

M-Line eBook

M-Line: Transforming pork processing with robotic precision

✦ JBT Marel



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M-Line: Transforming pork processing with robotic precision

Meet your daily challenges
head-on

Designed to automate the
most challenging tasks
with unmatched precision,
food safety, and efficiency.

In today's pork processing plants, the pressure is growing. You need to **increase throughput, improve hygiene, reduce labor dependency, and protect your margins**—all at the same time. The primary processing floor is unforgiving. Manual processes are risky, inconsistent, and labor-intensive.

The solution? M-Line robotic systems



TwinTool Technology – Uninterrupted hygiene at full speed



The TwinTool system is the beating heart of M-Line's hygiene excellence.

It's a patented solution that guarantees the highest possible food safety—without slowing down your production.

TwinTool Technology

How it works:

Each M-Line robot equipped with TwinTool technology uses two fully independent tools.

- While one tool is operating on the carcass, the second tool is being thoroughly cleaned in a fully enclosed chamber—avoiding any splashing or risk of cross-contamination.
- When the active tool completes its task, the system automatically switches to the freshly cleaned tool.

This continuous rotation ensures hygienic processing at every cycle, even in high-speed slaughter lines processing up to 900 pigs per hour per unit. This means no trade-off between hygiene and capacity: tools are cleaned during every cycle.

Why it matters:

Traditional automation systems rely on quick basic “rinsing, requiring manual intervention or line stoppages to maintain hygiene standards.

With TwinTool, M-Line offers a breakthrough: hygienic processing at full capacity, with no interruptions.

Sanitation is no longer a rinsing step. TwinTool brings a sanitation jump from less than a second to a full **cycle time of more than four seconds per sterilization, allowing a perfect sanitation process.**

Your Benefits:

- Unmatched food safety: Tools are cleaned after every cycle—this is a new hygiene benchmark.
- Maximum uptime: Continuous production at highest hygienic standards without risks of contamination or need for manual cleaning stops.
- Operational simplicity: Fully automated tool switching and sterilization.
- Reduced risk of cross-contamination: The TwinTool system cleans tools in a fully enclosed chamber, preventing bacterial carry-over and eliminating contamination from splashing or dirty water.

