



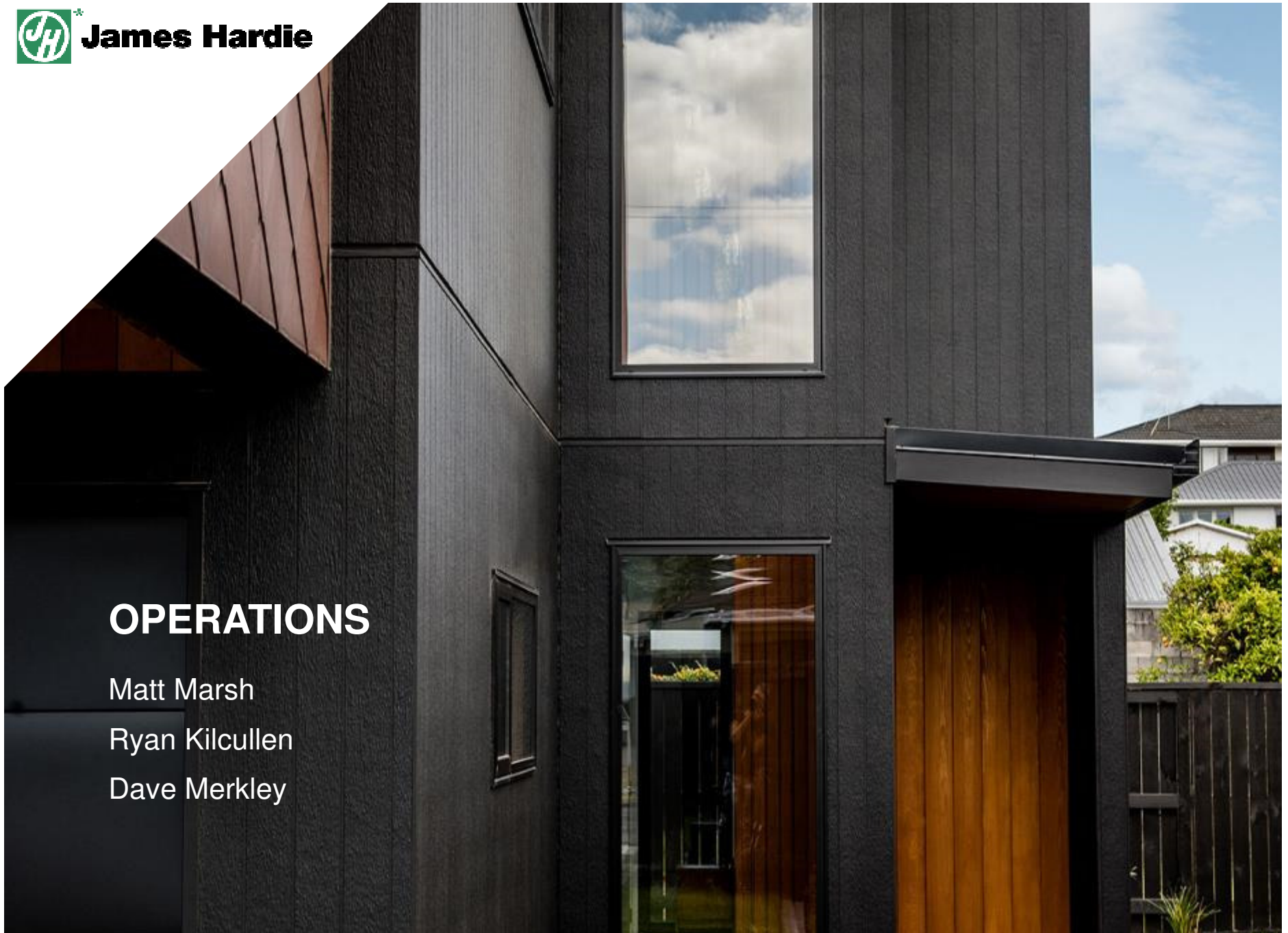
James Hardie

OPERATIONS

Matt Marsh

Ryan Kilcullen

Dave Merkley



AGENDA

- Introduction
- Enabling Growth & Network Returns
- Transforming Our Manufacturing Approach
- Customer Value Creation & FC Process Innovation
- Capacity Project Update



INTRODUCTION



HARDIE OPERATIONS – HISTORICAL PERSPECTIVE

JH Operations: A significant enabler of our 35/90 organic growth strategy

NETWORK CAPACITY WITH UNIQUE RETURNS

- Regional flexibility
- Efficient freight network
- Capex:Capacity efficiency

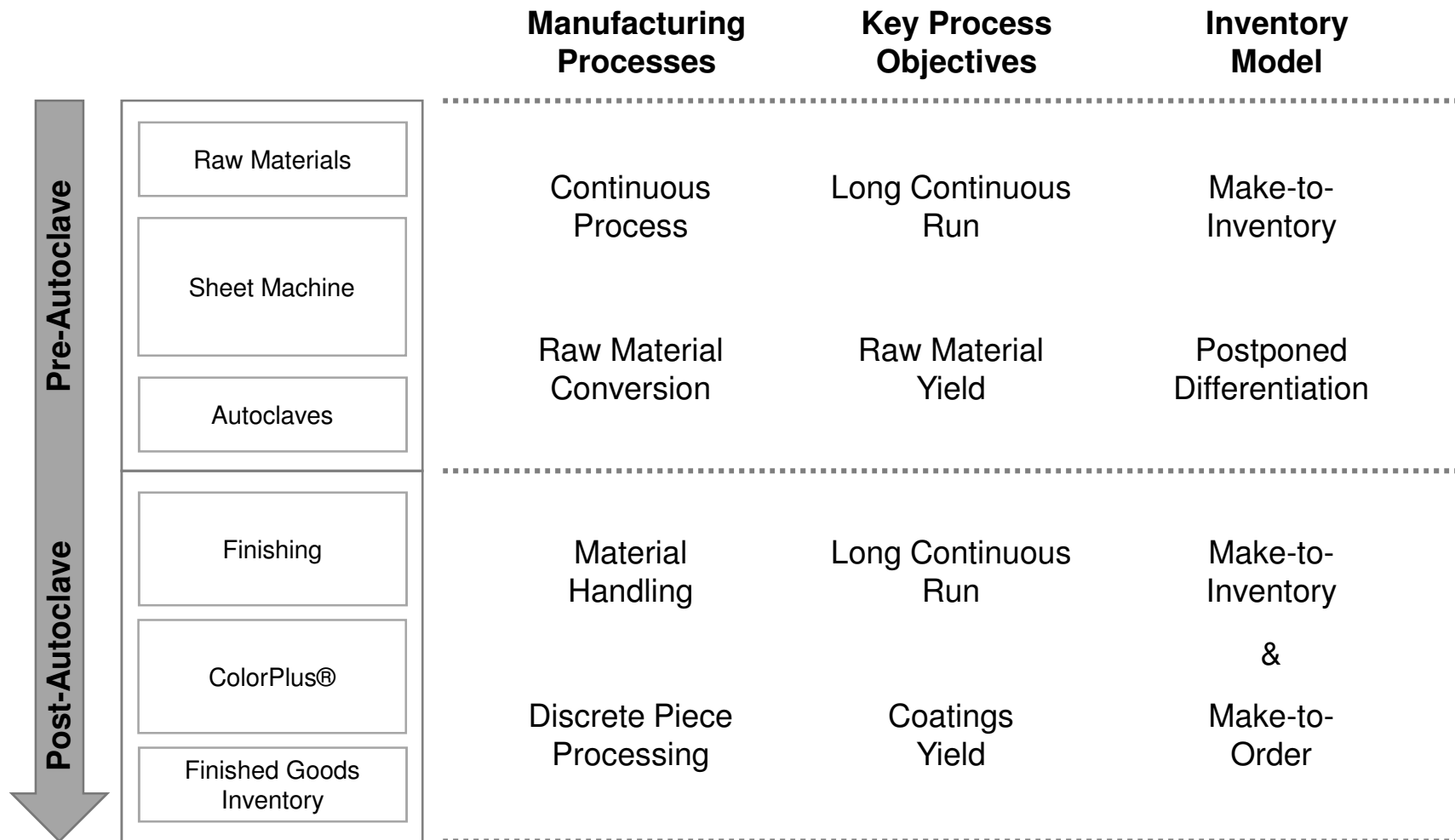
FC MANUFACTURING SCALE ADVANTAGE

- Hatchcheck scale up
- 24/7 fiber cement
- High throughput ColorPlus[®] technology

