STEMCELL Technologies

Experiences from our Demand Driven journey

December 2 2015 - Juan Abbud, T’ai Palladino

Company Overview

Dr. Allen Eaves – Founder, President & CEO

STEMCELL™ TECHNOLOGIES

Scientists Helping Scientists™ | WWW.STEMCELL.COM

A Family Owned Company

- We can move quickly in a fast moving market
- We listen to our employees & customers
- Growth over 20 years dependent on sales revenue – a great discipline!
- Sales are largely dependent on the new products that we develop
- New products are developed by our outstanding R&D scientists - who are essential to STEMCELL's success!
- Planning and prioritization of new product development is done carefully and confidentially
- Leadership & decisions are focused on long-term growth and stability

STEMCELL Mission, Vision & Values

Our Mission

To advance the pursuit of scientific knowledge and understanding by supplying high quality, innovative reagents, tools and services that enable life science research.

Our Vision

To have our products used in all research labs around the world, significantly impacting the development of new life science discoveries.

Our Values

Innovation: We are curious and nurture innovation

Quality: When we do something, we do it well

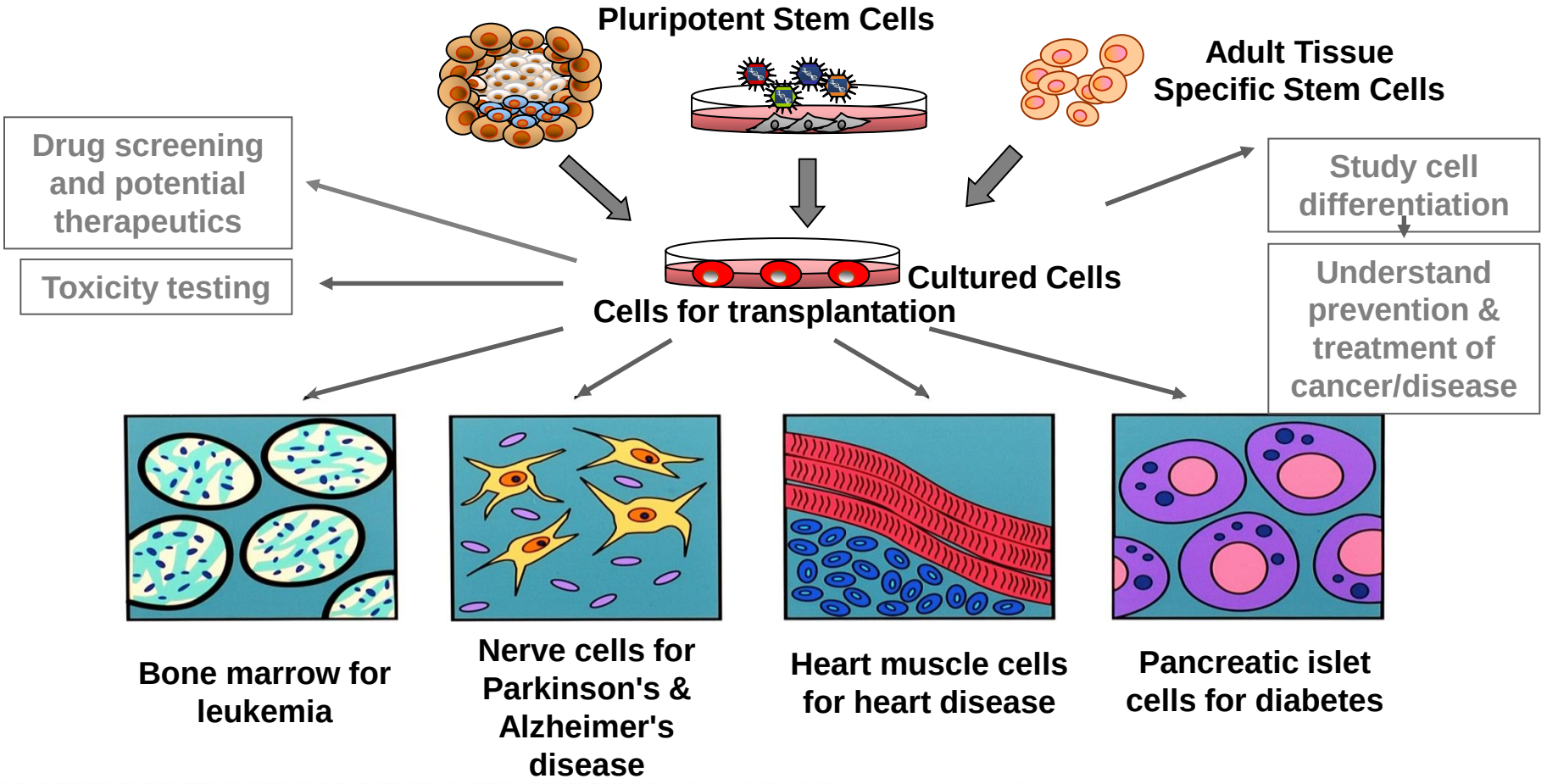
Responsive: We move quickly to support scientific advancements

