THE SPEED TO SUCCEED

Leaner, more responsive and quality-driven automotive operations with a Manufacturing Execution System.

Rockwell Automation

BEGIN

THE AUTOMAKER'S DILEMMA

Market forces and technology advances have put the auto industry on a new course. One where the focus must be on delivering smarter, more energy efficient and more customizable vehicles. And as in the past, the automakers that find success in this period of disruption will be the ones that turn its greatest challenges into opportunities.

- **Managing greater complexity** in the production process to meet growing demand for electric vehicles, achieve faster refreshes and deliver the promise of personalized vehicles.
- **Maximizing productivity and continuing to reduce production costs** to meet global demand even in times of economic uncertainty.
- **Achieving new levels of production and supply chain visibility** to keep up with technology changes in areas like electric drivetrains and to rapidly respond to demand changes with the agility that some automakers demonstrated during the pandemic.
- **Continuing to provide high-quality vehicles** even as vehicle technologies evolve and production processes are transformed.

The long-term outlook for EVs [electric vehicles] remains bright, as fundamental cost and technology improvements outweigh the short-term impacts of the pandemic.

SWITCH TO TOP GEAR

A Manufacturing Execution System (MES) solution can help you keep pace with an increasingly complex and fast-changing automotive industry, and better align your manufacturing operations to market needs. An MES uses three key functionalities to accomplish this:

Operations management: An MES can help you better coordinate the full spectrum of production operations for both build-to-stock and build-to-order manufacturing. This includes synchronizing production activities, improving work-instruction delivery to plant personnel in increasingly complex flexible manufacturing operations, and better managing the flow of materials from warehouses and suppliers.

Information management: Automating data collection in an MES can replace costly, time-consuming and potentially mistake-prone manual data collection. Data can be displayed in dashboards and as KPIs for better decision making and consistent performance measurement. Production data can also be used for regulatory compliance and warranties, while genealogy and traceability can help limit the scope of recalls and shorten containment response times.

Integration gateway: An MES also enables integration between plant-floor and business networks. This is the key to bridging historically separate information technology (IT) and operations technology (OT) systems to create what's known as The Connected Enterprise — a unified network architecture that connects the people, processes and technologies across your entire organization.

An MES can deliver quantifiable improvements in many areas:

Reduce scrap up to	Reduce lead times up to	Reduce cycle times up to	Reduce labor costs up to	Reduce reject rates up to
8%	45%	45%	50%	75%

An MES can also keep **automotive suppliers at the forefront** of a changing industry.

Battery producers can gain complete traceability throughout the manufacturing process, from mixing through formulation, to better manage quality.

Tire makers can keep production efficient and focused on quality, even as they manage more complex tire mixes.

MORE EFFICIENT, FLEXIBLE PRODUCTION

Flexible manufacturing enables you to produce a wider range of vehicles and provide more choices for customers from a single production site. It even allows you to deliver the lot of one — personalized vehicles that are as unique as their buyers. An MES can help you master this greater complexity with more efficient control and automation of your operations:

Order-management functionality can help match the requirements for assembly and subassembly processes, providing real-time coordination for everything from an order's initiation to its final packaging.

Performance measures can give operators and plant managers more detailed insights into site, line, machine and cell/area performance. This information can help plant personnel better understand where downtime is occurring, pinpoint the root causes of efficiencies, and make better decisions to optimize assets and improve productivity.

Error proofing can transform your bill of materials, work instructions and procedures into enforceable work instructions that guide operators through each production process. Amid a constant influx of changing requirements, parts and processes for new orders, this helps ensure products are built to their defined specifications, which in turn can improve throughput and reduce costs.

Enterprise data can also be shared across your organization. The data can be contextualized into information relevant to each person's role, allowing a broader range of stakeholders to support continuous-improvement efforts.

Building the lot of one

An MES helps make personalized vehicle production possible.

By integrating with your PLM system, it allows you to create a manufacturing bill of process for each order and can flow data across your operations. It can also identify the most efficient route for building each vehicle and guide operators through the assembly process.

