

Warehouse to Wheat

How a Manufacturing Service Organization Uses Smart Maintenance



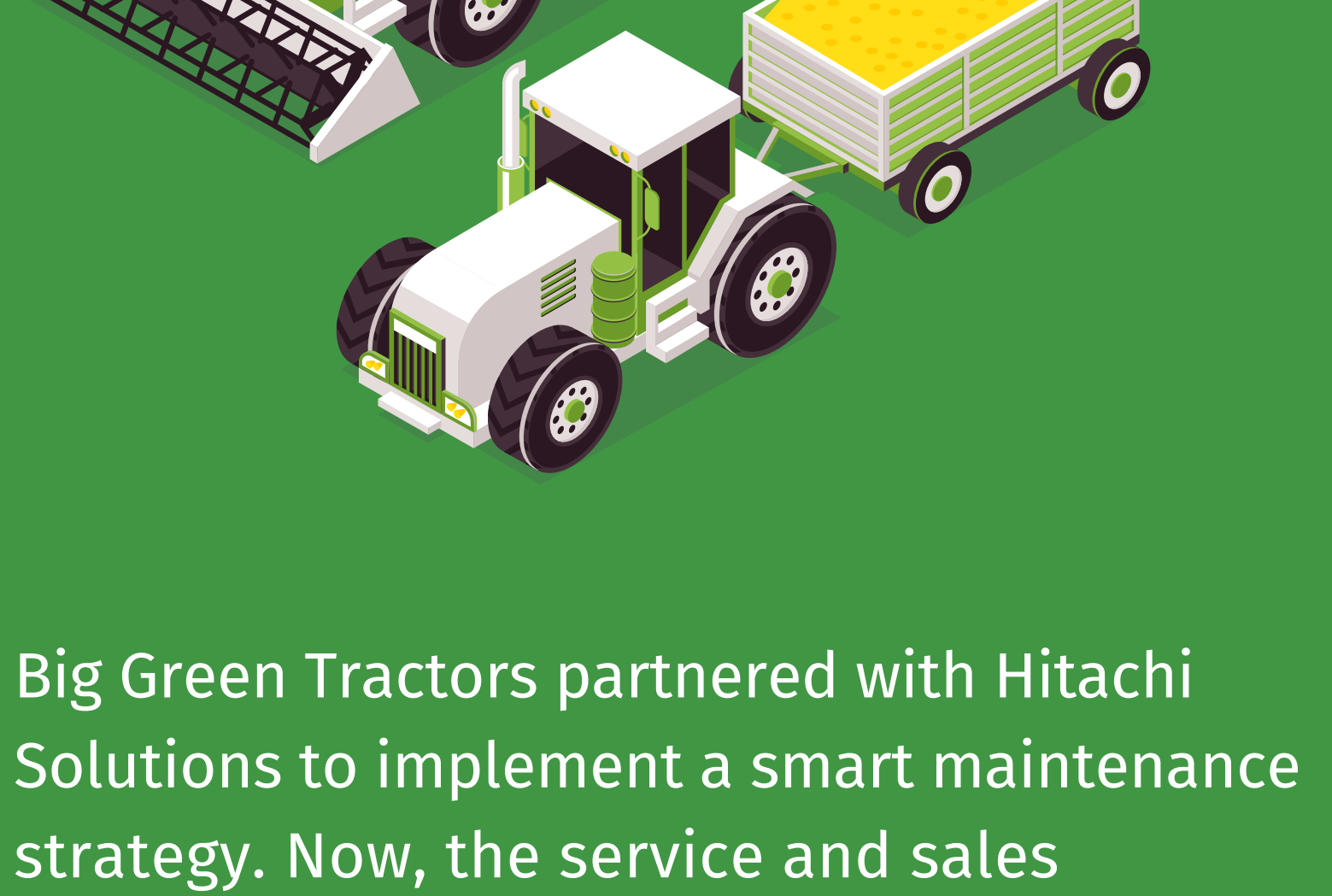
Supply chain disruptions, workforce shortages, and the ubiquity of IoT have converged to create a compelling business case for smart maintenance. Manufacturers and service organizations have now passed a major inflection point, as smart manufacturing and maintenance adoption soared by 50% in 2022.¹

Smart maintenance and manufacturing are here to stay²



Big Green Tractors (BGT), a fictitious regional farm equipment sales and service dealer, was like many industry peers that needed to evolve from a preventative maintenance model to a predictive maintenance model.

