war, all our family members are alive and healthy, and we are able to reunite in our homeland.”

# Governance



## OUR PRIORITIES



Engraining Environmental, Social, and Governance (ESG) principles into our business with our Leap Ambitions as the guide



Robust sustainability governance



Value chain and policy engagement as a critical tool for achieving our financial and sustainable outcomes

## WHAT WE HAVE DONE



CREATED A CORPORATE SUSTAINABILITY DEPARTMENT



ISSUED JOHN DEERE'S FIRST SUSTAINABILITY-LINKED BOND



PARTNERED WITH THE HACKERONE PROGRAM ON CYBERSECURITY AND DATA PRIVACY RISK



UPDATED SUPPLY MANAGEMENT CODE OF CONDUCT TO INCORPORATE SUSTAINABILITY

# SUSTAINABILITY GOVERNANCE

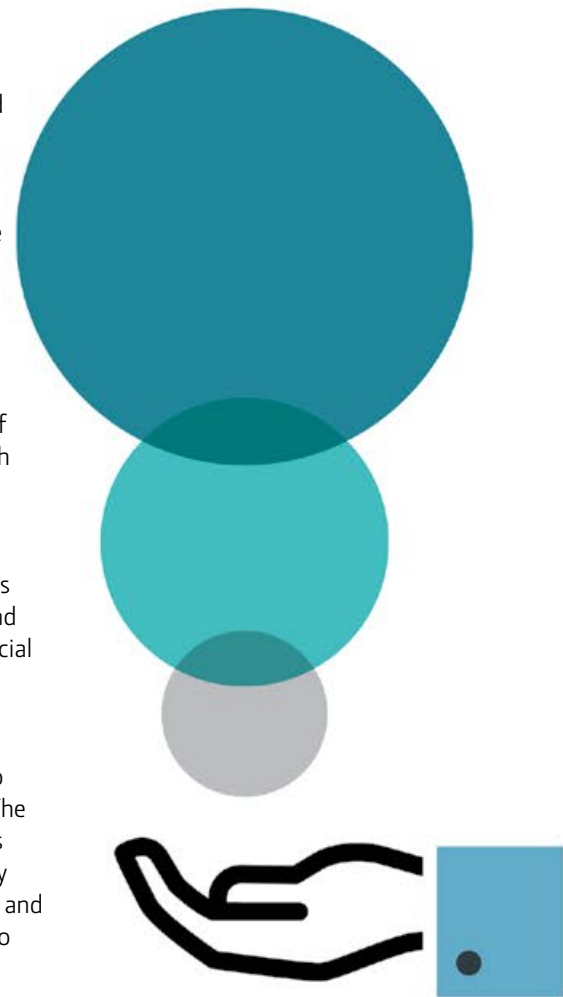
The Deere & Company Board of Directors has oversight of sustainability and is responsible for aligning strategic priorities and ensuring environmental, social, and governance (ESG) principles are integrated throughout the enterprise.

The Corporate Governance Committee of the board reviews ESG topics on a quarterly basis. During 2022, the committee was briefed on strategic sustainability initiatives, performance on metrics and targets, the sustainability reporting roadmap, feedback from stakeholder engagement, and the landscape of shifting ESG expectations and practices. The committee also received educational updates from external experts on evolving trends and best practices in ESG reporting. Through regular engagement, the committee guides and directs strategic ESG planning, ESG goal setting, and the scope of sustainability reporting.

The Compensation Committee of the board is responsible for ensuring compensation is aligned with the strategic priorities, performance, and opportunities of the company. Throughout 2022, the committee was involved in understanding progress toward the John Deere Leap Ambitions and the priorities that we believe will move our business forward over the next decade.

The full board of directors has oversight of the risks and opportunities associated with climate change and updates are provided to the board in alignment with Enterprise Risk Management processes. Additional detail about the board's and the company's governance of climate change can be found in our Task Force on Climate-related Financial Disclosures (TCFD) Report.

To enable and execute the Leap Ambitions, numerous teams and policies are in place to help ensure full organizational alignment. The Smart Industrial operating model continues to prioritize and aim to embed sustainability throughout worldwide business operations and further strengthens the company's ability to successfully achieve ESG ambitions.



## SUSTAINABILITY-LINKED BOND

In April 2022, John Deere Capital Corporation issued \$600M USD of sustainability-linked medium-term notes with an initial interest rate of 3.35 percent, which are due in 2029. This transaction supports the company's commitment to environmental sustainability.



To see more on Deere & Company Sustainability-linked Bond, see [investor.deere.com](https://investor.deere.com)

# TEAMS

## CEO STAFF

The CEO Staff provides direction for and ultimately own the execution of the company's sustainability initiatives. Oversight and ownership at this level help ensure the company's sustainability initiatives are aligned with and a core component of the overall business strategy. The CEO Staff receive sustainability updates at least quarterly. During 2022, updates included progress toward the development of baselines and glide paths for all Leap Ambitions, strategic priorities for achieving John Deere's validated Science Based Targets for Scope 1, 2, and 3 greenhouse gas (GHG) emissions, goal-setting priorities, performance on the 2022 Sustainability Goals, status updates on projects and initiatives enabling our ESG priorities, sustainability reporting trends and multiyear roadmap, and stakeholder feedback.

## CORPORATE SUSTAINABILITY

With the launch of the Leap Ambitions in February 2022, the company increased its commitment to delivering outcomes for customers and stakeholders. Achieving these sustainable outcomes requires cross-functional coordination and incorporation of sustainability as a critical part of core company processes. In addition, the external environment related to corporate sustainability reporting remains dynamic, with expectations for transparency continuing to expand, and regulatory oversight of sustainability reporting a likely reality in the near term.

A new organization, Corporate Sustainability, was created within the Accounting & Finance function in 2022 to drive enterprise sustainability strategy and governance. This team serves as a centralized group responsible for driving, measuring, and reporting sustainability strategies and initiatives at Deere. The team coordinates across the enterprise to measure and report progress on Leap Ambitions and other sustainability metrics, evolve core processes, and engage with external stakeholders to communicate the Smart Industrial model and Leap Ambitions.

This team also partners with the company's technical accounting and internal audit experts to build robust processes and rigor related to sustainability reporting. In addition, the team relies on a broad group of subject matter experts throughout the organization to execute Leap Ambitions through the development and implementation of roadmaps that align delivery of products and solutions with Leap Ambition outcomes.