PROCESS INNOVATION & CUSTOMER VALUE

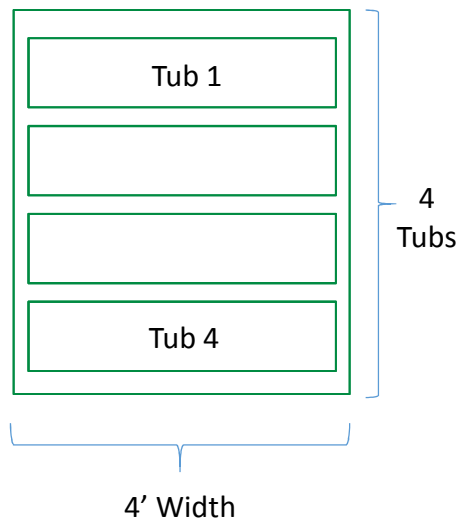
- Engineered for Climate[®]
- Low density
- Coatings advantage

HARDIE PLANT OVERVIEW

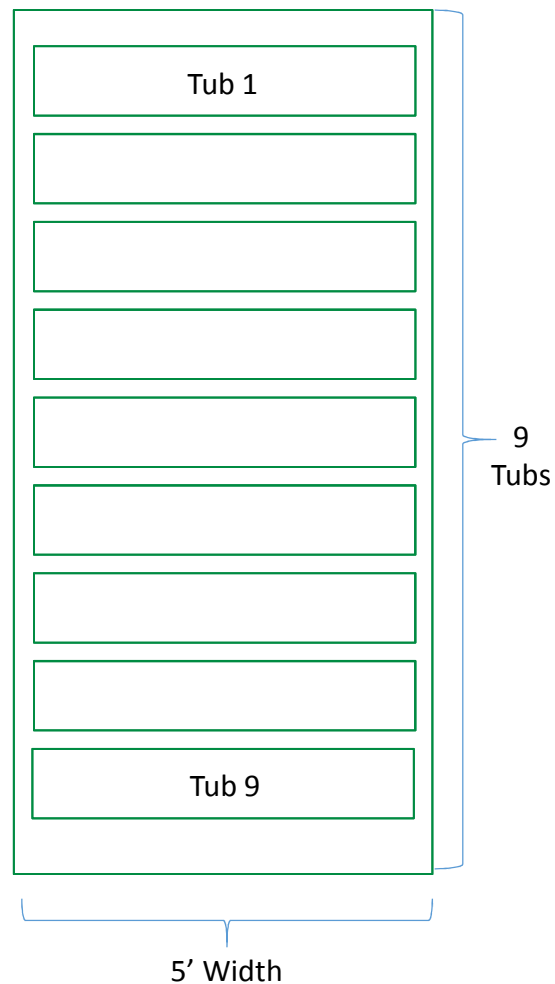


SHEET MACHINE INDEX CONCEPT

4x4 Sheet Machine



9x5 Sheet Machine



Machine Throughput Drivers

Machine throughput of “design product” is determined by:

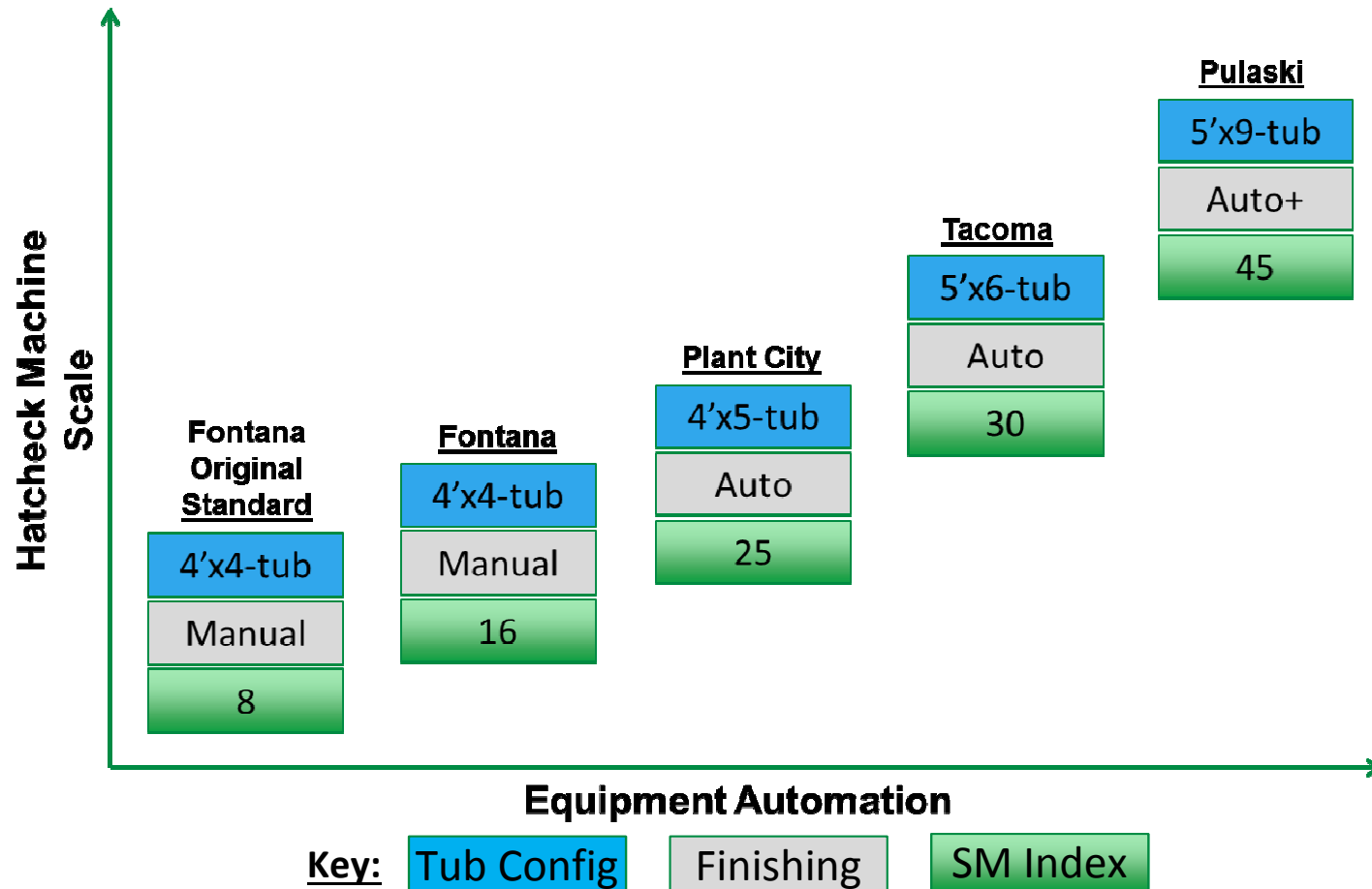
- Machine index
- Film build capability

Other factors that influence throughput:

