Navigating a changing material handling industry

How recent technological advances help the material handling industry respond to new challenges

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Introduction

It's a new world out there.

The coronavirus pandemic has put the logistics industry to the test — high demand, critical deliveries, and unstable staffing. Fortunately, advances in intelligent material handling can help you adapt to the new normal. This e-guide explores the technology ready to make it happen.

Around the U.S., buying behaviors are strikingly different than just a few months ago. A month into the pandemic, the e-commerce industry saw a 74 percent rise in demand, a trend that continued into the summer.[1] For material handling facilities, that means picking, sorting, and conveying far more individual parcels than full pallets, creating more complexity.

Many systems weren't designed for this kind of pace; the average material handling facility is 15 years old.[2] And yet, there are promising strategies that will help the logistics industry modernize, digitize, and thrive in the months and years ahead.

A month into the pandemic, the e-commerce industry saw a 74 percent rise in demand.

[1] "COVID-19 Crisis Drives Changes in e-Commerce Purchasing Behaviors, ACI Worldwide Research Reveals," AP News, 2020.
[2] "Age of Material Handling Systems," MH&L News, 2015.

Optimizing the journey of goods

To be clear, the technology explored in this guide is no single tool; it's a full array of smart devices, management software, analytics, and people, together working in total alignment.

The complete vision, which we call EcoStruxure™ for Industry, includes:

- Industrial IoT (IIoT)
- Predictive analytics
- Robotics and automation

This e-guide covers how EcoStruxure for Industry optimizes the journey of goods throughout your facility. In addition, it explores how EcoStruxure for Industry helps material handling facilities thrive in the new normal by solving two key challenges:

1. Resolve more issues remotely with shorter staff
2. Scale capacity rapidly

Current trends and forces shaping the logistics industry

Technology trends

- Cloud
- Industrial IIoT
- Mobility
- Big data and predictive analytics
- Cyber / physical systems
- Renewable energy

Market trends

- e-Commerce
- Omni-channel
- New competitors
- Tight labor market
- Package size and shape
- Volatility in price of energy and materials
- Generational shifts

Logistics industry imperatives

- Growth
- Capacity expansion
- Operational efficiency
- Return on assets
- Flexibility and adaptability
- Sustainability
- Workforce evolution and capabilities

Smart logistics

The future of logistics

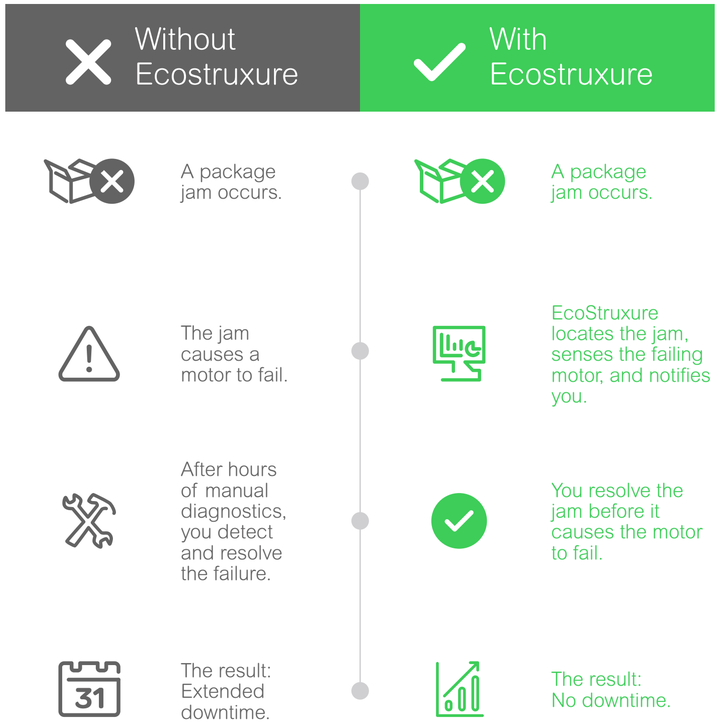
Before delving into the two strategic objectives, it's worth examining what a connected, intelligent logistics facility actually looks like. As you know, your material handling facility contains much more than the conveyors, sortation devices, and robotics. From electricity, to IT, to building management, there are many systems at work. But are they always in alignment?

EcoStruxure for Industry connects these systems under a single dashboard. In that way, EcoStruxure is a "system of systems" that offers unparalleled visibility and control over your entire facility. Without that sweeping vista, it's harder to see how they work together, and may even work against one another.