BETTER MATERIAL COORDINATION

In fast-moving and more customized automotive production operations, you can't afford to have vehicles sitting and waiting for the right materials. An MES can coordinate all material-management activities and provide real-time inventory visibility to help keep lines moving.

An MES can also replace the need to manually manage inventory and material transactions. Instead, the system can use Kanban and just-in-time **material replenishment triggers** to detect when an inventory is low. It then automatically sends a request to a supplier, while also sending a purchase order to accounting.

An MES can **synchronize the flow of materials** in parallel with vehicles as they progress through the assembly line. This helps ensure continued material availability for each planned production sequence and reduces the likelihood of production gaps.

Real-time visibility into inventory levels within an MES enables operators to track materials and provide input at each decision point to help rein in material consumption.

REACT FASTER TO MARKET CHANGES

From demand for electric vehicles that can fluctuate with the price of oil to a continued desire for new and improved technologies, consumer demands can be difficult to predict. An MES can help ensure your operations are agile and responsive enough to adjust to those demands.

Responsive operations

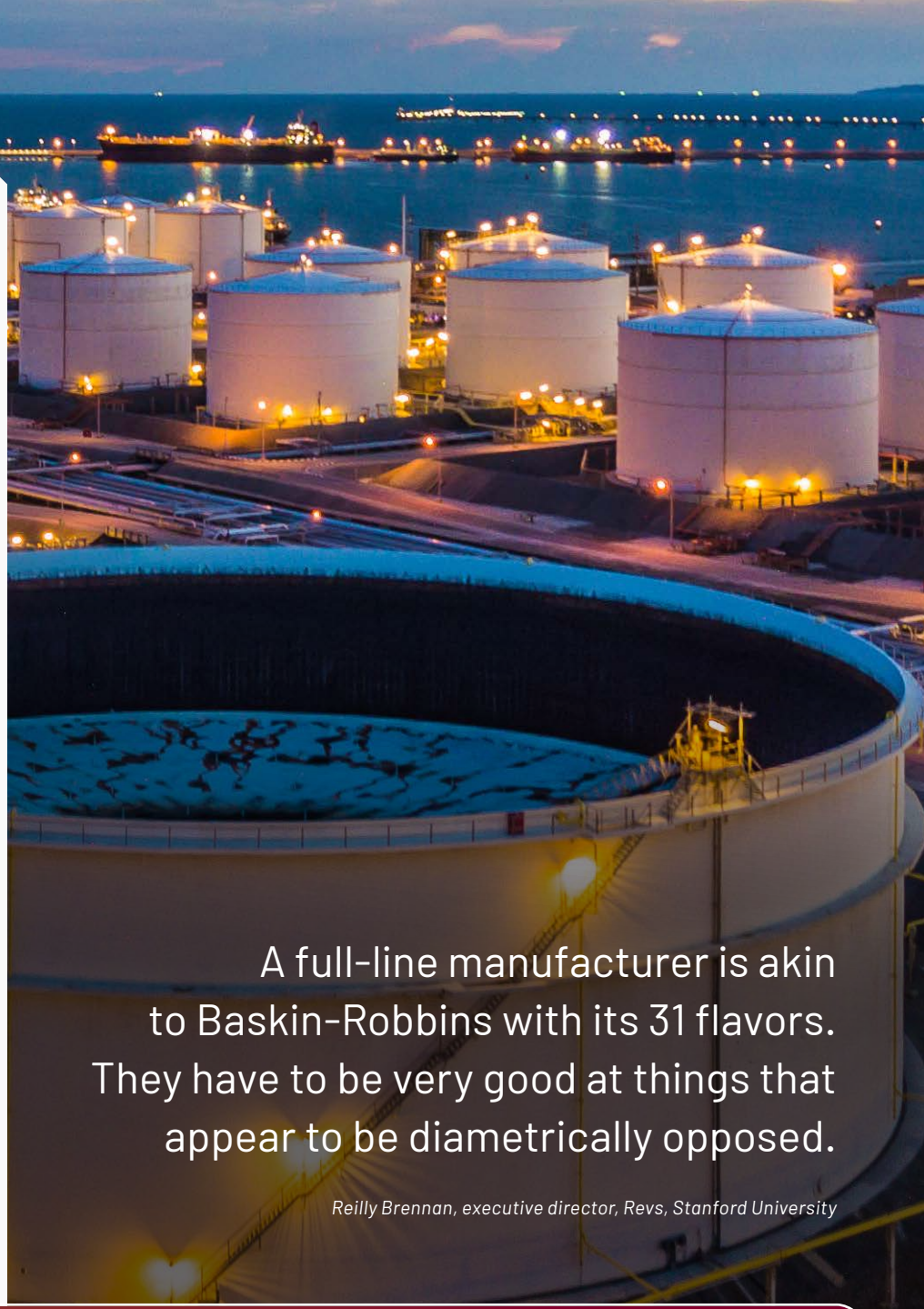
ERP system connectivity can help ensure your operations quickly respond to new orders. Order information and build data can be immediately obtained from your business system and seamlessly converted into detailed build sheets for each shop. Plant managers and business leaders can also track order statuses and other information using real-time work-in-progress (WIP) updates.