- Product line discounts on felt speed
- Machine width utilization

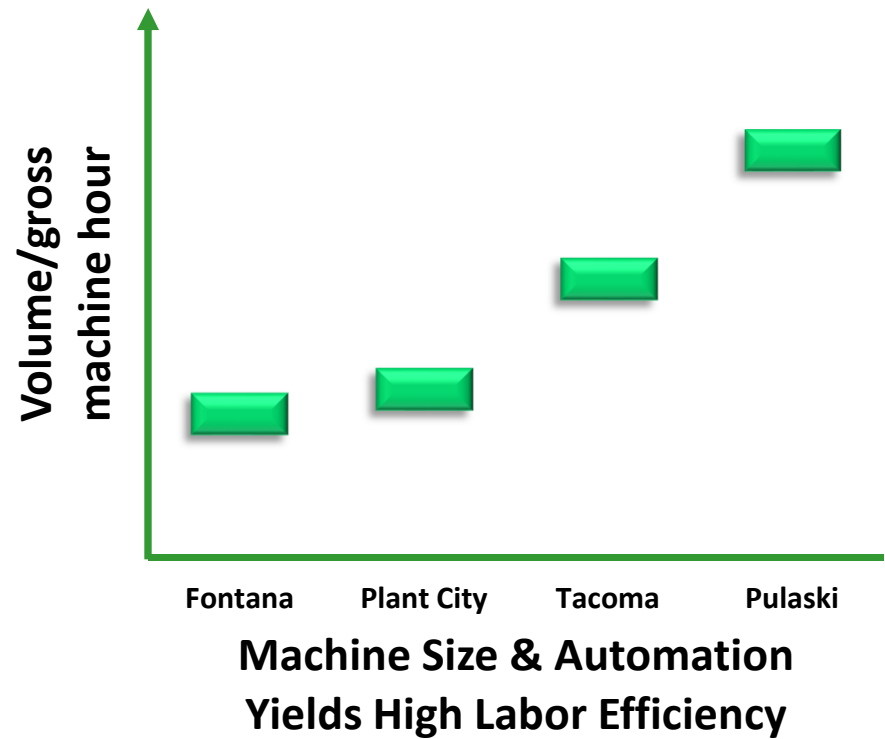
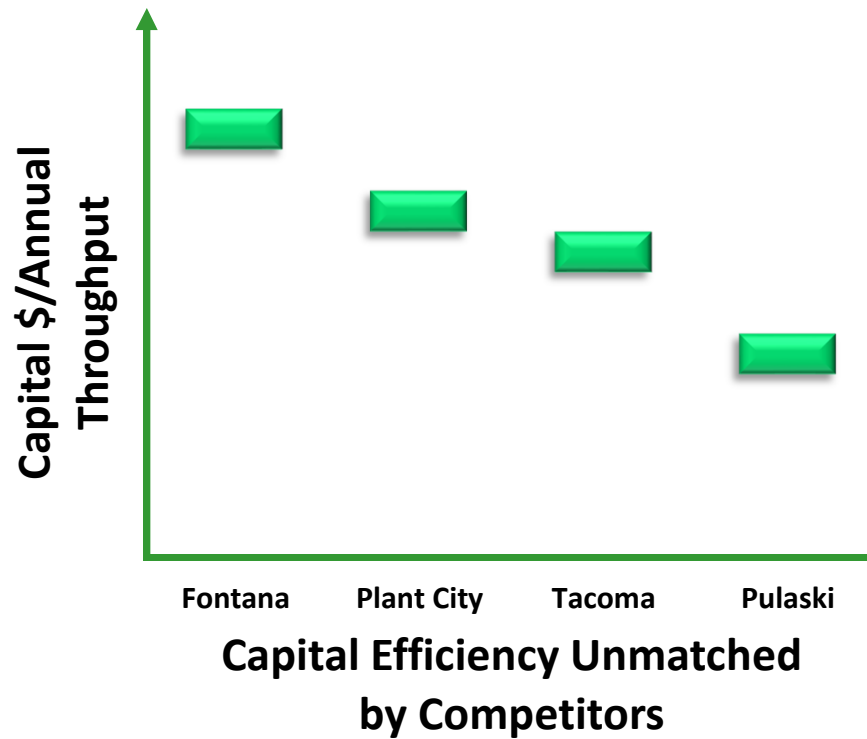
MACHINE INDEXING CREATED HIGH THROUGHPUT FC

A culture of engineering step-change has yielded a tremendous increase in manufacturing scale



MANUFACTURING SCALE CREATES FC MOAT

Manufacturing scale creates a significant competitive advantage



PROCESS INNOVATION LEADS TO CUSTOMER VALUE

Internally developed process capability enables product differentiation

Product thickness & density
control



HardieTrim® & Artisan®
product lines

Fit-to-purpose manufacturing
processing



HardieZone® Engineered
for Climate®

Post-processing
engineering



Aspyre

Coatings application
expertise



ColorPlus® Technology

HARDIE OPERATIONS – ENABLING FUTURE VALUE CREATION

JH Operations: Organized to deliver on the next phase of value creation in our 35/90 organic growth strategy

NETWORK CAPACITY WITH UNIQUE RETURNS

High scale mega-sites
optimizing total network
returns

FC MANUFACTURING SCALE ADVANTAGE

Transforming from the world
leading FC producer to a
world class manufacturer

PROCESS INNOVATION & CUSTOMER VALUE

FC process innovation &
scale advantage delivering
customer value & returns



ENABLING GROWTH & NETWORK RETURNS



HISTORICAL CORE CONCEPTS IN CAPACITY PLANNING

Core concepts of our approach to capacity management

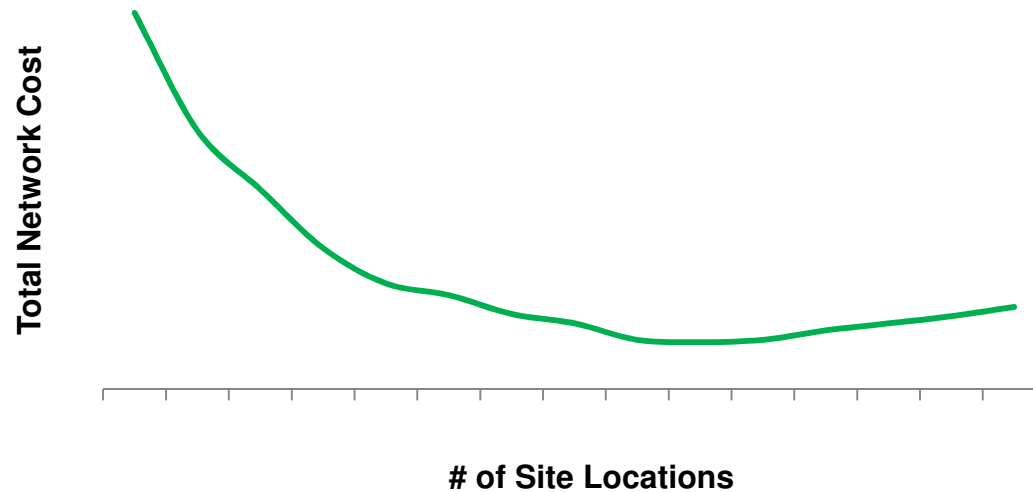
- ➡ Provide supply ahead of demand to enable JH organic growth strategy
- ➡ Make network design investments with the end state in mind
- ➡ Design an optimal network footprint for JH by optimizing a multi-part equation

Freight costs + Capital costs + Site operational costs

Our understanding of the drivers of our network cost equation combined with our insights of our long-term organic growth strategy enabled the creation of a highly efficient current state manufacturing footprint