A simple example

A motor could slowly fail due to repeated package jams on a conveyor. Without EcoStruxure, it could take hours to diagnose and days to receive new ordered parts, causing extended downtime. EcoStruxure predicts and notifies you of the failure, giving you ample time to repair or order new parts. Our EcoStruxure-savvy field service engineers can also perform monitoring and maintenance for you.

How EcoStruxure protects critical assets



EcoStruxure for Industry, explained

The EcoStruxure for Industry architecture consists of three interconnected layers. Together, these three layers help you monitor, manage, and optimize your facility each day, and also for the long haul.

Layer #1: Connected devices

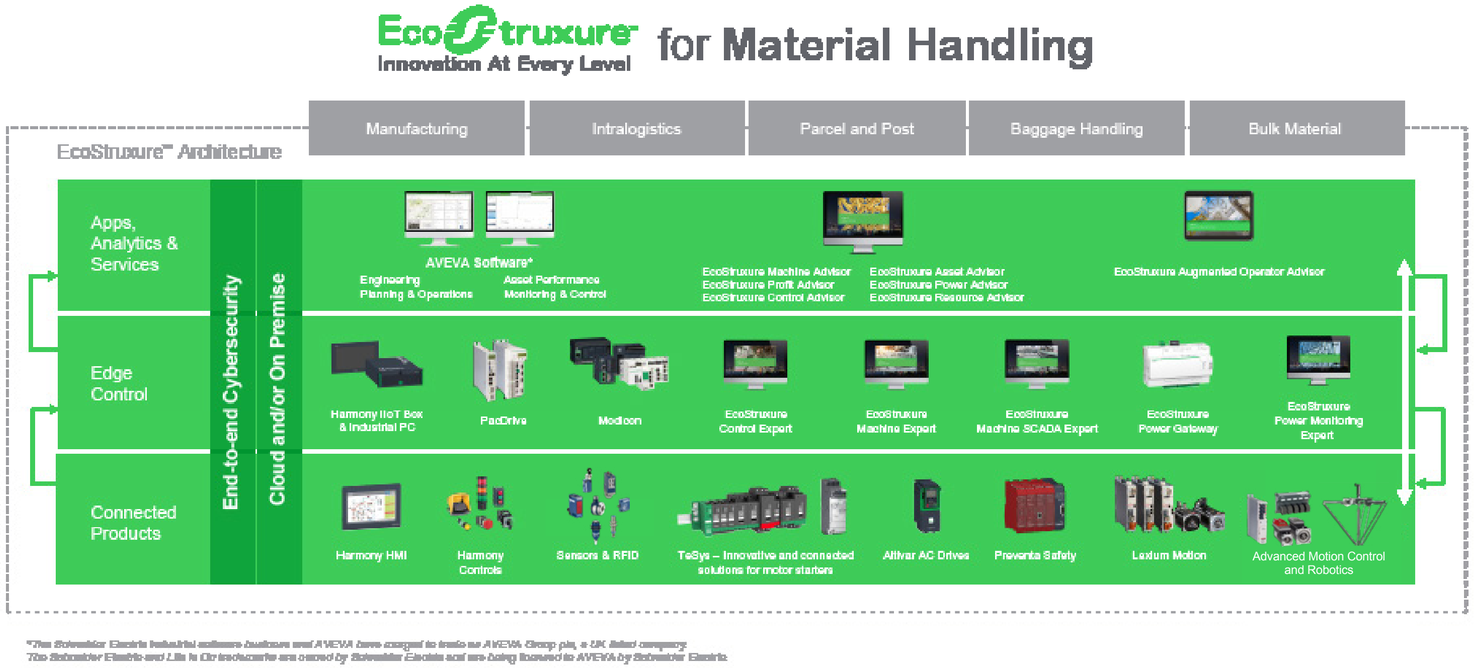
Secure, IIoT-connected smart devices across your facility's systems: servos, motors, drives, sensors, and so on.

Layer #2: Edge control

Control computing and programmable controllers that manage these smart devices remotely, from your phone or tablet.

Layer #3: Apps, analytics, and services

Collaborative human and machine intelligence that analyze data from connected devices to identify energy waste, maintenance needs, and other actionable data.