What drove their change?



Big Green Tractors partnered with Hitachi Solutions to implement a smart maintenance strategy. Now, the service and sales departments are humming along like a well-oiled machine.

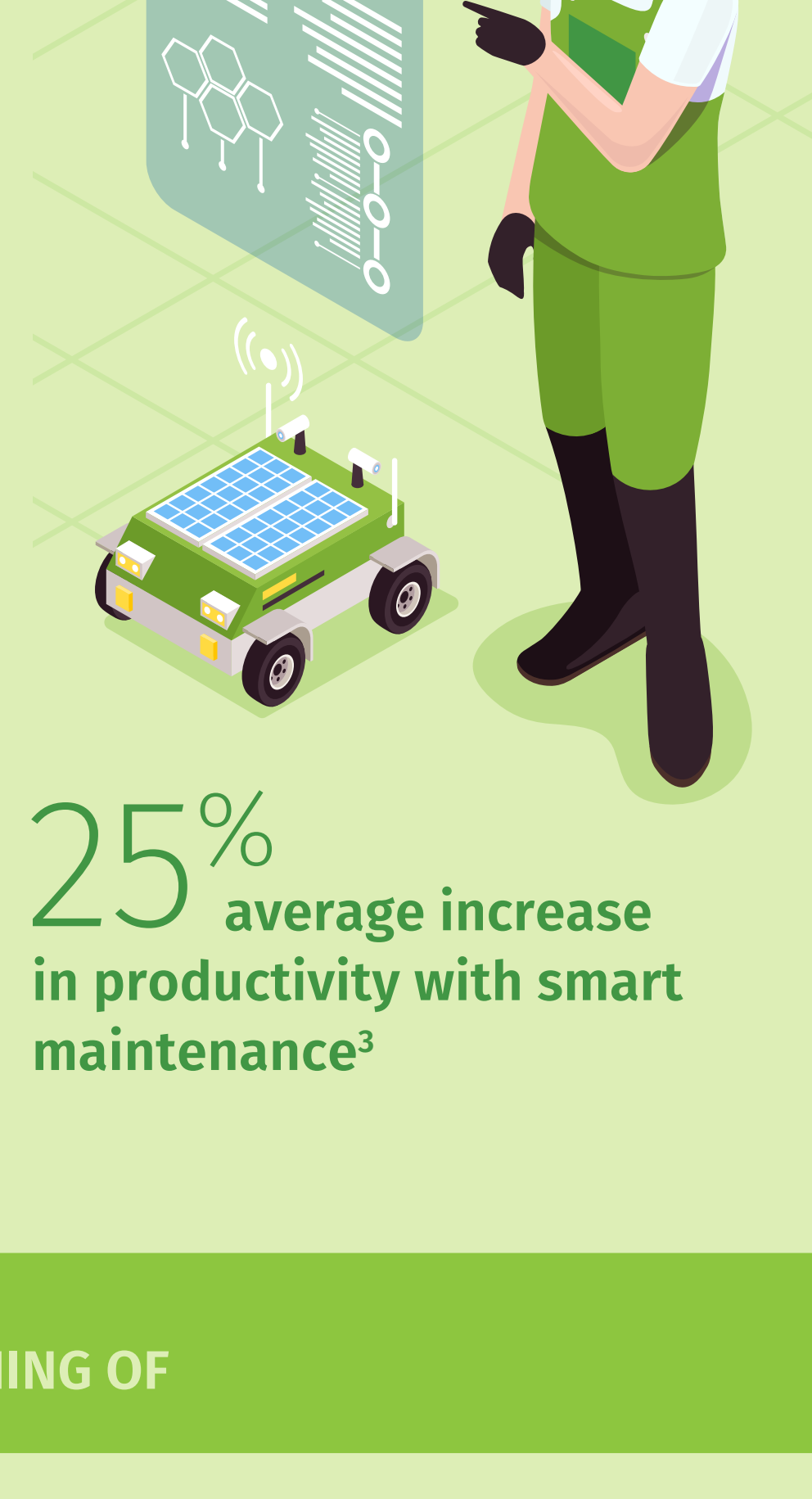
Follow along as Big Green Tractors helps their customer, Triple Rivers Farm, prepare for harvest season. Before these farmers can get to work, they need their tractors and harvesters working in top condition.