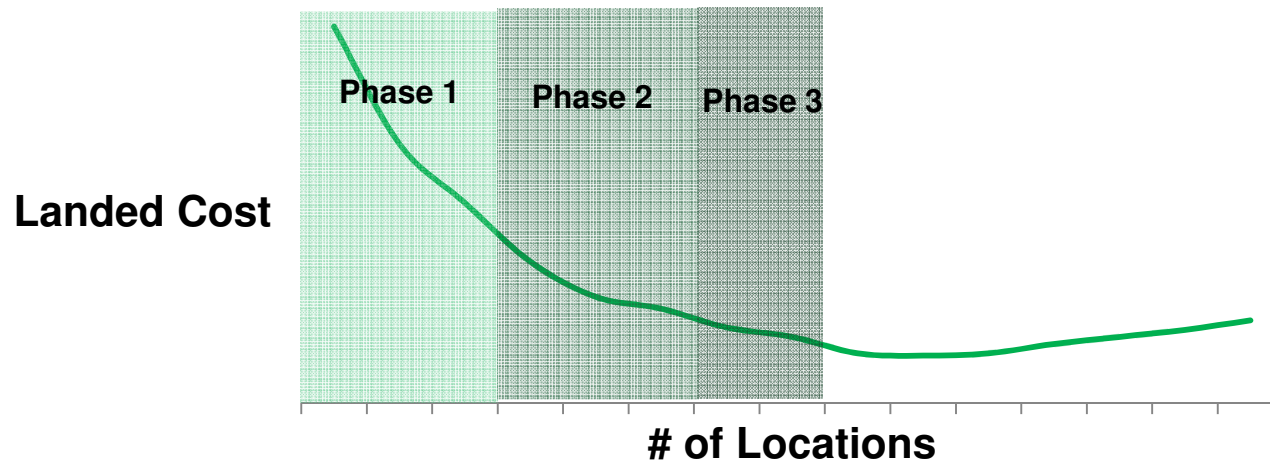
DESIGNING AN OPTIMIZED JH FOOTPRINT

JH Total Network Cost Trade-Off Curve



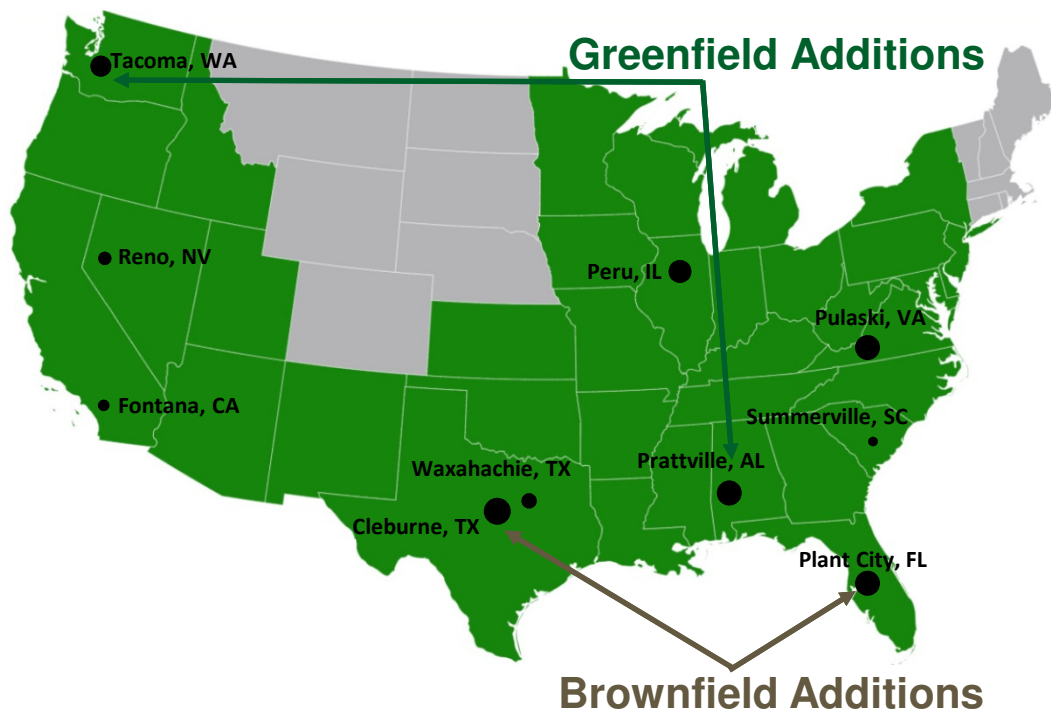
PHASES OF OUR NETWORK EXPANSION

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Phase 3</u>
Markets Enabled	HZ10	HZ5	Existing
Approach	Greenfield	Greenfield	Brownfield Bias
Network Enabler	Significant LOH Reductions	Continued LOH Reductions Post-autoclave Value Add Full-Wrap Capability	Product Line Flexibility Multi-Line Sites Brownfield Capability



JH NORTH AMERICAN MANUFACTURING NETWORK

- ➔ Post-recession capacity adds – combination of greenfield & brownfield sites
- ➔ Recent brownfield sites have used site optionality to create multi-line plants with continued investment in post-autoclave value-add capability



Nameplate Capacity (mmsf)

4,626 mmsf

Products

Primed Siding (HardieZone®)

Backer

Trim

ColorPlus® Technology

HardieShingle®

Aspyre

Note: Nameplate capacity of 4,626mmsf is post completion of announced greenfield expansion in Alabama of 600 mmsf.

KEY LEARNINGS THROUGH PHASE 3 OF OUR EXPANSION

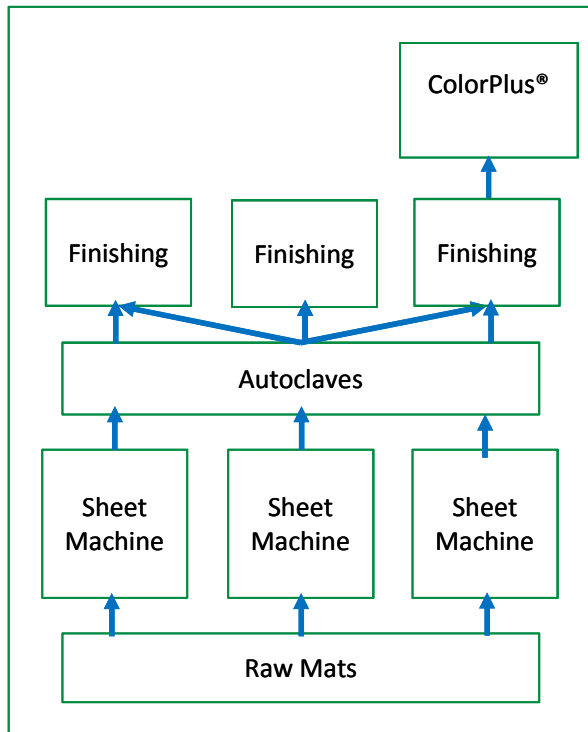
Insights from our expansion to date have led us to value creation opportunities for our phase 4 expansion

Key Insights

- ➡ Brownfield expansion offers a significant capital efficiency over greenfield
- ➡ Multi-line (3+ SM) plants can be efficiently run and have the opportunity to enable a valuable scale advantage with site improvements & operating changes
- ➡ Pre- and Post-autoclave assets can be decoupled – both on-site & by distance
- ➡ Regional machine/product line specialization benefit is enabled by volume scale
- ➡ Diminishing freight returns from greenfield sites creates an opportunity for value creation through brownfield expansion expertise & mega-site operations

INSIGHT EXAMPLE #1: MULTI-LINE OPERATING OPPORTUNITY

Addition of 3rd SM Cleburne Pre-Expansion



Opportunities

Post-autoclave flexibility

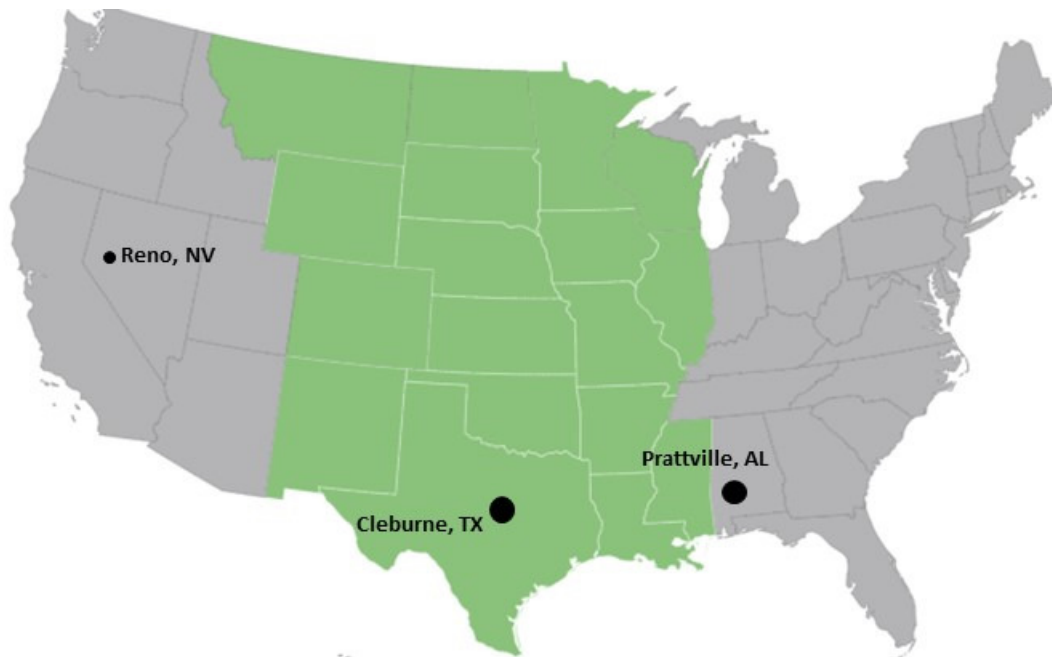
By-pass finishing for Color

Shared systems running at high utilizations, driving plant decision making despite low value add

Site leadership focus: continuous improvement instead of constraint management

Material flow optimization

INSIGHT EXAMPLE #2: REGIONAL PRODUCT SPECIALIZATION



Regional Specialization of Products:

- Input cost advantage
- Machines advantaged

Operational Advantages

- Reduced changeovers
- Improvements from specialization

Opportunity to ship higher ratio of products via rail

INSIGHT EXAMPLE #3: POST AUTOCLAVE SPOKE OPPORTUNITY

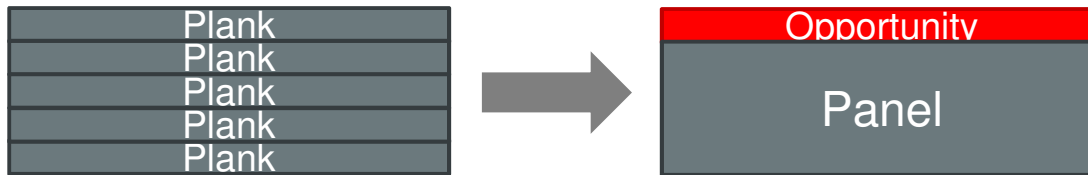
Enabled mega-site provides in market, post autoclave operations

- ✓ Low input cost
- ✓ Low capital cost (land, building, and installation)
- ✓ In plant economies of scale
- ✓ Competitive rail enabled
- ✓ Shortened truck length of haul



INSIGHT EXAMPLE #4: SPECIALIZATION FOR EFFECTIVE CAPACITY

5 foot wide machines



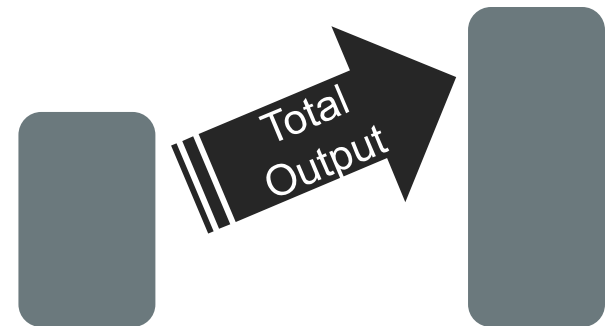
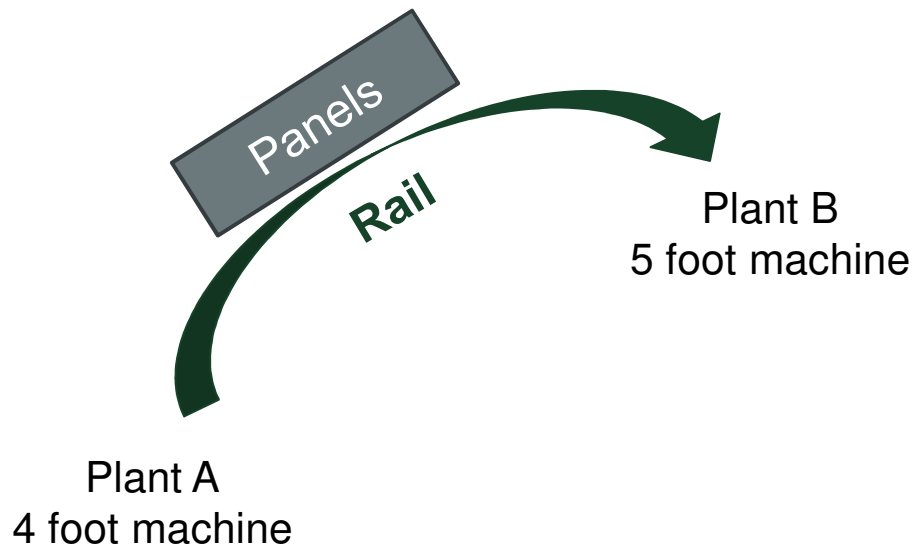
Optimize products to machines

More output with same hours

Changeover Reduction

Low incremental cost to produce

Efficient supply chain

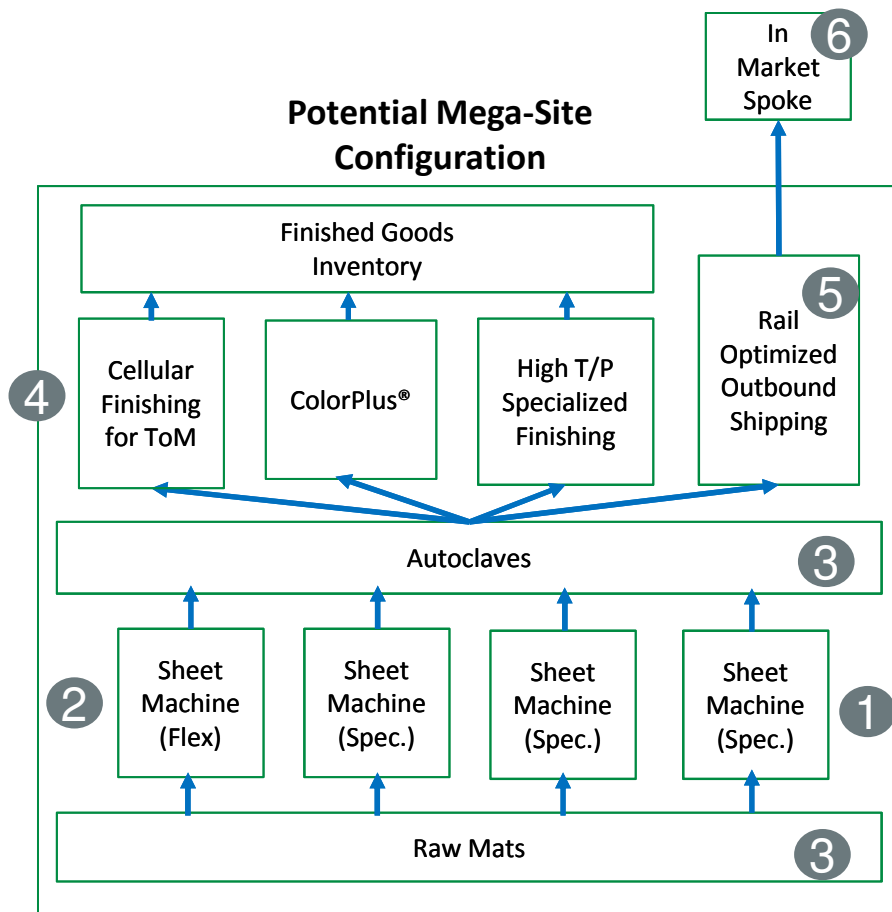


TODAY TO 35/90 – PHASE 4 OF OUR NETWORK EXPANSION

In our phase 4 network expansion we will look to apply these insights

- ➡ Brownfield expansions at existing sites
- ➡ Investments in multi-line (3+ SM) sites will enable efficient mega-sites
- ➡ Individual capacity investments will deliver total network optimization benefits
- ➡ Post-autoclave decoupling will enable on-site efficiencies as well as the potential for spoke value add operations

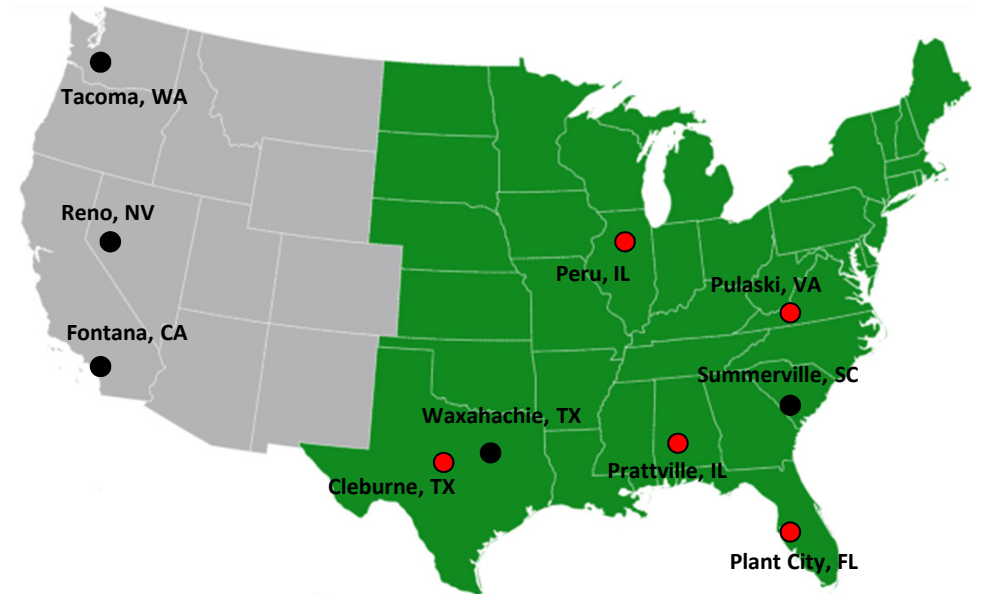
CORE CONCEPTS OF A MEGA-SITE (INSIDE THE WALLS)