## LEAP AMBITION STRATEGY CHAMPIONS AND OWNERS

Each Leap Ambition has a goal champion and owner. Each goal champion owns the delivery of a goal and is responsible for aligning priorities and resources throughout the organization, reviewing progress and challenges, and driving execution of initiatives to meet the goals. Goal owners have specific ownership of the actions driving the steps needed to achieve the Leap Ambitions.

## CLIMATE TEAM

During 2022, the Climate Team — a cross-functional team responsible for addressing the various identified risks and opportunities for our business relative to climate change — monitored developments, quantified risk and opportunities, developed action plans, and engaged throughout the organization to help ensure alignment and assess performance toward goals and targets. Members of this team engaged in a variety of topics this year including customer sustainability requests, investor feedback, biofuels markets, policy and regulation changes around climate change, carbon markets, Scope 1, 2, and 3 GHG emissions and customer CO<sub>2</sub>e decarbonization strategy, and the UN Climate Change Conference of the Parties (COP) 26th annual summit.

## 30X30 STEERING COMMITTEE

The 30x30 Steering Committee's purpose is to develop and align plans and opportunities to reduce 30 percent of the company's Scope 3 Category 11 (Use of Sold Products) GHG emissions by 2030. The team is comprised of company leaders in production systems, engineering, corporate sustainability, and marketing. This team has strategically determined a roadmap to success to reduce emissions via alternative propulsion from renewable fuels, electrification, and hybridization. To review more accomplishments and strategic steps taken in 2022, [see the Product Emission Reduction Strategy](#).

## SUBJECT MATTER EXPERTS

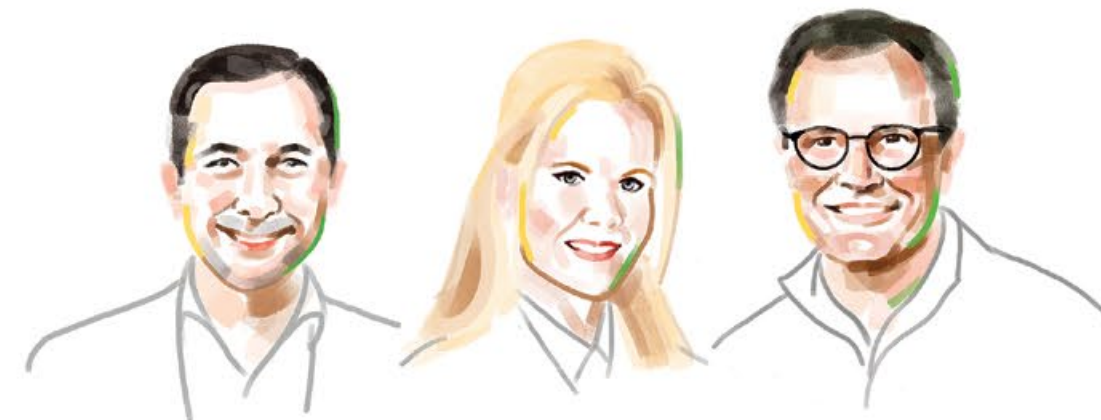
A broad team of subject matter experts is critical to the execution of John Deere strategic priorities. Working with their teams, they develop the implementation plans for achieving our sustainability initiatives and continually monitor and engage these teams to ensure the delivery of action plans. They also serve a key role in keeping the organization informed relative to progress and roadblocks as they track and report metrics on a regular basis. These individuals have deep technical knowledge in their respective areas of expertise and serve as go-to experts within the organization.

LEFT TO RIGHT:

**CRISTIANO CORREIA**  
Production Systems Strategic Planning Manager, R3 Marketing Director

**ELLERY HANLIN**  
Manager, Turf Battery Electric Vehicle Product Strategy & Compact Utility

**PIERRE GUYOT**  
Senior Vice President, Power Systems



# SUSTAINABLE SUPPLY CHAIN MANAGEMENT

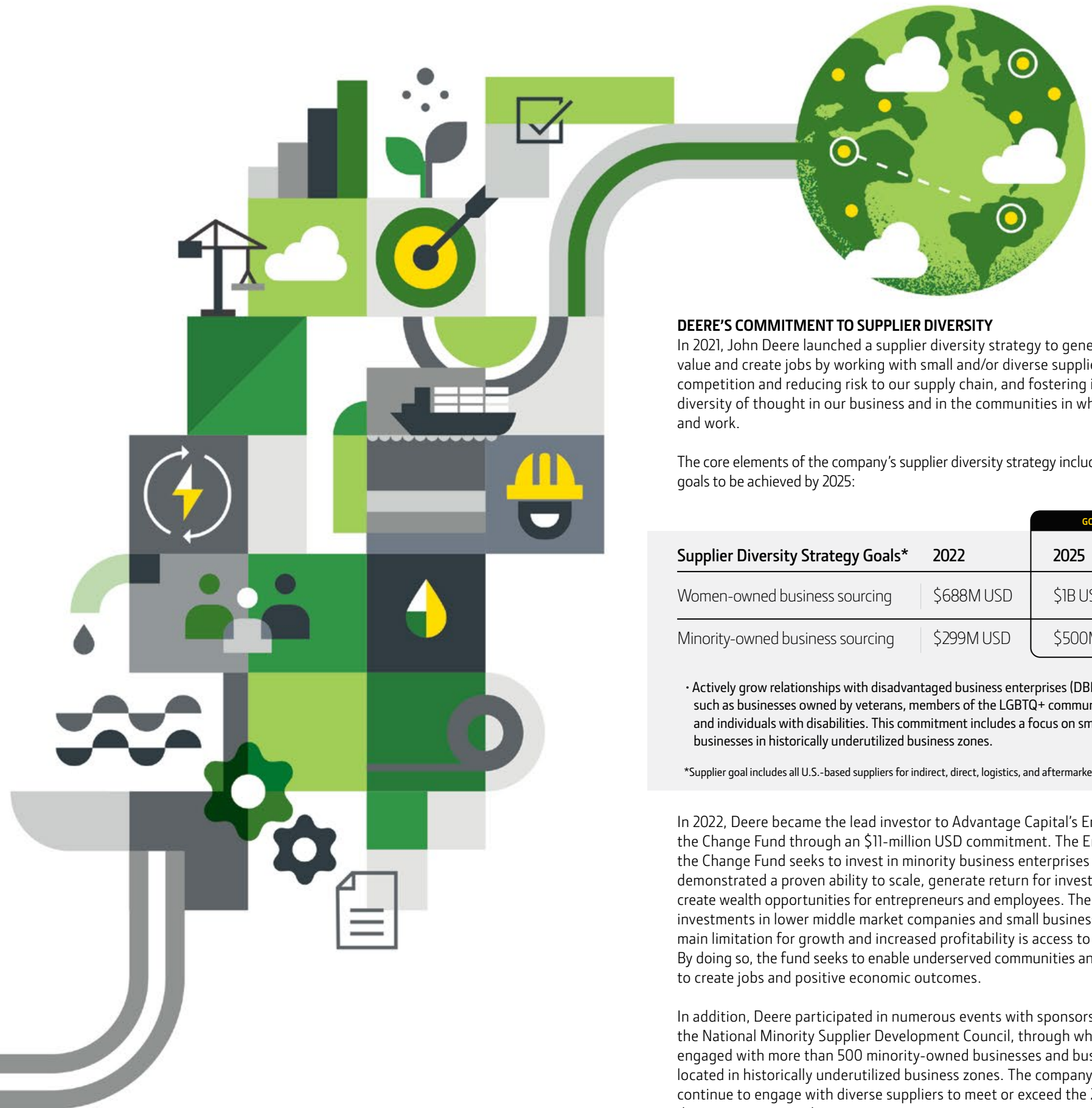
John Deere Supply Management and Logistics teams continue to seek to meet customer needs through promoting sustainability and by furthering developments in technology and supplier relationships.