Agile production

Shops can use MES information to look ahead at production sequences, allowing them to retrieve the corresponding parts or tools in advance of each order. The system also eliminates the need for each shop to handle its own documentation. Instead, it can automate the collection of millions of data points and share that data across the enterprise as actionable information that is contextualized to each worker's unique role.

Speed new deployments

Rather than developing and deploying new applications at each station — which can often involve writing the same code for multiple applications — an MES can include automotive library suites that save engineering time and costs. These configurable and scalable library suites are designed for common automotive applications and can help ensure faster deployments.



A full-line manufacturer is akin to Baskin-Robbins with its 31 flavors. They have to be very good at things that appear to be diametrically opposed.

Reilly Brennan, executive director, Revs, Stanford University

IMPROVE QUALITY MANAGEMENT

Quality can never be compromised. Your reputation — and your business — is built on it. Yet higher volumes, more frequent vehicle refreshes, and changes to powertrain and drivetrain technologies make quality more difficult to maintain in an increasingly complex manufacturing environment.

An MES can help you manage key quality characteristics throughout your operations to help deliver consistently high-quality vehicles and comply with industry standards.

Built-to-spec quality

In addition to helping improve production efficiency, an MES error-proofing application can also use enforceable work instructions to help ensure workers build vehicle assemblies and subassemblies to specification. This can help maximize first-pass quality and reduce scrap resulting from nonconforming vehicles.

Defect management

If an error should occur on the production line, hold-and-quarantine capabilities available within an MES can help you manage affected vehicles. This supports ISO 9001 and TS16949 automotive quality initiatives, and can ultimately prevent defective and potentially dangerous vehicles from reaching your customers.

Information coordination

Real-time connectivity to automation systems allows you to capture process results, defects and attributes. Collected information can support key requirements, such as visual defect tracking, statistical process control and root-cause analysis. This information can be shared across business and plant-floor systems as part of regular KPI reporting.