4PM THE DAY BEFORE

Mike, the BGT service manager, is preparing for tomorrow's big job and knows his crew has a lot to get done.

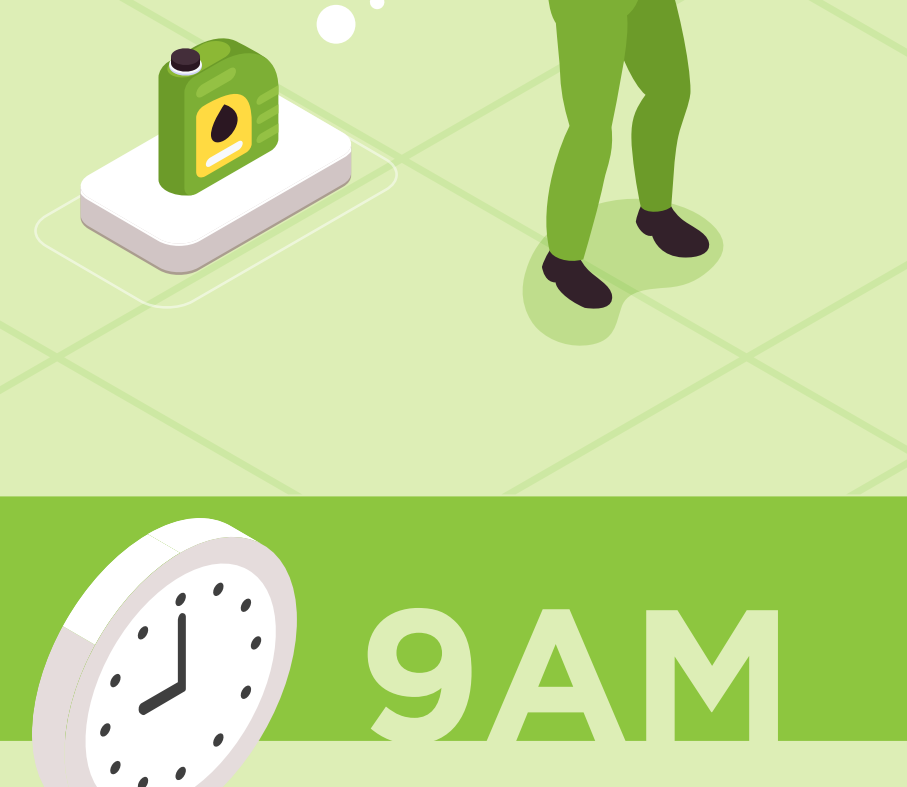
The machines at Triple Rivers Farm includes connected devices outfitted with IoT sensors, real-time reporting, and self-resolution capabilities. The onboard system, Microsoft Dynamics 365 Field Service, and Hitachi's predictive maintenance solutions work together to send Mike an accurate view of the vitals and data—engine hours, fluid levels, replaceable parts, performance metrics, and more. Mike even gets a report on which automatic and remote maintenance procedures have been completed since the last service interval.