*The Schneider Electric industrial software business and AVEVA have merged to create AVEVA Group plc, a UK listed company.
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Schneider Electric’s end-to-end solutions for intelligent logistics facilities

All connected by devices, software, analytics, and services from EcoStruxure for Industry

Power: medium voltage and low voltage electrical distribution

- Switchboards and switchgear
- Busways and breakers
- Power meters and sensors
- Transformers and automatic transfer switches

Grid and renewable energy

- Decentralized energy resources (e.g., solar, wind)
- Microgrid solutions
- Energy meters

IT and Secure Power

- Uninterruptible power supplies
- Precision cooling units
- Racks, power distribution units, and physical security

Buildings

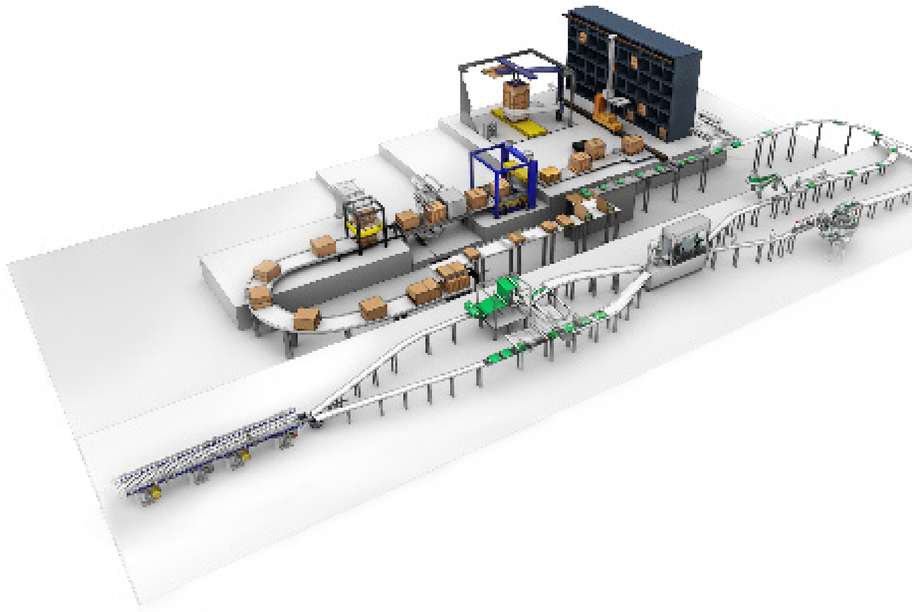
- Building management systems
- HVAC and lighting controls
- Sensors and wiring devices

System (primary processes)

- Programmable application controllers (PACs)
- Human machine interfaces
- Distribution control systems
- AC drives

Machine (high performance)

- Control and signaling
- Motion control
- Power supplies, sensors, PLCs, and AC drives



How EcoStruxure solves two key challenges

Digital solutions for a changing industry

How does the EcoStruxure-equipped material handling facility help you adapt readily to changing conditions? The next section covers two key objectives that are now essential in the pandemic era.

Challenge #1: Resolve more issues remotely with smaller staff

The first strategic objective for material handling facilities is the need to elevate remote monitoring. Social distancing, shorter staffing, and tighter budgets are forcing facility managers to be in multiple places at once. The only way to achieve that, aside from **quantum superposition**, is through software tools that enable remote monitoring. For the foreseeable future, remote monitoring is the key to resilient operations.

Keys to effective remote monitoring

Remote monitoring now goes far beyond simple video surveillance. EcoStruxure for Industry lets you see inside your material handling equipment, as well as your power distribution, IT, and HVAC systems. You can check on environmental conditions, spot operational anomalies, and detect downtime risks. When the EcoStruxure **Machine Advisor** and **Asset Advisor** tools detect an issue, they send you an alert, wherever you are, according to your preferences.

But you're not alone in keeping watch. Our analytics and service engineers can also monitor this data, using machine learning to understand your facility's patterns. We then notify you when we discover efficiency improvements, energy waste, or downtime threats. These analytics are the basis of predictive maintenance, which allows you to spot downtime threats before they arise. If you face limited staffing, we can help fill the gaps so that you can focus on your core mission.