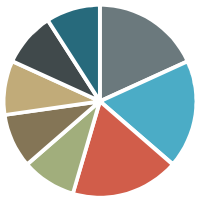
CORE CONCEPTS OF MEGA-SITES (OUTSIDE THE WALLS)

Deliver landed cost advantage while benefiting from site scale

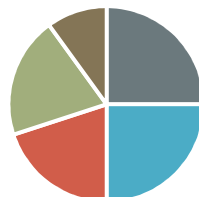
- In-market spoke enables freight efficiencies
- High volume rail capability
- Optimized plant and product mix



Plant Mix – all plants



Plant Mix – impacted plants

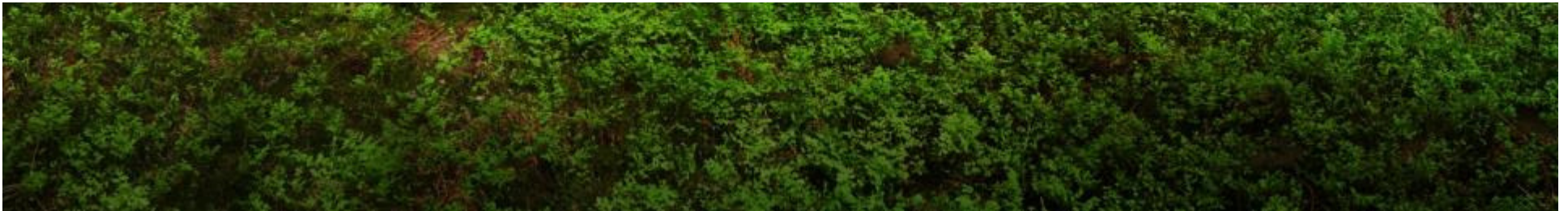


CAPACITY SUMMARY

- Our current network footprint was designed to enable future organic volume growth at a high efficiency
- Insights from our network build out are well understood, and learnings are being applied to future investments
- Mega-site facilities will enable a scale advantage locally & create total network optimization benefits



TRANSFORMING OUR MANUFACTURING APPROACH



HISTORICAL MANUFACTURING APPROACH

JH Manufacturing Approach: A decentralized, entrepreneurial approach utilizing step change engineering to scale a process with unlocked potential

An approach that enabled unique manufacturing capabilities...

Industry leading economic returns from manufacturing capacity

Step change engineering delivering unmatched FC cost position

FC process technology leadership creates customer value

...that contributed significantly to the value creation equation of JH

Tacoma 1:
$$\frac{\$100\text{M in annual revenue}}{\$30\text{M invested capital}}$$

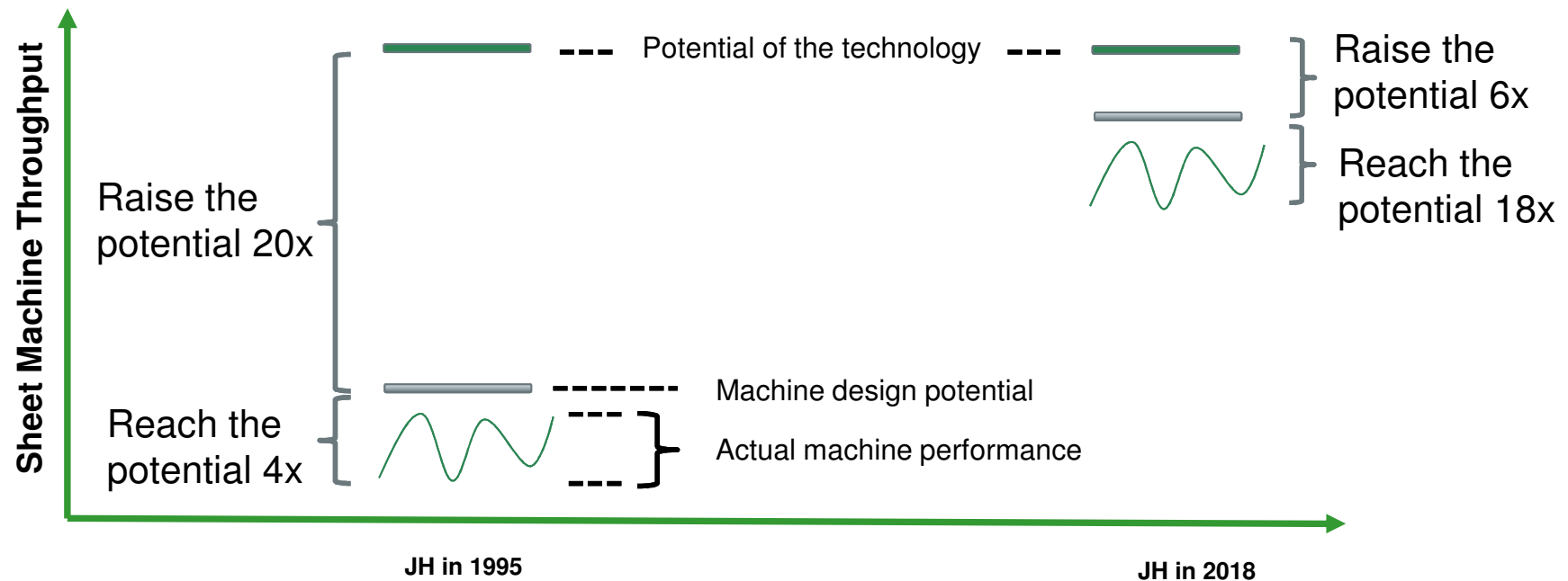
9x5 Hatschek productivity over Generation One 4x4 FC line

Low Density → HLD Trim

HZ5 Durability → Northern FC

AN APPROACH THAT ALIGNS WITH THE OPPORTUNITY

The value creation opportunity in JH manufacturing has shifted significantly...



...and the approach, capabilities, and focus must align to it

A NEW PATH FORWARD FOR HARDIE MANUFACTURING

We are in the early stages of deployment of a shift in how we manage of manufacturing site operations...

From

Local site autonomy



To

Network standardization

Step change delivers the gains



Continuous improvement sustains
& improves

Technical/Engineering managers



Lean leaders

Factories as innovations labs



Focused factories & targeted
centers of innovation

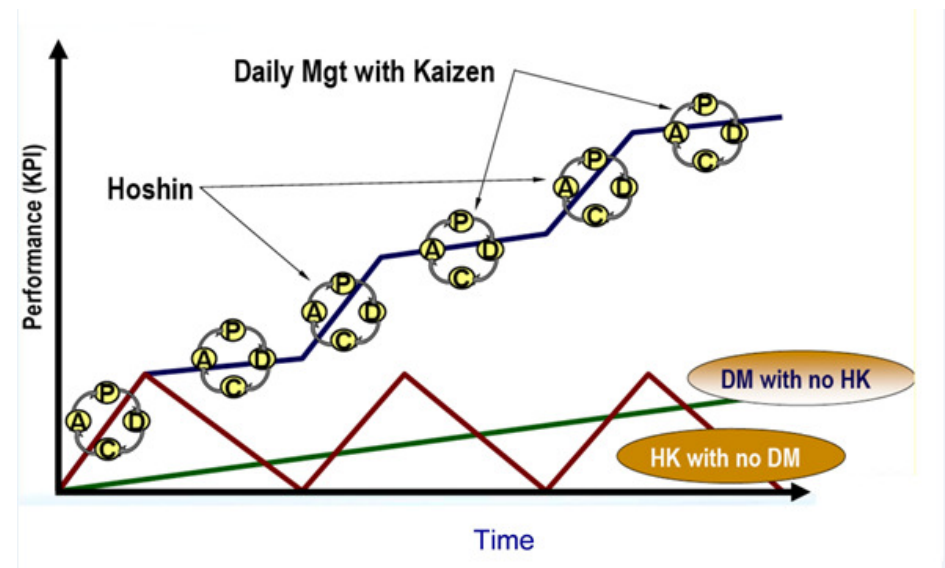
A TRANSFORMATION TO LEAN MANUFACTURING

The adoption of a lean manufacturing approach will create the platform for our manufacturing transformation