The data is automatically fed into Microsoft Dynamics 365 Field Service, generating a full view of tomorrow's service procedures, required parts, and performance optimizations by analyzing the data, cross referencing maintenance records, and identifying new service bulletins to address.



25% average increase in productivity with smart maintenance³

7AM THE MORNING OF



Beth in the parts department receives the work orders and gets right to work, pulling the parts and fluids for the job. The system also identifies the most qualified technician for the jobs and sends him an alert to load some specialty tools onto the truck.

Parts planning is now more efficient because the machines are constantly updating the warehouse with data about consumables like filters and belts. Inventory needs are proactively updated well in advance of a service interval, avoiding rescheduling due to parts delays and costly overstocking. Each time Beth pulls a part, the inventory department receives the update and truck stock is automatically replenished.

Everything that's needed is loaded onto the truck and BGT hits the road.

9AM

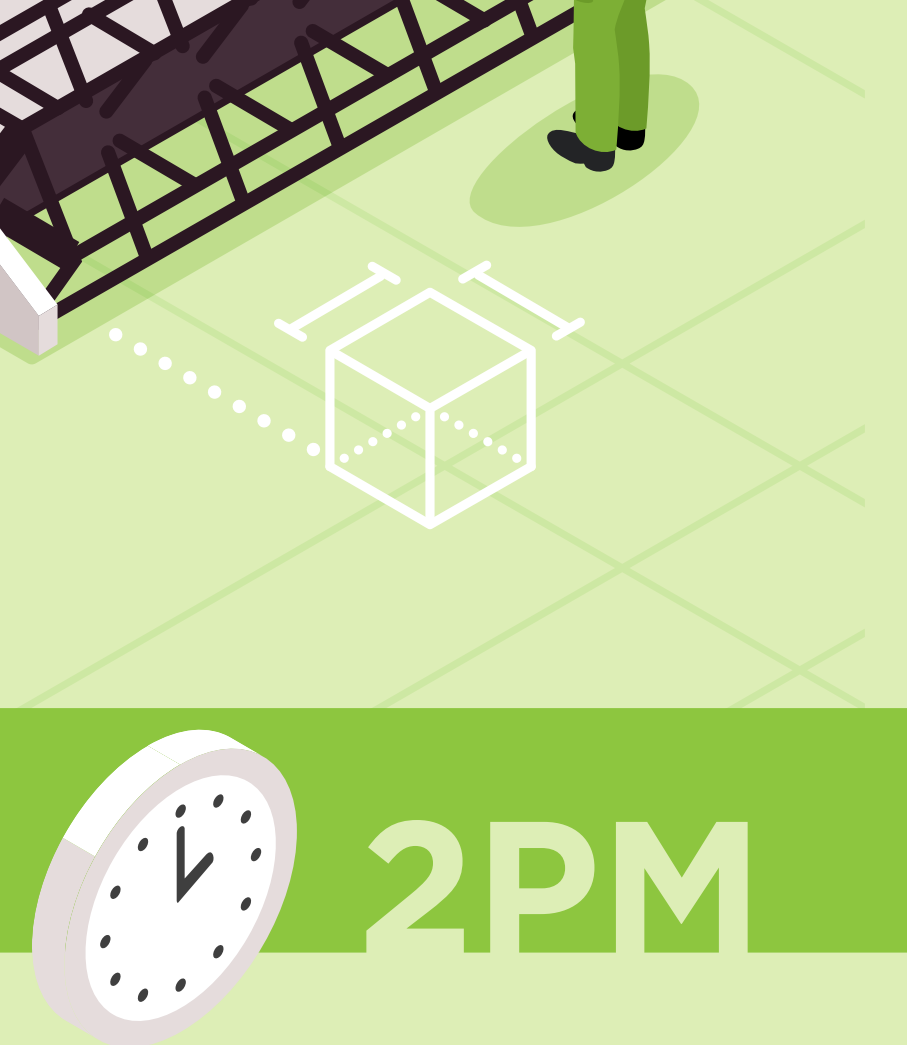
Justin, the field technician, arrives at Triple Rivers Farm, digitally organized and ready to work. Before starting, he opens a digital twin augmented reality guide on his tablet, bringing interactive 3D schematics of each machine into his hands.