Aligned with the new Leap Ambitions, our updated strategic sourcing approach considers sustainability a key action area, balanced with ongoing expectations for quality, cost, and delivery. In fiscal year 2022, John Deere communicated its strategy to all suppliers in the John Deere Supplier Network (JDSN) platform. This strategy guides our search for supplier opportunities that further our 2030 goals – those relating to greenhouse gas (GHG) emissions reduction, increased use of sustainable materials, and recyclable materials. For fiscal years 2022 and 2023 we intend to collaborate with energy-intensive suppliers of key materials, beginning with steel, castings, rubber, glass, packaging, data centers, batteries, and power systems. Those materials are all tied directly to GHG emissions, waste intensity at facilities, and circularity of products.

Our supplier sustainability strategy encourages supplier engagement with EcoVadis. John Deere utilizes EcoVadis to assess suppliers in an objective and independent way. The assessment looks at corporate social responsibility, sustainability management systems, and identifies potential supplier contributions to sustainability as well as risks. Over 1,000 supplier locations have completed EcoVadis scorecards, helping Deere exceed the fiscal year 2022 goal to reach 1,000-plus suppliers engaged with sustainability assessments. These assessments have allowed Deere to develop a deeper understanding of suppliers' current state, aspirations, and progress toward sustainable outcomes. This understanding unlocks key next steps to achieve the Leap Ambitions.

We updated the Supplier Code of Conduct to further engrain sustainability into our expectations and our suppliers' commitments. Our enhanced sustainability expectations cover multiple areas, including the environment, labor and human rights, ethics, and sustainable procurement. [Click here to view the Supplier Code of Conduct.](#)

We continued to assess and advance supplier performance in areas like compliance and financial health. Our corrective-action process provides suppliers with opportunities for continuous improvement. John Deere manages risks associated with critical materials as well. For more information, refer to the [Sustainability Accounting Standards Board \(SASB\).](#)



## DEERE'S COMMITMENT TO SUPPLIER DIVERSITY

In 2021, John Deere launched a supplier diversity strategy to generate economic value and create jobs by working with small and/or diverse suppliers, increasing competition and reducing risk to our supply chain, and fostering innovation and diversity of thought in our business and in the communities in which we live and work.

The core elements of the company's supplier diversity strategy include the following goals to be achieved by 2025:

| Supplier Diversity Strategy Goals* | GOAL       |            |
|------------------------------------|------------|------------|
|                                    | 2022       | 2025       |
| Women-owned business sourcing      | \$688M USD | \$1B USD   |
| Minority-owned business sourcing   | \$299M USD | \$500M USD |

\* Actively grow relationships with disadvantaged business enterprises (DBEs) such as businesses owned by veterans, members of the LGBTQ+ community, and individuals with disabilities. This commitment includes a focus on small businesses in historically underutilized business zones.

\*Supplier goal includes all U.S.-based suppliers for indirect, direct, logistics, and aftermarket.

In 2022, Deere became the lead investor to Advantage Capital's Empower the Change Fund through an \$11-million USD commitment. The Empower the Change Fund seeks to invest in minority business enterprises that have demonstrated a proven ability to scale, generate return for investors, and create wealth opportunities for entrepreneurs and employees. The fund targets investments in lower middle market companies and small businesses whose main limitation for growth and increased profitability is access to capital. By doing so, the fund seeks to enable underserved communities and businesses to create jobs and positive economic outcomes.

In addition, Deere participated in numerous events with sponsors such as the National Minority Supplier Development Council, through whom Deere engaged with more than 500 minority-owned businesses and businesses located in historically underutilized business zones. The company intends to continue to engage with diverse suppliers to meet or exceed the 2025 supplier diversity strategy ambitions.

## CYBERSECURITY AND DATA PRIVACY



As data and connectivity become a greater part of our work at John Deere and in our customers' operations, we continue to dedicate cybersecurity teams around the globe who are committed to helping protect our customers, dealers, products, and infrastructure.

To learn more about Deere's approach to digital security [click here](#).

Our Audit Review Committee and Corporate Governance Committee provide board oversight of our cybersecurity and data privacy programs. Information on the latest cybersecurity trends, strategic initiatives, and metrics are presented quarterly. Our Digital Risk Governance Council and Executive Business Conduct Council provide senior leadership oversight on information security governance, data governance, digital risk management, and privacy.

We leverage the National Institute of Standards and Technology (NIST) Cybersecurity Framework as the foundational building block of our global information security program. We work with third parties to assess the maturity of our program in the NIST Cybersecurity Framework and develop strategic areas of focus from those assessments.

Building a companywide culture of cybersecurity starts with cybersecurity education. Our goal is to teach employees about key security concepts, trends, and the role each employee plays in helping to prevent cyberattacks. Our methods include mandatory training, phishing simulations, newsletters, and educational events.

Another key part of Deere's cybersecurity culture is the Security by Design program. It combines people, processes, and technologies to

integrate security concepts throughout the product development lifecycle. Our cybersecurity professionals partner with software engineers in the development process and use technologies, such as code scanning, to enhance security.

John Deere also takes care to respect people's privacy in handling personal data. Our data privacy program is structured to monitor and adapt to comply with changes in global privacy laws and regulations. To learn more about our privacy practices [click here](#).