Augmented reality and cybersecurity for advanced remote monitoring

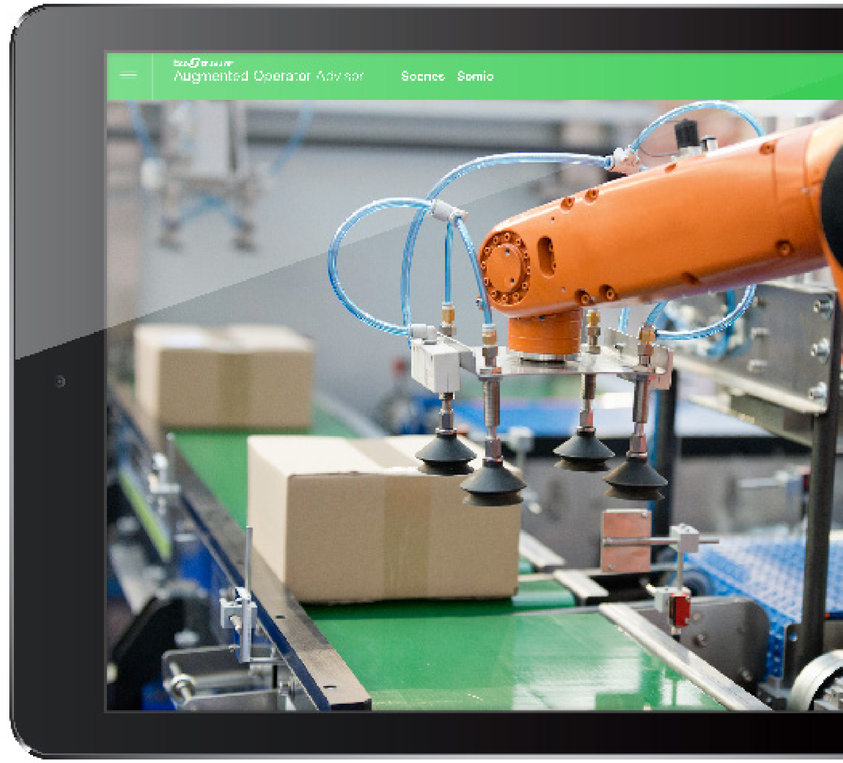
EcoStruxure Augmented Operator Advisor software is an intuitive diagnostic maintenance tool that can promote social distancing. The tool allows you to peer inside your equipment via augmented reality (AR) on your phone or tablet, without needing to touch the machine. Augmented Operator Advisor gives your team immediate, real-time access to crucial information on your machines: operational history, process variables, and key documentation. Your team benefits from having all the information they need, which simplifies repairs and maintenance.

Augmented Operator Advisor also supports greater social distancing. One person can share the AR footage with the rest of your team, allowing collaborative discussion, diagnosis, and decisions. Maintenance workers can operate alone, avoiding physical contact with each other and the machines.

Want to learn more about how EcoStruxure Augmented Operator Advisor works?

Augmented reality lets you see inside your machines without touching them.

Watch the video

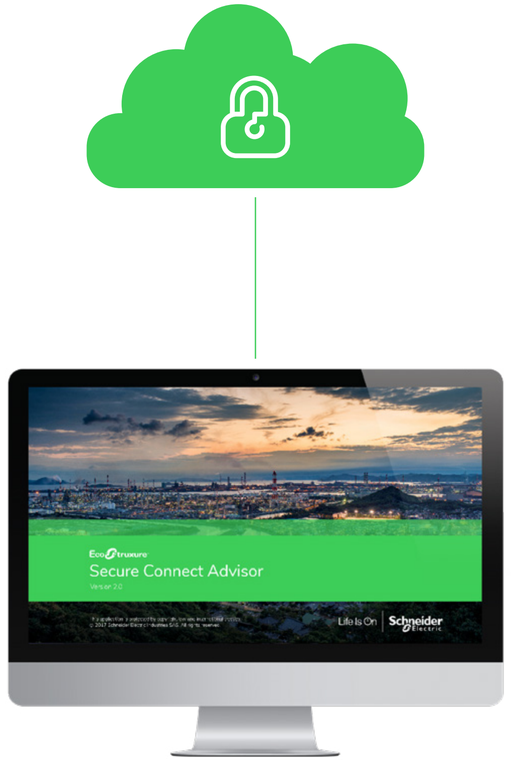


Cybersecurity comes standard

A critical piece of any remote monitoring scheme is cybersecurity. With our Secure Connect Advisor tool, you can connect your system to the cloud via a designated modem in each piece of equipment. EcoStruxure is designed for end-to-end cybersecurity, so you can focus on your remote monitoring and maintenance without worrying whether your data is secure.

Protecting workers with connected devices

Beyond these software solutions lie a set of connected devices that boost efficiency and safety for the on-site staff. Wireless push-buttons and pendants offer freedom of movement, helping workers keep a safe distance from one another. Workers no longer have to activate line alerts manually via pull-cords. Instead, new e-Andon systems enable production equipment to initiate alerts automatically, with signals broadcast by tower lights. These are just a few examples of how smart, connected devices can enhance workplace conditions.



Challenge #2: Scale capacity rapidly

The second strategic objective for material handling facilities in a changed world is the ability to scale capacity quickly. Wherever demand spikes, the key is to be able to rise to the occasion while remaining right-sized.