Dynamics 365 uses AI to send Justin the digital service manuals and even some useful videos on how to perform an advanced diagnostic procedure. Dynamics 365 even sequences the work orders in the most efficient flow, across and within each machine.



25% lower maintenance costs with smart maintenance⁴

11AM



Justin is performing the 500 hour maintenance on a harvester, which normally calls for replacing the cutting teeth. However, the onboard sensors and predictive maintenance system determines that the cutting teeth have plenty of usable life remaining and the service can be deferred. Justin does a visual inspection and confirms that's the case.

The predictive maintenance system guides Justin to do a bearing inspection because they are within the service tolerances. He's able to perform the maintenance today, rather than making a return trip in a few months. That's great news for everyone, saving BGT and Triple Rivers valuable time and money.

The system automatically updates the machine's digital service log and inventory system so that the parts department and procurement know that the cutting teeth are going back into the inventory.

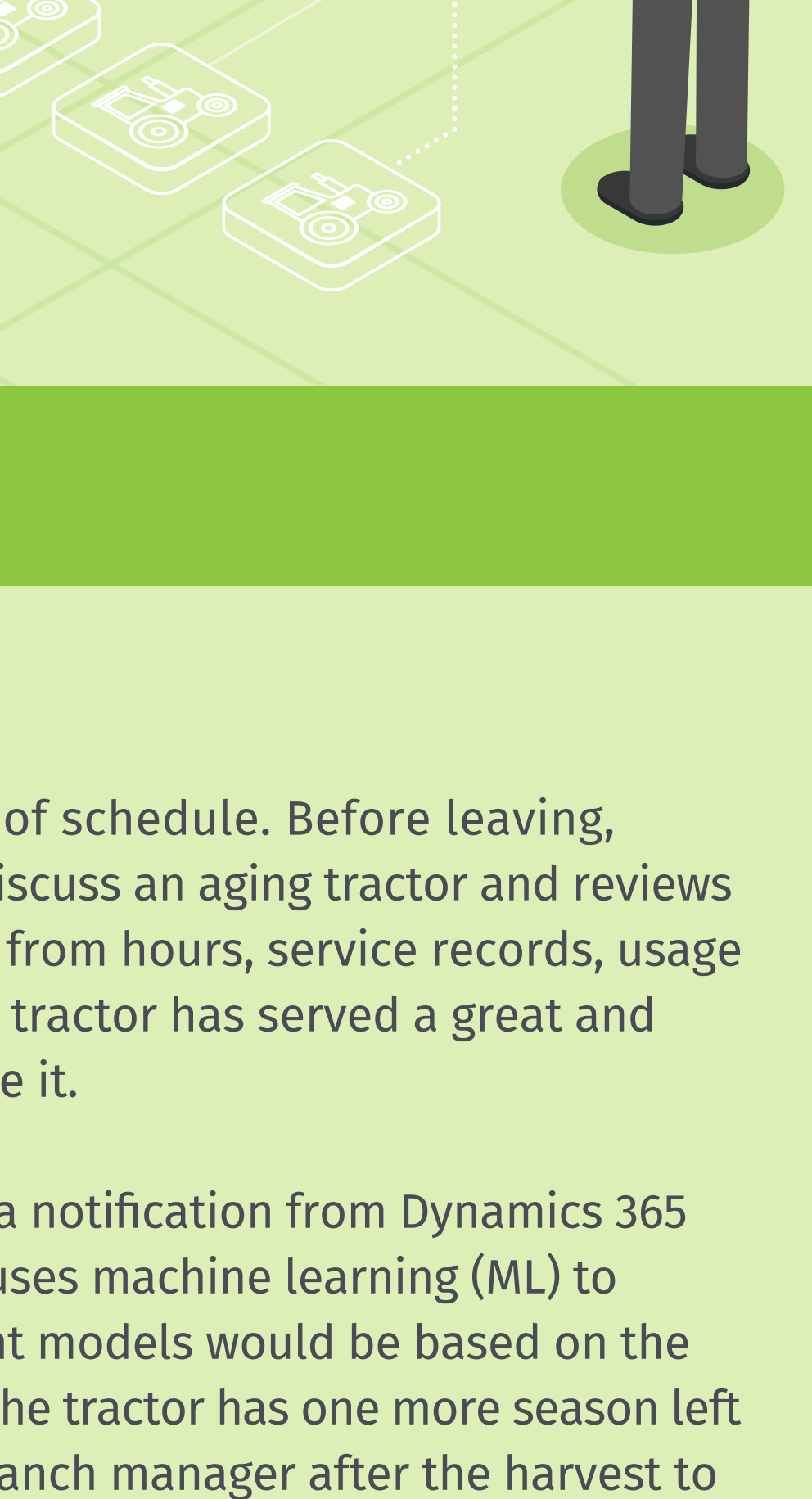
30%-50% reduction in machine downtime with smart maintenance⁵