While the European General Data Protection Regulation and other laws have brought increased requirements and general awareness to privacy, we have long focused on ensuring the responsible use of personal data. John Deere maintains its European Binding Corporate Rules, often considered the global gold standard for the transfer and processing of European personal data. Reflecting our commitment to privacy, we routinely submit significant parts of our global privacy program to European regulators for review, as appropriate.

### PUBLIC VULNERABILITY DISCLOSURE PROGRAM

John Deere partners with HackerOne, a global security platform connecting businesses with cybersecurity researchers who test and examine their systems. Deere has launched a public Vulnerability Disclosure Program with HackerOne, through which third parties may report potential security vulnerabilities.

## COMPLIANCE

The Center for Global Business Conduct provides continuous training, communications, and best practices throughout John Deere operations to sustain our strong ethical culture and help ensure compliance with laws and regulations.

The Code of Business Conduct and our framework of global ethics and compliance policies serve as the foundation for our compliance program and culture. The Supplier Code of Conduct and the Dealer Code of Conduct clarify the expectations Deere has for suppliers and dealers to conduct business in an ethical, compliant manner.

Deere's compliance training program includes a robust curriculum for newly hired employees, as well as regular, periodic training on a rotating list of topics for all employees. Training topics are defined by balancing data from our compliance program and enterprise risk management with legal and regulatory requirements. Training provided in 2022 included, but was not limited to, the following topics: cybersecurity, data privacy and protection, workplace and sexual harassment, Code of Business Conduct, and trade sanctions. Training material is translated into as many as 20 languages and generally delivered and tracked through an online learning management system.



Outreach to employees is an important element of our compliance program, led by compliance team members embedded in key geographies. Deere makes a concerted effort to connect with employees around the world through compliance networks, Employee Resource Groups, and global events, such as our Compliance Week 2022. The week kicked off with a conversation between the Chairman & CEO and Vice President & Chief Compliance Officer. Throughout the week, employees had opportunities to attend various discussion groups hosted by compliance team members around the world, often in local time zones and languages. These discussion groups featured recent compliance-related case studies or articles for employees to read and discuss. The week also included several email outreach efforts featuring real hotline cases from within the company.



The John Deere compliance hotline is operated by an independent company and is available to receive confidential reports from anyone within or outside the company. To access country-specific hotline information, employees can view the posters on display at each company location or visit the John Deere intranet. The John Deere Compliance Hotline website is listed in the Code of Business Conduct, the Dealer Code of Conduct, and the Supplier Code of Conduct.

Creating more transparency around our reporting and investigating processes has been an ongoing effort. In 2022, in addition to sharing real hotline cases through email and in our monthly e-newsletter, we launched a podcast series featuring lessons learned from hotline cases. In each episode, a compliance team member interviews a member of our investigations team about a recent, fully anonymized case. We also feature a senior leader speaking directly to the topics raised in the investigation and their personal commitment to ethics and compliance. Each episode reiterates the company commitment to non-retaliation.



## HUMAN RIGHTS

At John Deere, we honor human rights and respect the individual dignity of all people. Our commitment to human rights requires that we understand and carry out our responsibilities consistent with company values and practices upheld for all employees and workers in our value chain.

We strive to ensure that human rights are upheld for our employees and all workers in our value chain. Our commitment to respecting human rights is defined in our Code of Business Conduct, Supplier Code of Conduct, Dealer Code of Conduct, and John Deere's Support of Human Rights in Our Business Practices. These codes establish clear guidelines for our employees and suppliers, while helping to inform our business decisions. Deere closely monitors and assesses global human rights-related risks and developments. Deere develops region- or location-specific guidance and processes as appropriate to address human rights risks in those areas.

John Deere employees have a responsibility to uphold the standards of honor and integrity in the Code of Business Conduct. All employees are required to review the code and incorporate it into their work and behavior. To foster an inclusive workplace, the code provides guidance on creating an environment that promotes mutual respect and acceptance. It also discusses how to maintain a high level of integrity when working with customers and suppliers.

When choosing suppliers as appropriate, we seek to engage with those who comply with laws and uphold values aligned with our own. Our employees regularly discuss the Supplier Code of Conduct with suppliers, and most supplier contracts require adherence to the Supplier Code of Conduct. This code addresses the following key areas: labor and human rights, health and safety, environment, and ethics. Deere uses a third-party global leader, EcoVadis, in ratings to further assess the sustainability performance of key suppliers in our supply

chain. Deere uses the results of these assessments in our procurement processes and sourcing decisions as appropriate. The company conducts periodic audits of its suppliers to assess risk.

As the face of the brand to our customers, our dealers, distributors, and their sub-dealers (collectively, dealers) are expected or required to commit to conducting business ethically and in compliance with all applicable laws. Like the other codes, the Dealer Code of Conduct covers many topics, including labor, human rights, health and safety, environment, and ethics.



### JOHN DEERE POLICIES

Because we believe corporate governance is integral to creating long-term shareholder value, our board of directors has adopted companywide corporate governance policies that are periodically reviewed and revised to ensure that they reflect the board's corporate governance objectives. These policies, along with the company's Code of Business Conduct and other work-specific policies, establish the framework by which we seek to conduct ourselves and our global business in compliance with the law and by which we affirm our commitment to integrity in everything we do.

### CORPORATE GOVERNANCE POLICIES

These policies establish the guiding principles for John Deere corporate governance, including board composition and functions, meetings, committees, compensation, management evaluation, and succession planning.

### CODE OF ETHICS

This code establishes ethical standards applicable to directors, employees, and officers in satisfaction of applicable laws and regulations and the New York Stock Exchange.

### CODE OF BUSINESS CONDUCT

This code provides specific guidance to employees and outlines how we can and must uphold and strengthen the standards of honor and integrity that have defined our company since our founding.

### DEALER CODE OF CONDUCT

This code expects that dealers conduct business with a high degree of integrity and in a socially and environmentally responsible manner.

### ENVIRONMENT, HEALTH, AND SAFETY POLICY

With a focus on continuous improvement, this policy provides that we conduct our business in a manner that protects our customers, employees, communities, suppliers, and the environment.

### GLOBAL CONFLICT MINERALS POLICY

This policy sets forth our commitment to conducting worldwide business operations in a manner that complies with applicable laws and regulations regarding conflict minerals.

### SUPPLIER CODE OF CONDUCT

This code requires that all our suppliers conduct business with a high degree of integrity and in a socially and environmentally responsible manner.

### SUPPORT OF HUMAN RIGHTS IN OUR BUSINESS PRACTICES

This guidance outlines how John Deere strives to ensure that human rights are upheld for our employees and all workers in our supply chain.