Genealogy and traceability

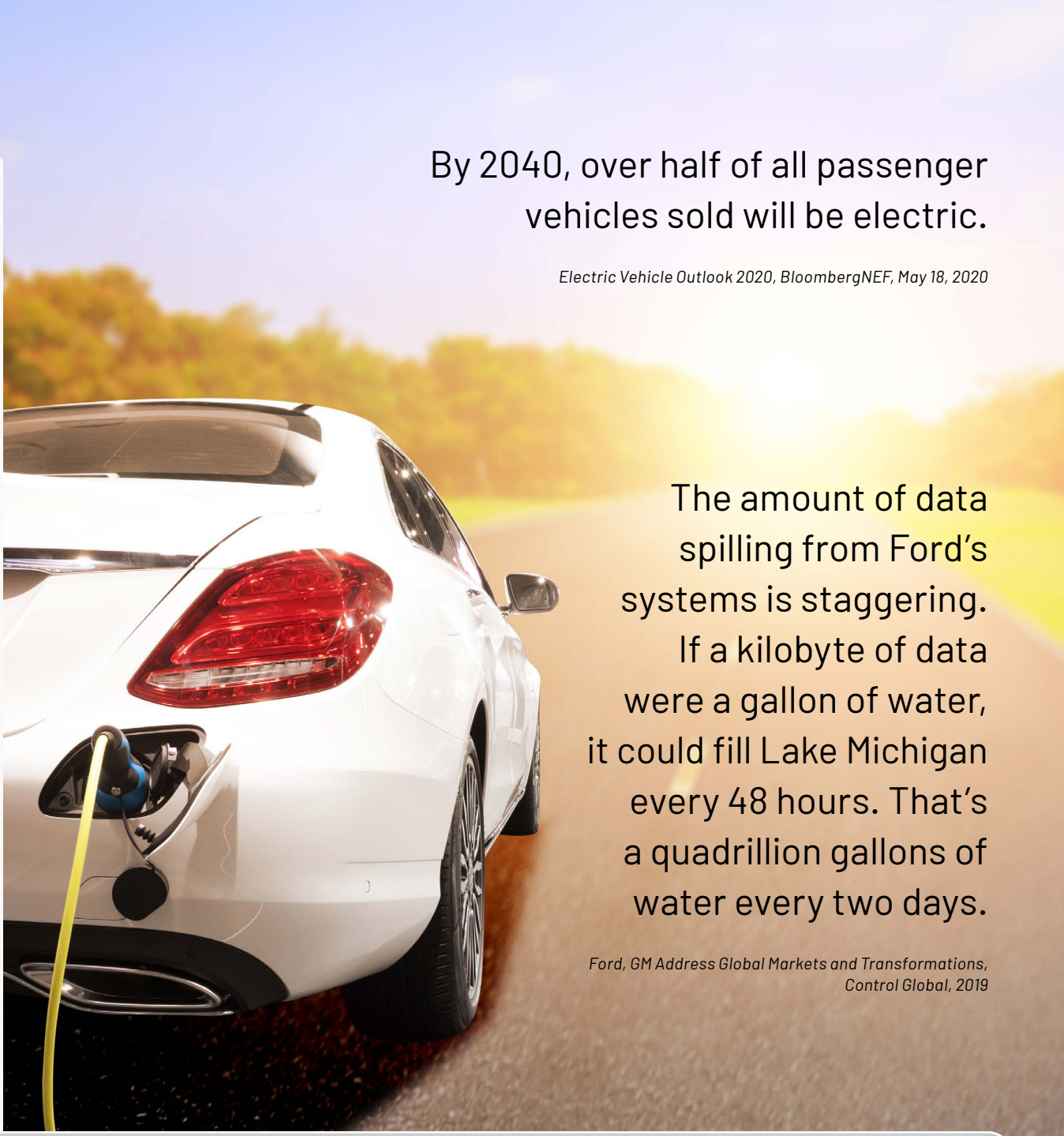
An MES with genealogy and track-and-trace capabilities can give you forward and backward traceability to identify upstream or downstream quality issues. It can provide real-time product location and as-built data to help limit the scope of recalls. And it can provide transparency for electric-vehicle battery production to help make sure each battery delivers consistent quality.

PAVING A NEW ROAD

The auto industry is only going to become more competitive as both new and established automakers compete to reshape the auto industry as we know it, while also trying to minimize risk and costs in uncertain times.

Meanwhile, greater connectivity — within your organization, to your suppliers and dealerships, and even out to the vehicles you to deliver to customers — requires that you be able to collect the valuable data resulting from those connections and effectively act on it within your production operations.

An MES is the foundation on which this can all occur. To learn more about how an MES can make your automotive operations more efficient, responsive and quality driven, contact a Rockwell Automation sales representative or **visit our website.**



By 2040, over half of all passenger vehicles sold will be electric.

Electric Vehicle Outlook 2020, BloombergNEF, May 18, 2020

The amount of data spilling from Ford's systems is staggering. If a kilobyte of data were a gallon of water, it could fill Lake Michigan every 48 hours. That's a quadrillion gallons of water every two days.

Ford, GM Address Global Markets and Transformations, Control Global, 2019

BACK

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