2PM

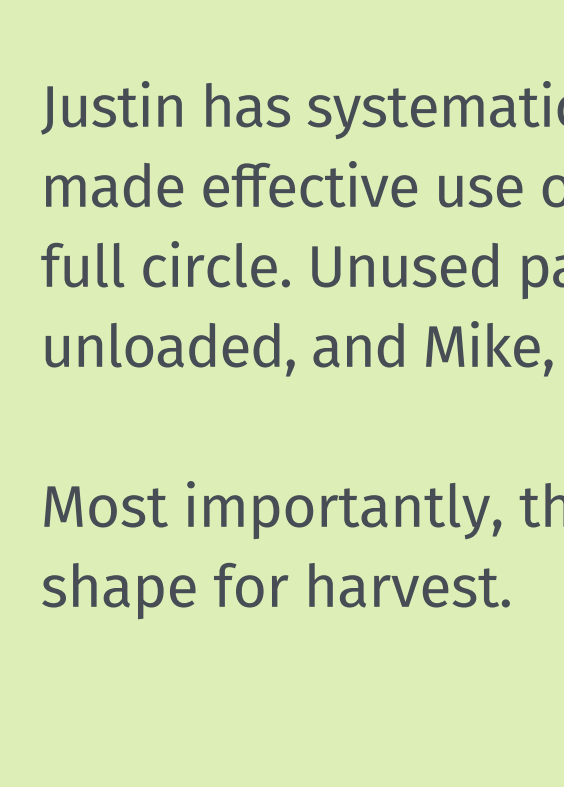
While running engine diagnostics, Justin identifies a top end RPM performance issue and sends the diagnosis to Mike the service manager. Using remote assistance, Justin and Mike collaborate and determine the issue can be resolved with a firmware update to the engine computer module, rather than bringing the tractor into BGT for service (and downtime).

Dynamics 365 automatically predicts that the same issue is likely to arise on three other tractors. Justin downloads the firmware and applies the update. Now all the tractors are running the optimal firmware and can operate at peak performance, avoiding unplanned downtime in the middle of the harvest.

Unplanned downtime can cost as much as \$260,000 per hour⁶



3PM



The day's work is winding down ahead of schedule. Before leaving, Justin meets with the farm manager to discuss an aging tractor and reviews the machine's entire history, everything from hours, service records, usage patterns, and performance reports. This tractor has served a great and long life, but it will soon be time to retire it.