## POLITICAL ENGAGEMENT

At John Deere, we believe that participating in democratic political processes around the world and advocating for public policies that permit us to compete fairly and freely in the marketplace are vitally important to all our stakeholders. In whatever form it might take, our engagement in the political process is grounded in and guided by our firm commitment to strong corporate governance and global corporate citizenship.

John Deere engages in public policy advocacy around the world to underscore the responsibility of a global business to participate in our communities. We engage in public policies such as trade, agricultural and infrastructure development, and regulations that impact how John Deere operates around the world. We seek to promote policies that provide solutions to food security, rural broadband, rapid adoption of precision technologies, mechanization, infrastructure, renewable fuels and alternative power, and tax and financing access that impacts our customers, among other policies. As a part of these efforts, we engage with like-minded companies, non-governmental organizations (NGO), and associations as well as participate in public-private partnerships, to reach global audiences and policymakers.

### U.S. POLITICAL CONTRIBUTIONS

In compliance with U.S. federal and state election laws, John Deere administers the John Deere Political Action Committee (JDPAC), a voluntary, nonpartisan initiative comprised of U.S. employees. JDPAC members voluntarily pool their personal financial contributions to support select federal and state office candidates who understand and support the business interests of our company, customers, employees, and stakeholders. Under federal law and company policy, participation in JDPAC is limited to eligible, salaried U.S. employees.

Except for administrative expenses, JDPAC is funded solely by the voluntary contributions of John Deere employees and is not supported by funds from John Deere itself. The company does not reimburse employees directly or indirectly for political contributions, including contributions to JDPAC.

Oversight of JDPAC's contributions and related activities is governed by its board, comprised of 13 John Deere employees from throughout our various business units. JDPAC does not engage in legislative matters or lobbying activity. Further, JDPAC does not seek to influence any particular vote through contributions.

JDPAC fully discloses all contributions made and received through reports filed with the Federal Election Commission and various state ethics commissions, as required by law. For transparency, John Deere posts an annual report on our website summarizing JDPAC contributions made in the most recent calendar year or election cycle, categorized by state, candidate, and amount. To view the annual report for the 2021–2022 election cycle, please [click here](#).

John Deere complies with federal, state, and local campaign finance laws and regulations governing political contributions and the disclosure of these contributions. Consistent with U.S. federal law, John Deere does not contribute corporate funds to federal candidates, national political party committees, or other federal political committees. For example, even when permitted by applicable law in connection with certain state and local elections, we do not use corporate assets to support or oppose any candidate for political office or ballot measure. The company does, however, reserve the right to make exceptions to this practice so long as any contribution we make is consistent with our public policy agenda, in accordance with our Code of Business Conduct, and previously approved by our relevant leadership.

John Deere does not pay for any independent expenditures or electioneering communications, as those terms are defined by applicable law. Moreover, John Deere did not make any political expenditures out of corporate assets in the 2021 and 2022 calendar years. In the interest of transparency for our shareholders and other stakeholders, we publicly disclose and annually update our corporate contributions to associations for advocacy purposes. John Deere belongs to several trade and industry associations and pays regular dues to these groups. We participate in trade associations in part to join other like-minded companies in engaging in public education and advocacy efforts regarding major issues of common concern to our industries.

Our participation in trade associations is subject to management approval and oversight. We publicly disclose and annually update a list of those U.S. trade associations to which John Deere pays dues or makes other contributions of \$50,000 USD or more, as well as the portions of such dues or payments that are not deductible under Section 162(e)(1) of the Internal Revenue Code. To view the 2022 report for U.S. trade association memberships and expenditures, please [click here](#).



## REPORTING SCOPE AND ISSUANCE

Except where specifically noted otherwise, the reporting period of the John Deere 2022 Sustainability Report covers subject matter and data for Deere & Company's fiscal year 2022 (November 2021–October 2022) and is limited to the operations owned and/or operated by Deere & Company. References to John Deere, our, we, or the Company mean Deere & Company and its subsidiaries, unless the content indicates otherwise. Data associated

with the operations of acquisitions completed during the fiscal year are not included in the reported metrics, including: the operations of Kreisler Electric, AgriSync Inc., SureFire Ag Systems, Inc. and SureFire Electronics, LLC (collectively referred to as SurePoint), LGT, LLC (Light), and InnerPlant, Inc. The John Deere Leap Ambitions, referenced throughout this report, were launched on February 18, 2022. This report was published on February 1, 2023.

## FORWARD-LOOKING STATEMENTS

Safe Harbor Statement under the Private Securities Litigation Reform Act of 1995: Statements in this report that relate to future events, expectations, and trends involve factors that are subject to change and risks and uncertainties that could cause actual results to differ materially. These risks and uncertainties are difficult to predict and often are outside of the control of the company.

When used in this report, the words "may," "could," "anticipate," "target," "plan," "continue," "goal," "commit," "achieve," "project," "intend," "estimate," "believe," "expect," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain such words. Forward-looking statements are subject to certain risks and uncertainties that could cause actual results to differ materially from our historical experience and our present expectations or anticipated results. Forward-looking statements are neither historical facts nor assurances of future performance.

Instead, they are based only on the company's current beliefs, expectations, and assumptions regarding the future of its business, strategic objectives, projections, anticipated economic changes and trends, and other conditions. Forward-looking statements in this report may include, but are not limited to, estimates of addressable market size statements regarding the company's operational strategies; equipment designs that optimize performance outcomes for customers; efforts regarding energy, water, and emissions; and the development of mechanisms for tracking sustainability metrics. Important factors that could cause the company's actual results to differ materially from those indicated in the forward-looking statements include, among others, the following: (i) compliance with and changes to global and regional environmental, health, safety, and human rights laws, including emissions and noise regulations, and other ethical business practices; (ii) compliance with and changes to greenhouse gas emissions and other standards related to climate change; (iii) production, design, and technological innovations and difficulties, including capacity and supply constraints and prices; (iv) availability and price of raw materials, components, and