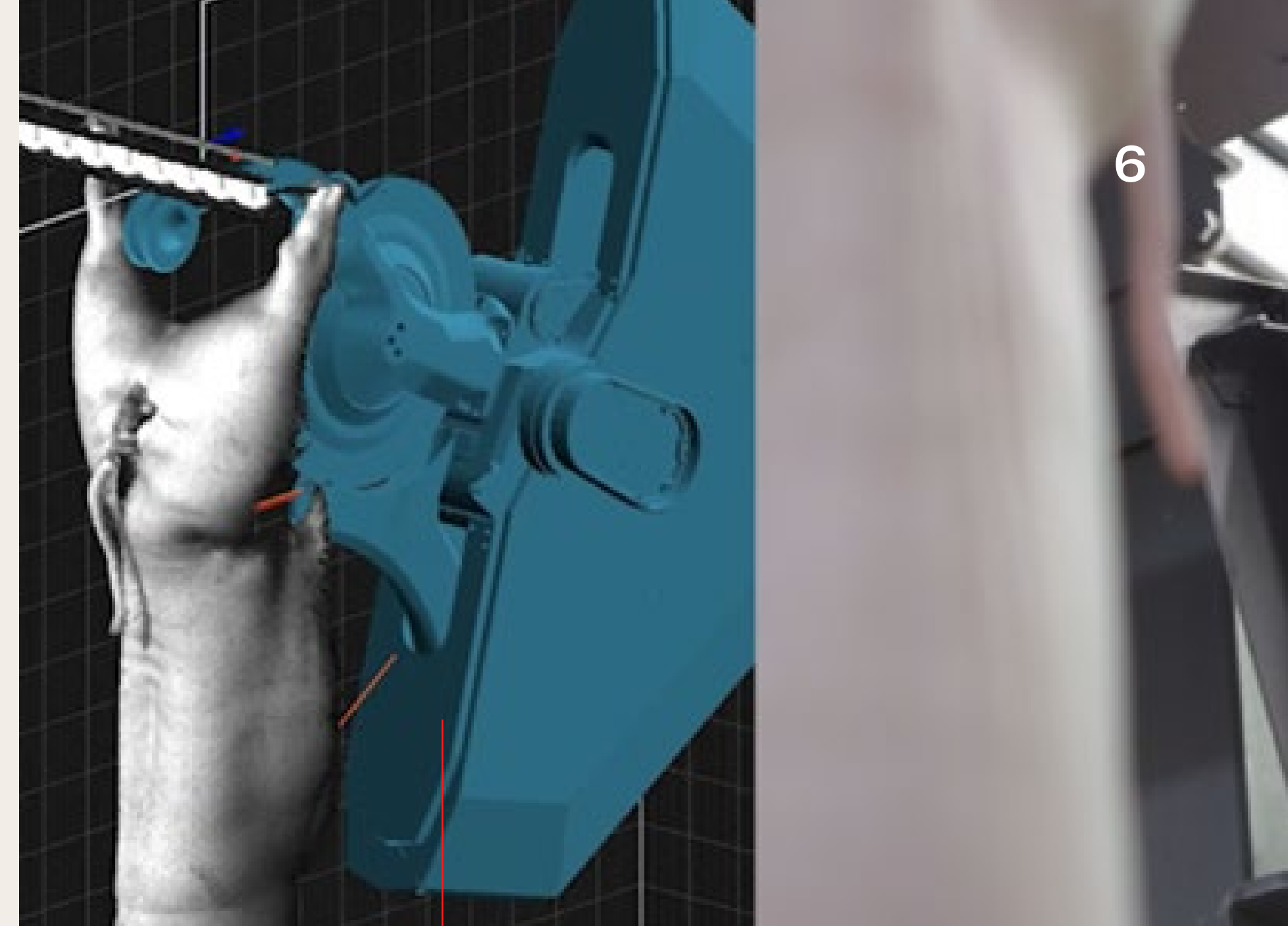
AI-Vision

Smart Processing That Adapts in Real Time

Precision starts
with perfect
vision.



Every M-Line robot is powered
by an advanced AI-driven vision
system that scans each individual
carcass in real time.



AI-Vision

How it works:

- **3D scanning** maps the exact shape, size, and anatomical structure of every carcass.
- The AI instantly interprets the scan and calculates the optimal processing path for each robot.
- **Each carcass has its own path**—fully customized, fully automatic.
- Adjustments are made on-the-fly—**no manual calibration or operator intervention needed.**

This ensures that every cut is perfectly positioned, **regardless of natural variation in carcass size, weight, or shape.**

Why it matters:

In pork processing, no two carcasses are the same.

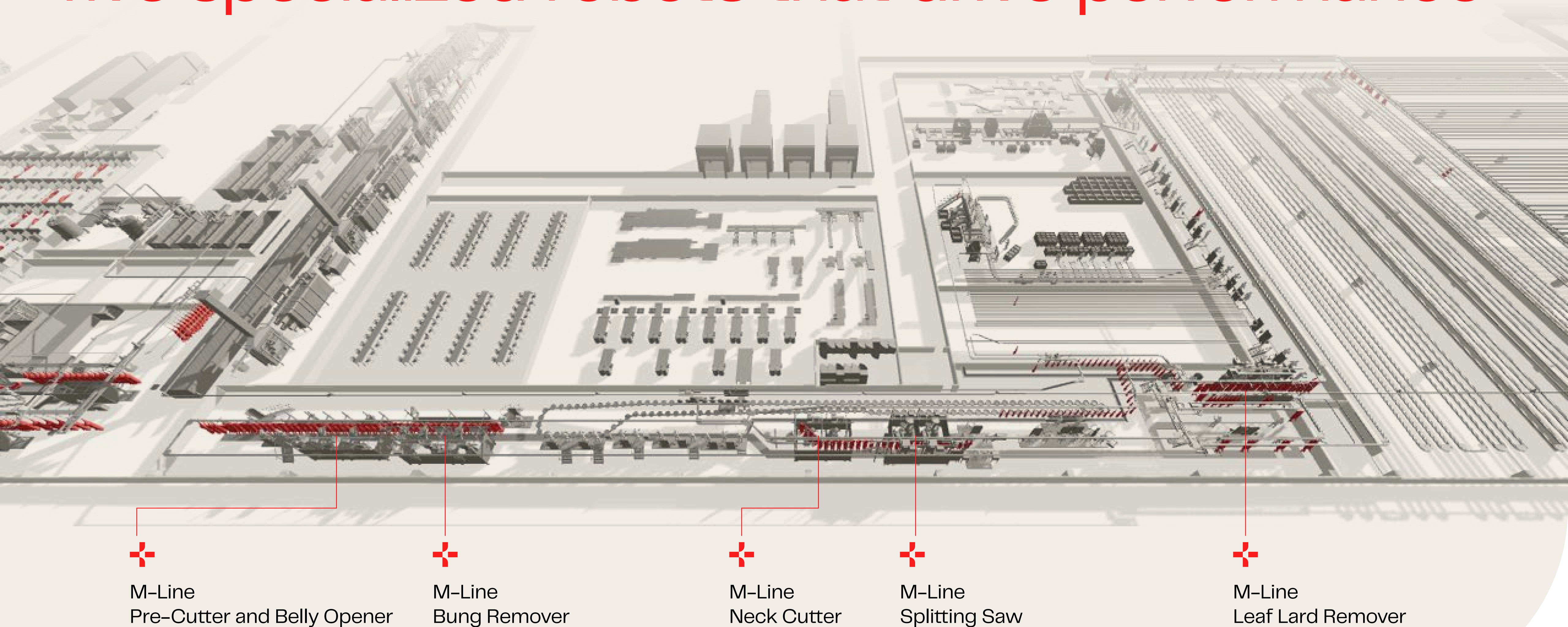
Traditional systems rely on fixed settings, which can lead to yield loss, inconsistent cuts, and manual rework.

M-Line's AI-Vision eliminates this risk by delivering fully customized, real-time cutting paths—carcass by carcass.