Expected Outcomes of Lean

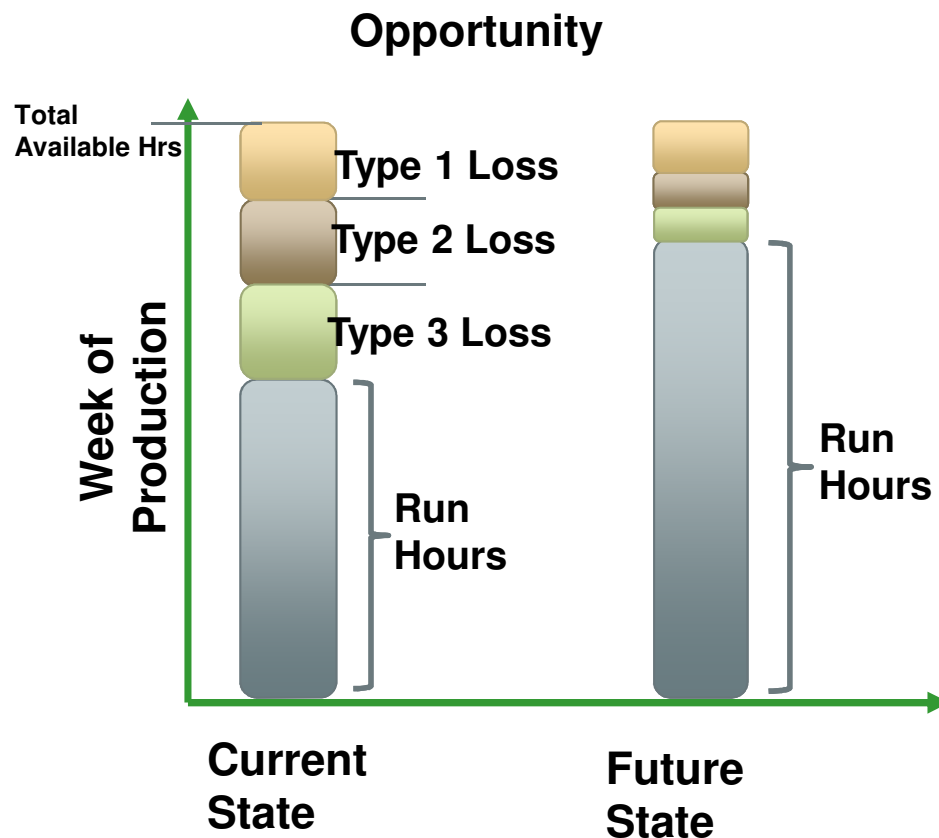
- A JH manufacturing operating system
- Increased standardization
- Common problem solving approach
- Empowering leadership approach

Sustain & Build on Improvements



MACHINE & PROCESS RELIABILITY

We have recently launched a reliability initiative designed to increase the net production hours of our sheet machines



Approach

1. Planned Outage Minimization
2. Critical Asset Reliability Program
3. Run Planning Optimization

ADDITIONAL AREAS OF OPPORTUNITY & FOCUS

We have invested in organizational capability to deliver on a number of specific additional opportunities inside of JH operations

Product Line Operations

Manufacturing focus on supporting profitable product line shifts and growth.

Expected Outcomes

- Interiors Focus
- Top-of-Market Focus

ColorPlus® Operations

Enabling the market share gain approach of our product strategy group

Expected Outcomes

- Execution of a an enabling strategy for ColorPlus®
- Technology growth
- Inside & Outside the gate opportunity

Post Autoclave 2.0

Creating a lift in the efficiency of product flow from the autoclave to the truck.

Expected Outcomes

- Line-to-truck optimization
- Off-the-line activity elimination
- Non-value add process minimization

JH MANUFACTURING STRATEGY SUMMARY

- A culture of innovation & step change has delivered significant value creation from our historical manufacturing approach
- Greater efficiencies in our base network will be generated from a shift to continuous improvement, world class manufacturing
- We are designing a more rigorous operating approach to manage the scale of our current & future sites



CUSTOMER VALUE CREATION & FC PROCESS INNOVATION



JH MANUFACTURING STEP CHANGE

We have also doubled down on our ability to deliver break through engineering step change in all areas of JH manufacturing

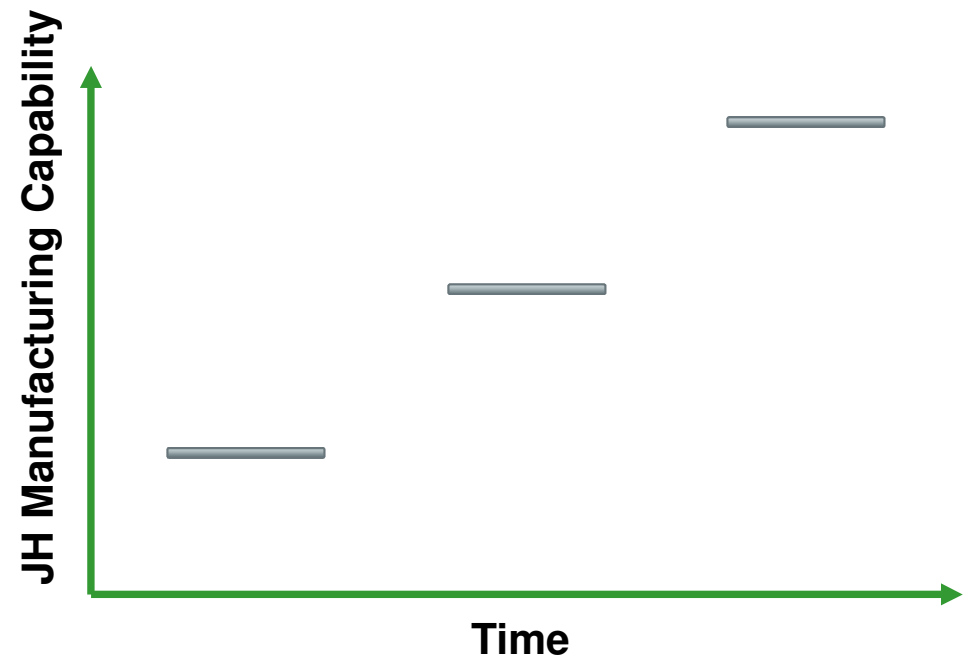
Step innovation in...