whole goods; (v) attracting, developing, engaging, and retaining qualified employees; (vi) weather conditions and natural calamities; (vii) availability of enabling technologies, including GPS and radio-frequency spectrums; (viii) network security breaches and disruptions; (ix) compliance with privacy and data-protection laws and regulations; (x) global and regional trade laws, regulations, and policies; (xi) governmental banking, monetary, and fiscal policies; (xii) global tax laws; (xiii) demand for food and bioenergy impacting farm commodity pricing and demand for the company's products; (xiv) global political, economic, and social events and uncertainty; (xv) competitors' actions and competitive pressures; (xvi) adapting products to customer preferences around the world; (xvii) infringement of the company's intellectual property; (xviii) economic conditions weakening demand and/or limiting access to funding and higher funding costs; (xix) ability to realize the anticipated benefits of our business strategies including acquisitions, joint ventures, divestitures, or new product or efficiency initiatives; and (xx) general global macroeconomic conditions, including but not limited to inflation, slower growth or recession, higher interest rates, and currency fluctuations. The company, except as required by law, undertakes no obligation to update or revise any forward-looking statements, whether as a result of new developments or otherwise. The forward-looking statements speak only as of the date of this report, and undue reliance should not be placed on these statements. Goals, targets, intentions, ambitions, or expectations described in this report, including the Leap Ambitions, are aspirational and subject to change and are not guarantees or promises that all goals, targets, intentions, ambitions, or expectations will be met. The United Nation Sustainable Development Goals (UNSDGs) are also aspirational in nature. The analysis involved in determining whether and how certain initiatives may contribute to the UNSDGs is inherently subjective and dependent on a number of factors. There can be no assurance that reasonable parties will agree on a decision as to whether certain projects, initiatives, investments, or other aspects of our business contribute to a particular UNSDG. Accordingly, investors should not place undue reliance on Deere's application of the SDGs, as such application is subject to change

at any time and in Deere's sole discretion. Similarly, there can be no assurance that our sustainability or ESG policies and procedures as described in this report will continue; such policies and procedures could change, even materially. We are permitted to determine in our discretion that it is not feasible or practical to implement or complete certain of our sustainability or ESG initiatives, policies, and procedures based on cost, timing, or other considerations.

Certain information contained herein has been obtained from third parties, and in certain cases has not been updated through the date hereof. We have not independently verified the data from these third-party sources in every instance and make no representation with regard to the verification of third-party data, unless explicitly otherwise indicated. While these third-party sources are believed to be reliable, we make no representation or warranty, express or implied, with respect to the accuracy, fairness, reasonableness, or completeness of any of the information contained herein, and we expressly disclaim any responsibility or liability therefor. The information contained herein is only as current as the date indicated and may be superseded by subsequent market events or for other reasons. Deere is not under any obligation to update or keep current the information contained herein. Statistics and metrics relating to ESG matters are estimates and may be based on assumptions or developing standards. This report may contain links and references to other Internet sites. Such links or references are not endorsements of any products or services in such sites, and no information in such site has been endorsed or approved by the company. The inclusion of information in this report should not be construed as a characterization regarding the materiality or financial impact of that information. Further information concerning the company and its businesses, including factors that could materially affect the company's financial results, is included in the company's filings with the Securities and Exchange Commission (SEC) (including, but not limited to, the factors discussed in Item 1A, Risk Factors of the company's most recent annual report on Form 10-K, and quarterly reports on Form 10-Q).



## DATA TABLE Unless otherwise noted, all metrics are determined on a fiscal year 2022 basis.

| ENVIRONMENTAL   | 2022       | 2021        | 2020       |
|---|------------|-------------|------------|
| Energy Consumption (GJ) <sup>1,2</sup>  | 13,770,000 | 12,890,000  | 11,806,000 |
| % Renewable Electricity <sup>1,2</sup>  | 58.9%      | 40.5%       | 29.2%      |
| Scope 1 Emissions (metric tons CO <sub>2</sub> e) <sup>1,2</sup>                | 418,200    | 403,300     | 343,500    |
| Scope 2 (market-based) Emissions (metric tons CO <sub>2</sub> e) <sup>1,2</sup> | 298,500    | 407,700     | 497,000    |
| Scope 3 Emissions (metric tons CO <sub>2</sub> e) <sup>1,3,4</sup>              | 97,353,000 | 100,456,000 | —          |
| Category 1 <sup>1,4</sup>   | 7,451,000  | 7,336,000   | —          |
| Category 11 <sup>1,3</sup>  | 89,902,000 | 93,120,000  | —          |
| Water Consumption (megaliters) <sup>1,5</sup>                                   | 23,900     | 23,900      | 20,246     |
| % of Waste Recycled <sup>1,5</sup>  | 84%        | 83%         | 78%        |
| Total Waste (metric tons) <sup>1,5</sup>  | 143,200    | 117,200     | 88,222     |
| Hazardous Waste (metric tons) <sup>1,5</sup>                                    | 14,900     | 11,600      | 7,999      |
| Non-Hazardous Waste (metric tons) <sup>1,5</sup>                                | 128,300    | 105,600     | —          |
| # of ISO14001 Manufacturing Sites Certified <sup>6</sup>                        | 52         | 35          | 13         |

<sup>1</sup> Apex Companies, LLC has verified greenhouse gas (GHG) emissions data in accordance with the ISO 14064-3: Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of GHG statements assurance standard and water and waste data in accordance with the ISAE 3000 Revised, Assurance Engagements Other than Audits or Reviews of Historical Financial Information assurance standard.

<sup>2</sup> Data associated with the operation of Unimil is not included in the reported metrics for 2021 and 2020.

<sup>3</sup> Scope 3 Category 11 (Use of Sold Products) methodology was updated to drive consistency across the enterprise in the way product line data is reported. 2021 data is restated from previous reporting in accordance with the updated methodology. Reduction in Scope 3 Category 11 greenhouse gas emissions from fiscal year 2021 to fiscal year 2022 was volume driven.

<sup>4</sup> Scope 3 Category 1 (Purchased Goods and Services) data does not account for any Deere acquisitions.

<sup>5</sup> Data associated with the operation of Unimil is not included in the reported 2021 metrics. Data associated with the operation of Unimil, PLA Holding Netherlands B.V., Mazzotti S.r.l. and King Agro Europa, S.L., and their related subsidiaries, and the Wirtgen Group entities are not included in the reported 2020.