Maria, the fleet sales manager, receives a notification from Dynamics 365 about the aging tractor and the system uses machine learning (ML) to determine what the suitable replacement model would be based on the farm's historic usage patterns. Knowing the tractor has one more season left in it, Maria schedules a time to visit the ranch manager after the harvest to discuss models and leasing options.

50% of organizations using IoT to improve products and services report increased revenue⁷

4PM

Justin has systematically and efficiently serviced the equipment and made effective use of his time. Back at the warehouse, the day comes full circle. Unused parts are put back into inventory, specialty tools unloaded, and Mike, Beth, and Justin get digitally organized for tomorrow.

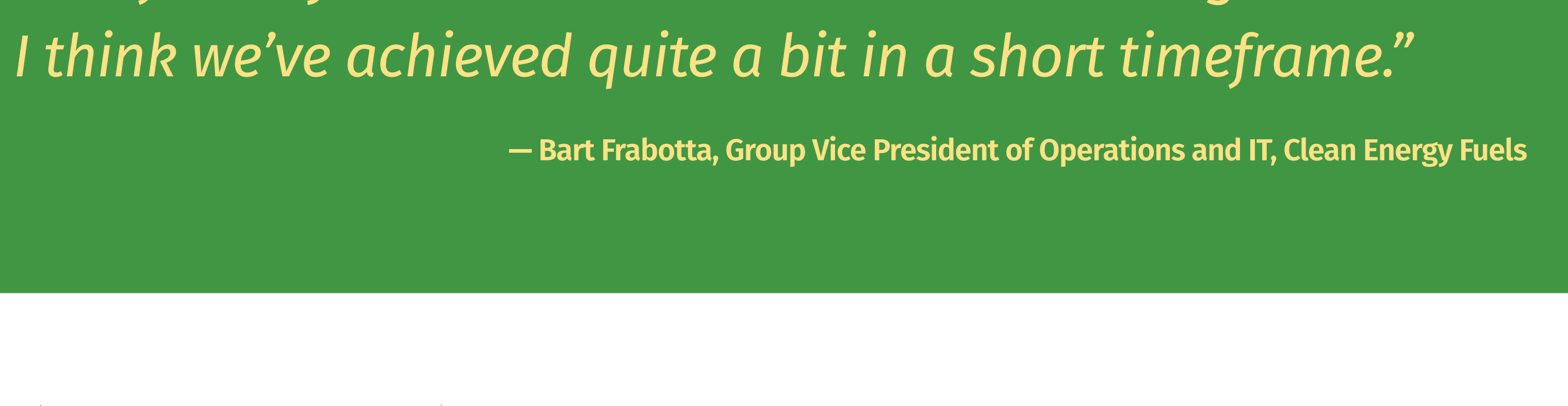
Most importantly, the machines at Triple River Farms are in tip-top shape for harvest.



60% of organizations say IoT improves customer satisfaction⁸

Smart maintenance—A better approach to keeping equipment running

Evolving from a preventative maintenance model to a cloud-enabled, smart, and predictive model yields business and customer value at every stage. For manufacturers, smart maintenance gives them greater efficiency, higher first-time resolution rates, faster problem diagnosis, better inventory and supply chain management, and new revenue opportunities. Customers are more satisfied with less equipment downtime, better utilization, and reduced maintenance costs.



Hitachi Solutions can make your transition to smart maintenance successful by combining Microsoft cloud technology with expert advice and lengthy experience in technology for digital products and enhancing field service.

"The journey [with Hitachi Solutions] has been great and I think we've achieved quite a bit in a short timeframe."

— Bart Frabotta, Group Vice President of Operations and IT, Clean Energy Fuels

¹ Flex, 7th Annual State of Smart Manufacturing Report
² Deloitte
³ Deloitte
⁴ IBM
⁵ IBM
⁶ Aberdeen Research
⁷ Microsoft, IoT Signals report
⁸ IBM, Microsoft