Next Generation
Hatschek

New Product Enablers

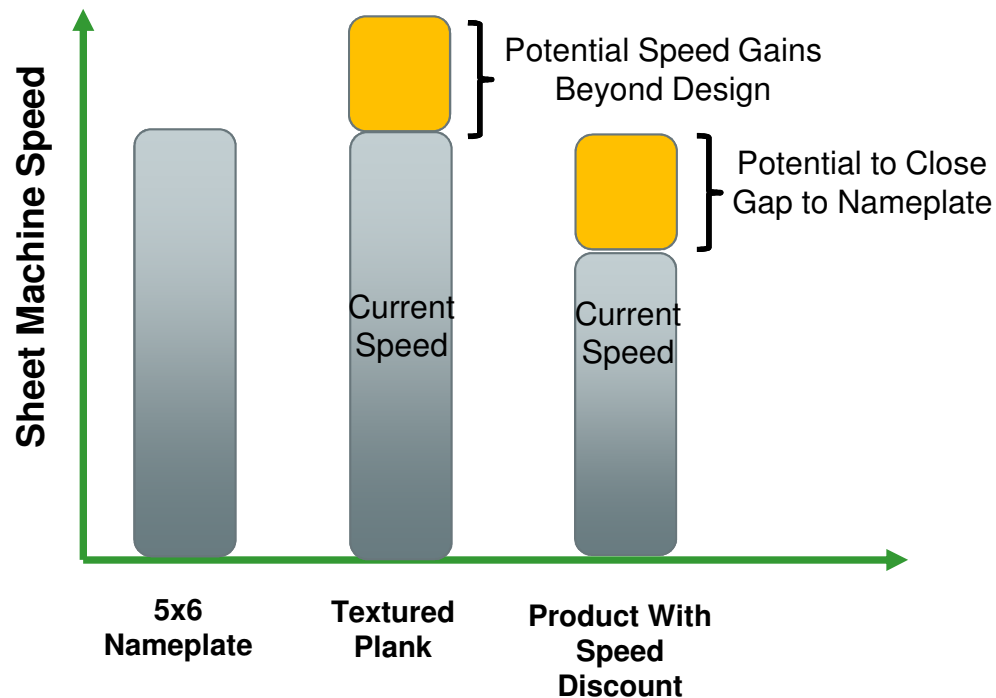
Mfg Platform
Development

...enables break through
progress



STEP CHANGING THE HATSCHEK PROCESS

Current Speeds vs. Nameplate

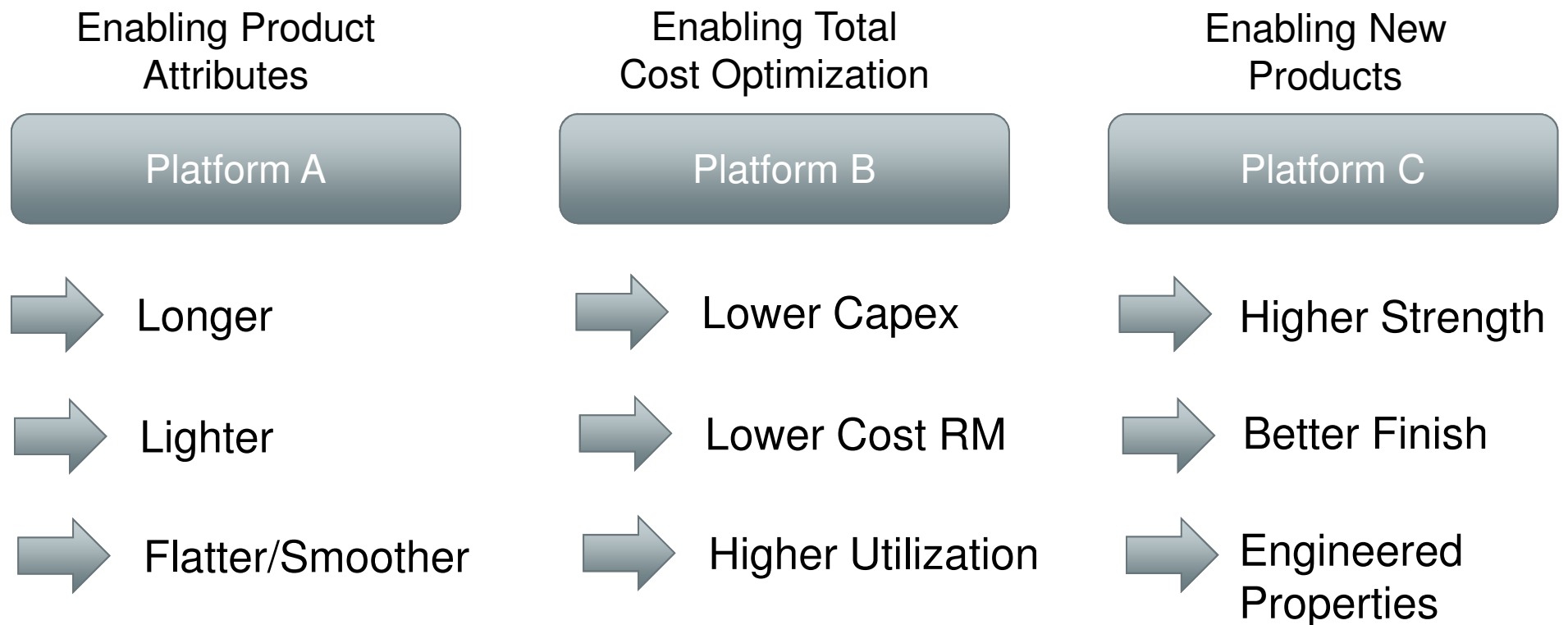


Enabled by step change innovation...

- Significant increase in drainage rate
- Raw material formation modifications
- Felt technology innovation
- New approach to sheet forming

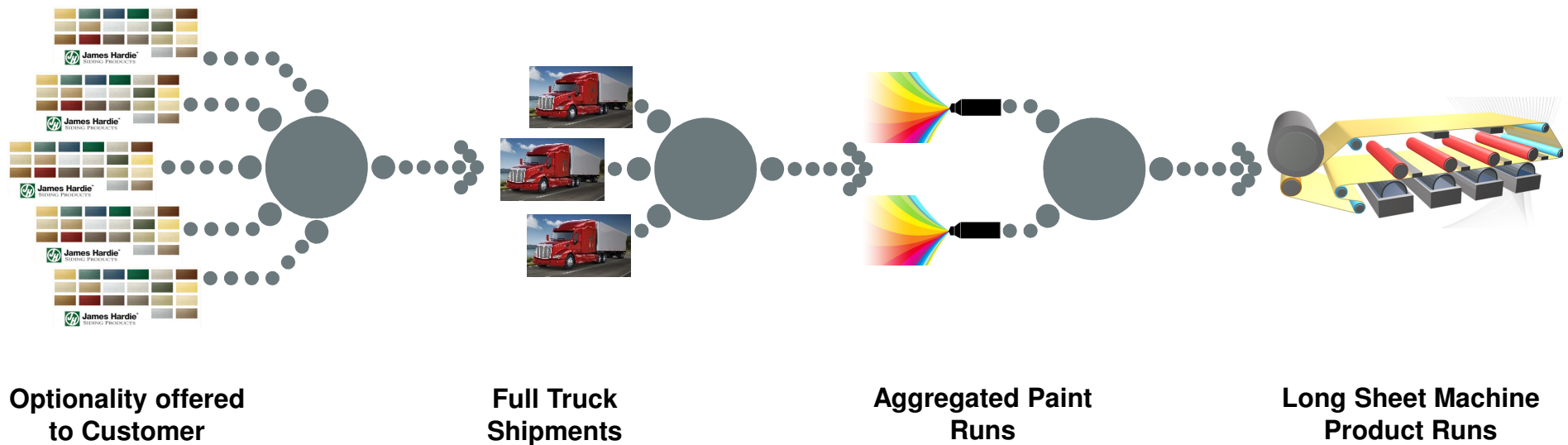
MANUFACTURING PLATFORM STEP CHANGE

Manufacturing platform innovation has the potential to unlock significant process, product and cost levers in fiber cement manufacturing



MANUFACTURING AND SUPPLY CHAIN SCALE

- ➡ Supply Chain enables efficient, full truck load shipments to distribution
- ➡ Scale and aggregation allows for efficient manufacturing



MANUFACTURING CAPABILITY SUMMARY

- We have an established history in step change manufacturing innovation
- We are adding to and enhancing the talent and capability of our engineering teams with the talent & capability to accelerate the pace of step change in JH
- The value associated with continuous improvement has increased with our scale and we are organizing to deliver
- Step change & continuous improvement efforts are both critical to delivering on our 35/90 manufacturing effort



CAPACITY PROJECT UPDATE



TACOMA 2 UPDATE



First Stacks Produced

- In start-up phase
 - C+ line expected 1H FY20
- Nameplate Capacity - 300 mmstdft/year
- Capabilities – Plank, Backer, HardieShingle®, ColorPlus® Technology
- 130 Employees at full production
- Site benefits
 - Low input cost
 - Proximity to growing markets

ALABAMA UPDATE

- Construction in process
- Expected commissioning 1H FY20
- Initial Nameplate Capacity – 600 mmstdft/year
- Anticipated Capabilities – HZ10 & HZ5 Plank, Backer, Aspyre Plank
- 175 – 200 Employees at full production
- Site benefits
 - Low input cost
 - Skilled manufacturing workforce
 - Rail accessibility



SUMMARY

- Tacoma II and Alabama projects are on-track
- Both investments bring incremental flat sheet and product line capacity to support future demand creation
- Learnings from our previous experience in building & operating sites are being applied

OVERALL SUMMARY

- We have a clear path forward in operations to continue to enable our 35/90 organic growth strategy
- Our network design capabilities continue to improve and mega-sites are expected to be important to future capacity
- Our journey to world class manufacturing has started
- Process innovation and customer value creation will continue to be focus areas of our manufacturing strategy



Q&A