<sup>6</sup> Manufacturing correlates to definition in our Form 10-K, Wirtgen Group entities are not included in the reported 2020 metrics.

| GOVERNANCE                                 | 2022    | 2021    | 2020    |
|--|---------|---------|---------|
| Total Compliance Training Course Completed | 302,983 | 279,147 | 247,189 |
| # of Suppliers <sup>7</sup>                | 4,147   | 4,457   | 4,533   |
| # of Supplier Audits <sup>7</sup>          | 936     | 880     | 402     |

<sup>7</sup> Data includes direct, logistics, and aftermarket Deere suppliers. Data does not account for any Deere acquisitions.

| SOCIAL   | 2022    | 2021    | 2020    |
|--|---------|---------|---------|
| Number of Employees  | 82,200  | 75,600  | 69,600  |
| % of Part-Time Student and Student Employees <sup>8</sup>    | 2.1%    | 1.9%    | 1.4%    |
| % of Women in Revenue-Generating Positions <sup>8</sup>      | 18.3%   | 17.3%   | —       |
| % of Women in STEM-Related Positions <sup>8</sup>            | 15.2%   | 17.6%   | —       |
| Global Production Employees Covered by Collective Agreements | 84.4%   | 91.7%   | —       |
| Turnover Rate Overall <sup>8,9,10</sup>                      | 13%     | —       | —       |
| Voluntary Turnover Rate <sup>8,9</sup>                       | 6.5%    | 7.0%    | 5.0%    |
| Voluntary Turnover Rate — Production <sup>8,9</sup>          | 7.1%    | 8.6%    | 4.2%    |
| Voluntary Turnover Rate — Salaried <sup>8,9</sup>            | 5.7%    | 5.4%    | 5.8%    |
| Training Hours per FTE <sup>8,11</sup>                       | 21.1    | 19.5    | 19.8    |
| Total Recordable Incident Rate <sup>12</sup>                 | 2.18    | 1.98    | 1.32    |
| Lost Time Frequency Rate <sup>12</sup>                       | 0.67    | 0.78    | 0.32    |
| Near Miss Frequency Rate <sup>13</sup>                       | 12.94   | 11.96   | 15.03   |
| Fatality Rate <sup>12</sup>                                  | 0.001   | 0.001   | 0.001   |
| # of ISO9001 Manufacturing Sites Certified <sup>14</sup>     | 49      | 48      | 44      |
| # of ISO45001 Manufacturing Sites Certified <sup>14</sup>    | 3       | 2       | —       |
| Charitable Contributions (% of net income)                   | 1.4%    | 1.5%    | 1.4%    |
| Charitable Contributions (millions USD)                      | \$55.5  | \$42.5  | \$36.7  |
| Volunteer Hours  | 174,518 | 124,332 | 123,033 |

<sup>8</sup> Metric is based upon data availability and accounts for approximately 86 percent of total Deere employees.

<sup>9</sup> Data is associated with the average of Deere's employees over a 12-month fiscal year period.

<sup>10</sup> Data includes all separations (retirements, involuntary, and voluntary).

<sup>11</sup> Global salaried employees only.

<sup>12</sup> Rate is per 100 employees. Data associated with the operation of Unimil is not included in the reported 2021 metrics. Data associated with the operation of Unimil, PLA Holding Netherlands B.V., and King Agro Europa, S.L., and their related subsidiaries, Mazzotti S.r.l., and the Wirtgen Group entities are not included in the reported 2020 metrics.

<sup>13</sup> Rate is per 100 employees. Data associated with the operation of Wirtgen Group and entities is not included in the 2022, 2021, and 2020 metrics. Data associated with the operation of Unimil is not included in the 2021 and 2020 metrics. Data associated with the operation of PLA Holding Netherlands B.V. and King Agro Europa, S.L. and their related subsidiaries, Mazzotti S.r.l., are not included in the 2020 metrics.

<sup>14</sup> Manufacturing correlates to definition in our Form 10-K: Wirtgen Group entities are not included in the reported 2020 metrics.

# DIVERSITY

## 2022 DIVERSITY KEY



### GENDER<sup>2</sup>

- Female (F)
- Male (M)
- Undisclosed (U)



### RACE AND ETHNICITY<sup>2,3</sup>

- American Indian or Alaska Native (AI/AN)
- Asian (AS)
- Black or African American (B/AA)
- Hispanic or Latino (H/L)
- Multiple Races (MR)
- Native Hawaiian or Pacific Islander (NH/PI)
- White (W)
- Undisclosed (U)

<sup>1</sup> Metrics are calculated on the basis of the 11 members of the Board of Directors as of October 31, 2022.

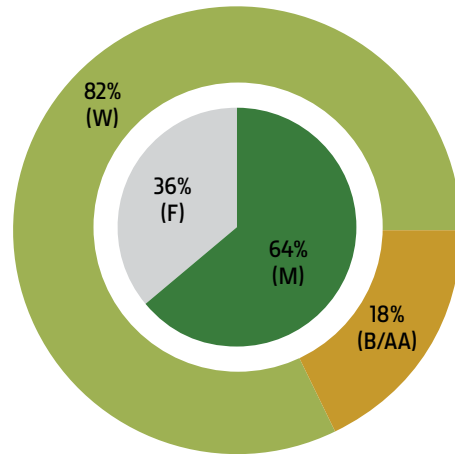
<sup>2</sup> Metric is based upon data availability and accounts for approximately 86 percent of total Deere employees.

<sup>3</sup> U.S. employees only

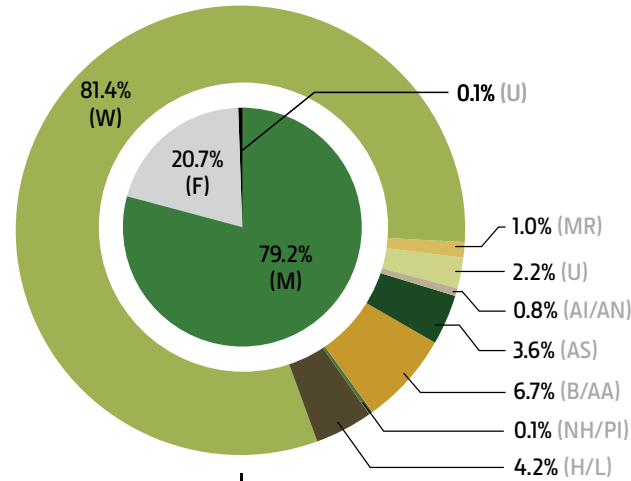


For more diversity statistics see the [2020 Sustainability Report](#) and the [2021 Sustainability Report](#).