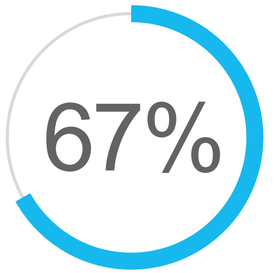
To adapt to that uncertainty, scaling capacity quickly and efficiently will be key to driving business value. EcoStruxure for Industry plays a role here not only with analytics and software, but also how it enables the adoption of other transformative technology, such as robotics.

Keys to scaling capacity rapidly

Robots are a big enabler of capacity scaling. During a big spike in demand, you're not left understaffed — idle robots can be powered up and programmed to complete a variety of tasks, quickly and precisely.

Although robots are nothing new, they're beginning to take hold. The Material Handling Institute's 2020 survey, published before the pandemic, found that robotics moved from fifth to first in the industry's ranking of the most disruptive technology[3]. Over two-thirds (67 percent) of survey respondents think robotics and automation will give them a competitive edge.

Why is that? Even before the pandemic, robotics and industrial automation decreased production costs and improved quality. Now that we all live in a fundamentally changed world, where social distancing is the new normal, industry adoption of automated material handling will surely accelerate.



Percentage of survey respondents who think robotics and automation will give them a competitive edge[3]

[3] "The 2020 MHI Annual Industry Report: Embracing the Digital Mindset," Material Handling Institute, 2020.

And because robots are a part of the total smart machine, they're also able to integrate with EcoStruxure for Industry. EcoStruxure shows you how much energy each machine is using, along with detailed statuses on their conditions. It also enables you to synchronize between 2 – 130 servo axes with communication cycles of just one to four milliseconds. In plain English, that means you're able to manage dozens of complex machines with hyper-precision.

With EcoStruxure's open-source architecture, you can also integrate legacy robots into your system. These open control platforms are not programmed in traditional robot language, allowing for easier integration and customizable controls. Controls can also extend into the robot's ancillary systems, thereby increasing integration, reducing costs, and boosting performance.

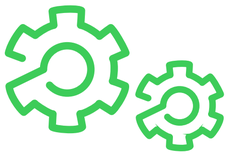
Automation beyond robotics

There are other methods to scaling capacity quickly. In your conveyor and sortation systems, our EcoStruxure solutions help you accommodate higher parcel volume and SKU proliferation. Plus, with our advanced drives, you can automate your conveyor without needing to purchase programmable logic controllers.

At high speeds, accuracy becomes a key challenge. With our EcoStruxure-connected roller conveyor sensors, you can "see" the target without foreground or background limitations. Detection is effective the entire width of the conveyor, so you don't miss any parcels.

Overall, with EcoStruxure for Industry, you can bolster speed and accuracy with a scalable system. That flexibility will help you respond to the next demand spike, whether it's hand sanitizer, sweatpants, or whatever consumers may desire in the future.

Boost speed and scalability across your facility



Conveyor and sortation

Run belts up to 600 feet per minute at one-inch resolution[4]

Pick and place

Achieve a typical pick rate more than 2,000 parcels per hour, exceeding human capabilities and delivering a fast return on investment[4]

Gapping and singulation

Reach singulation capabilities up to 18,000 parcels per hour without manual intervention

[4] Based on internal data. This is not a guarantee of future performance and results may vary.

What's driving the need for flexible automation?

In a word: simplicity. As e-commerce creates a need for speed and specificity, complexity grows. To counter this, integrated control and software solutions such as EcoStruxure offer simplified automation system engineering. With this simplicity, you can improve data quality, boost system consistency, and elevate workforce productivity. The end result: greater flexibility, continuous improvement, and holistic efficiency.

Speed	Labor	Modernization	Costs
Customers expect rapid delivery times	Shortages, higher costs, and seasonality	Digital transformation, connectivity, and integration	More affordable robots and robots-as-a-service

Flexible automation and operations innovation

The future, up close

Accelerating toward smart logistics

Rarely does so much happen in so little time. And yet, here we are — responding to massive changes in real-time. The logistics industry, like many others, has been forever changed. To adapt, material handling facilities will have to find new approaches that allow for more remote work and sudden capacity shifts.

Although the future is arriving suddenly, in ways, it's an acceleration of trends that were long-brewing: IIoT, robotics, remote monitoring, and automation. These are technological advances we at Schneider Electric have been propelling for quite some time, and we are ready to guide you into the new age of intelligent material handling.

UPS, a global logistics leader, transformed its smart hub facility to process 104,000 parcels per hour — with help from EcoStruxure solutions.

Watch the video

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