Your Benefits:

- **Higher Yield:** Every cut is optimized for meat retention and minimal waste.
- **Unmatched Cutting Accuracy:** Robots adapt to the unique characteristics of each carcass.
- **Reduced Operator Dependency:** No manual measurements or machine adjustments required.
- **Seamless Process Flow:** Real-time adaptation keeps your line running smoothly at high speed.

The power of M-Line: five specialized robots that drive performance



M-Line
Pre-Cutter and Belly Opener



M-Line
Bung Remover



M-Line
Neck Cutter



M-Line
Splitting Saw



M-Line
Leaf Lard Remover

MPB M-Line Pre-Cutter and Belly Opener

Three precision cuts in one seamless motion.

The MPB automates the splitting of the pelvic bone, opening of the belly, and cutting of the breastbone until the sticking point—three of the most contamination-prone tasks on the line. This multi-functional robot operates with surgical precision, ensuring perfectly symmetrical bellies and consistent processing quality.

By automating this process, the MPB eliminates the risk of fecal contamination (reduces close to zero).

By taking over repetitive manual cutting, the MPB **eliminates operator strain and reduces the risk of RSI injuries.**

Its adaptive system automatically adjusts to each carcass size, maintaining cutting accuracy without manual intervention.



Your benefits:

- Increased yield by eliminating contamination issues
- Higher processing consistency
- Safer working environment
- Reduced physical strain on operators
- Significant labor savings

MBR M-Line Bung Remover

The only hygienic drilling solution available.

The MBR takes one of the most hygiene-critical tasks off the hands of your operators.

It automatically locates and cleanly drills the bung, eliminating contamination risk and improving food safety across your process.

The system uses real-time adjustment to handle carcass variations, ensuring a perfect, contamination-free cut every time.

The patented Crown Cup ensures the bung remains sealed during removal, preventing leakage and cross-contamination. This reduces meat loss, extends shelf life, and safeguards product quality.



Your benefits:

- Minimized risk of contamination
- Superior process hygiene
- Consistent, reliable bung removal
- Reduced labor dependency

MNC M-Line Neck Cutter

Precision neck cutting for maximum meat retention.

The MNC delivers a **perfectly positioned head cut just behind the Atlas bone, preserving valuable meat.**

The robot automatically adapts to the position of the head, ensuring high-speed, high-accuracy performance on every cycle.

With the MNC, you can trust that the neck cut is always optimized for yield, while also relieving operators from a repetitive task.



Your benefits:

- Increased meat yield
- Consistent, high-quality cuts all along the day
- Less operator intervention
- Higher line efficiency
- Labor saving

MSS M-Line Splitting Saw

Setting the benchmark for carcass splitting.

At the core of the M-Line is the MSS delivering **exceptionally fast and accurate splitting at speeds over 900 pigs per hour with one robot.**

Its TwinTool system is a game-changer: while one tool is in use, the other is automatically sterilized, ensuring maximum hygiene.

The saw head's direct drive solution increases reliability, making the MSS an efficient, hygienic, and reliable solution for carcass splitting.

The MSS's integrated 3D scanning guides each cut with precision, delivering consistently even splitting that improves further processing.



Your benefits:

- Maximum throughput
- Uninterrupted tool sterilization for superior food safety
- Perfectly even carcass splitting
- Higher process reliability

MLR

M-Line

Leaf Lard Remover

Gentle, efficient leaf lard removal with precision.

The MLR fully automates the leaf lard removal process—traditionally one of the most difficult manual tasks.

The robot gently removes the leaf lard without damaging the carcass or compromising product quality.

Its adaptive control handles natural carcass variation, ensuring a clean cut and increased yield every time. The MLR features two independently operating tools, allowing each side of the carcass to be handled separately—an essential advantage, as no two halves are ever exactly the same.

By automating this challenging step, the MLR not only improves hygiene—it also increases throughput with more efficient leaf lard extraction and eliminates one of the most physically demanding tasks for your workforce.



Your benefits:

- Increased leaf lard yield
- Clean removal without carcass damage
- Higher hygiene and food safety standards
- Reduced operator workload and safety risks
- More stable production capacity due to eliminating a very labor intensive task

M-Line solutions go beyond automation. They are connected, intelligent, and designed for the factories of the future.

Each robot features:

- AI-Vision for precise, real-time adjustment
- Smart Base connectivity for remote monitoring and control
- Predictive maintenance to minimize downtime and optimize performance

With Smart Base, you get **live production data, process insights, and system health monitoring—all at your fingertips.**

Keep your line running smoothly while proactively managing costs.

**Smarter.
Safer. More
connected.**

Trusted Worldwide



With **30+ years** of experience in pork slaughter line automation and **hundreds of M-Line robots** running **globally**, the M-Line is not just the future—it's already delivering results.

M-Line is helping processors all over the world:

- **Meet the highest food safety standards**
- **Boost efficiency**
- **Reduce labor risks**
- **Maximize yield**

Discover the power of M-Line for your operation.

Contact us today to explore how automation can transform your pork processing line.

Visit marel.com



Ready to Take the Next Step?

Get in contact with our specialists