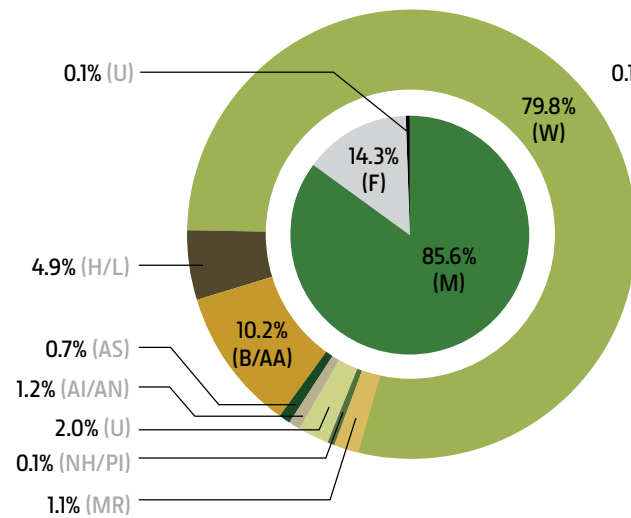
### BOARD OF DIRECTORS<sup>1</sup>



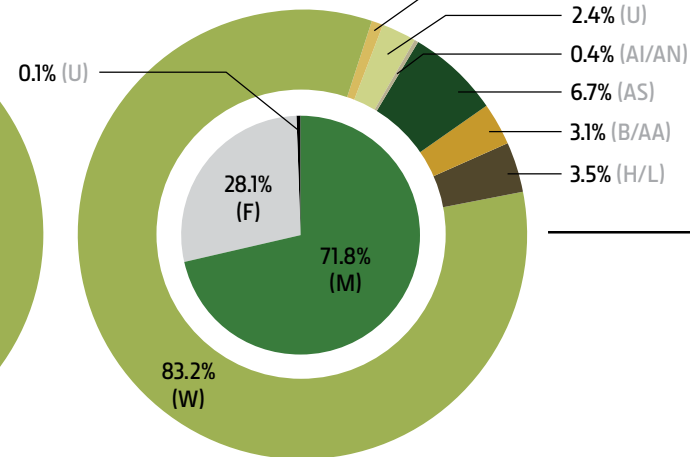
### GENERAL WORKFORCE



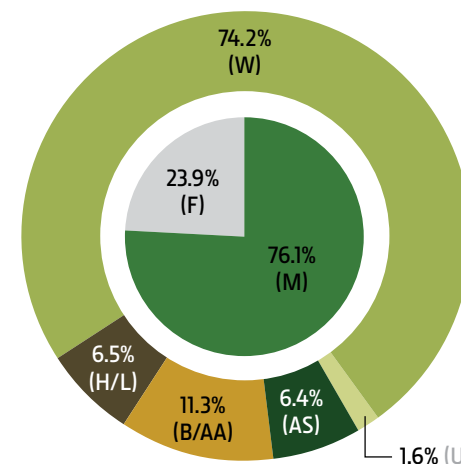
### PRODUCTION



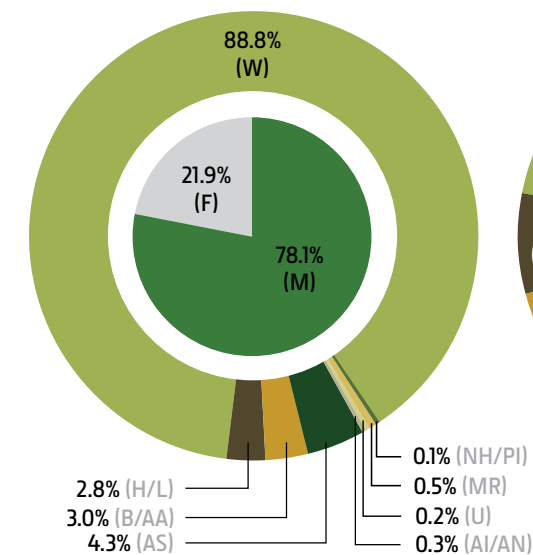
### SALARIED



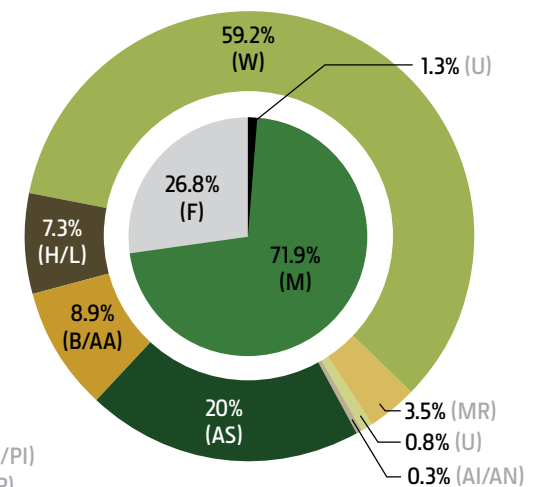
### SENIOR MANAGEMENT



### MANAGEMENT

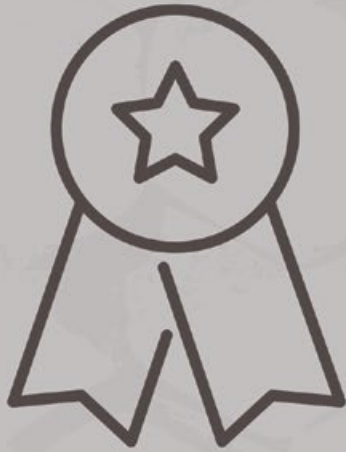


### INTERNS



### AGE DIVERSITY

|   | <30   | 30-50 | 50<   |
|---|-------|-------|-------|
| 2022 Overall Age Diversity <sup>2</sup> | 25.0% | 58.4% | 16.6% |



## 2022 AWARDS

### **AE50 Awards**

1775NT Planter  
C770 Cotton Harvesters  
HDF Hinged Frame Flexible Cutterbar Draper  
Integrated ExactRate™ Liquid Fertilizer System  
MY22 9 Series Tractors  
Quick Change Blade feature for ProSeries™ Opener  
See & Spray™ Select  
W200 Series Self-Propelled Windrowers and Platforms  
*ASABE*

### **Inclusive Employer Award — John Deere Limited**

*Australia Inclusive Employers Index*

### **Bronze Top Employer**

*India Workplace Equality Index*

### **CES® 2022 Innovation Awards — Best in Innovation Honoree**

Robotics  
Vehicle Intelligence & Transportation  
*Consumer Technology Association*

### **CES® 2023 Innovation Awards**

Robotics  
Vehicle Intelligence & Transportation  
*Consumer Technology Association*

### **CIVIC 50**

*Points of Light*

### **DesignEuropa Industry Award Finalist**

*European Union Intellectual Property Office*

### **Germany's Top Employer in Mechanical and Plant Engineering Industry**

*Germany Focus Magazine*

### **Show Me Service — Business Excellence for John Deere Reman, Springfield**

*Missouri Community Service Commission*

### **Top 50 Inclusive Brands**

*DEI National Convention*

### **Top Employer Spain**

*Top Employers Institute*

### **World's Most Ethical Companies**

*Ethisphere*

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