Integrity: We are truthful and ethical in all our dealings

Collaborative: We work with the scientific community to drive innovation

STEMCELL Corporate Video

The promise of stem cell research



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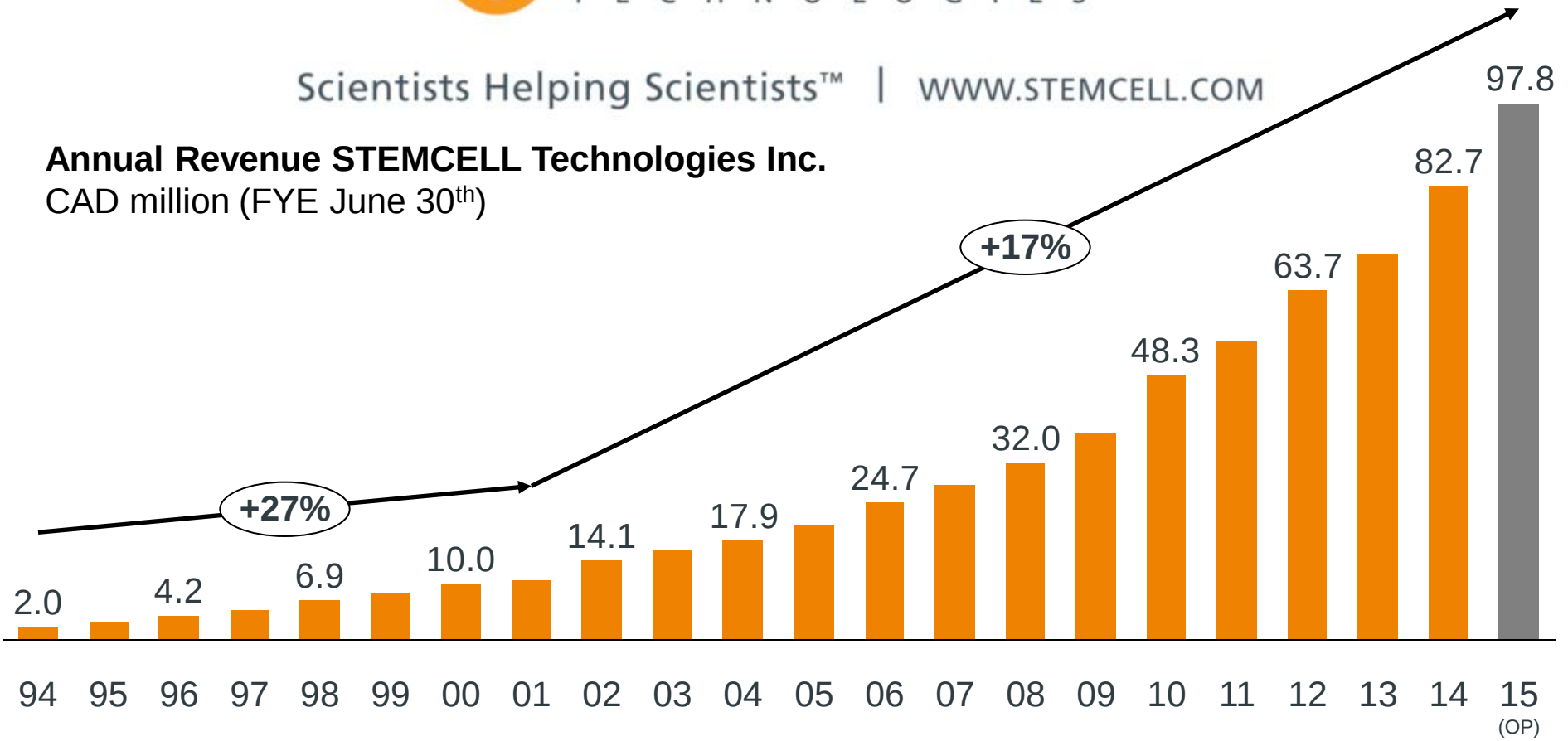
Annual Revenue STEMCELL Technologies Inc.
CAD million (FYE June 30th)



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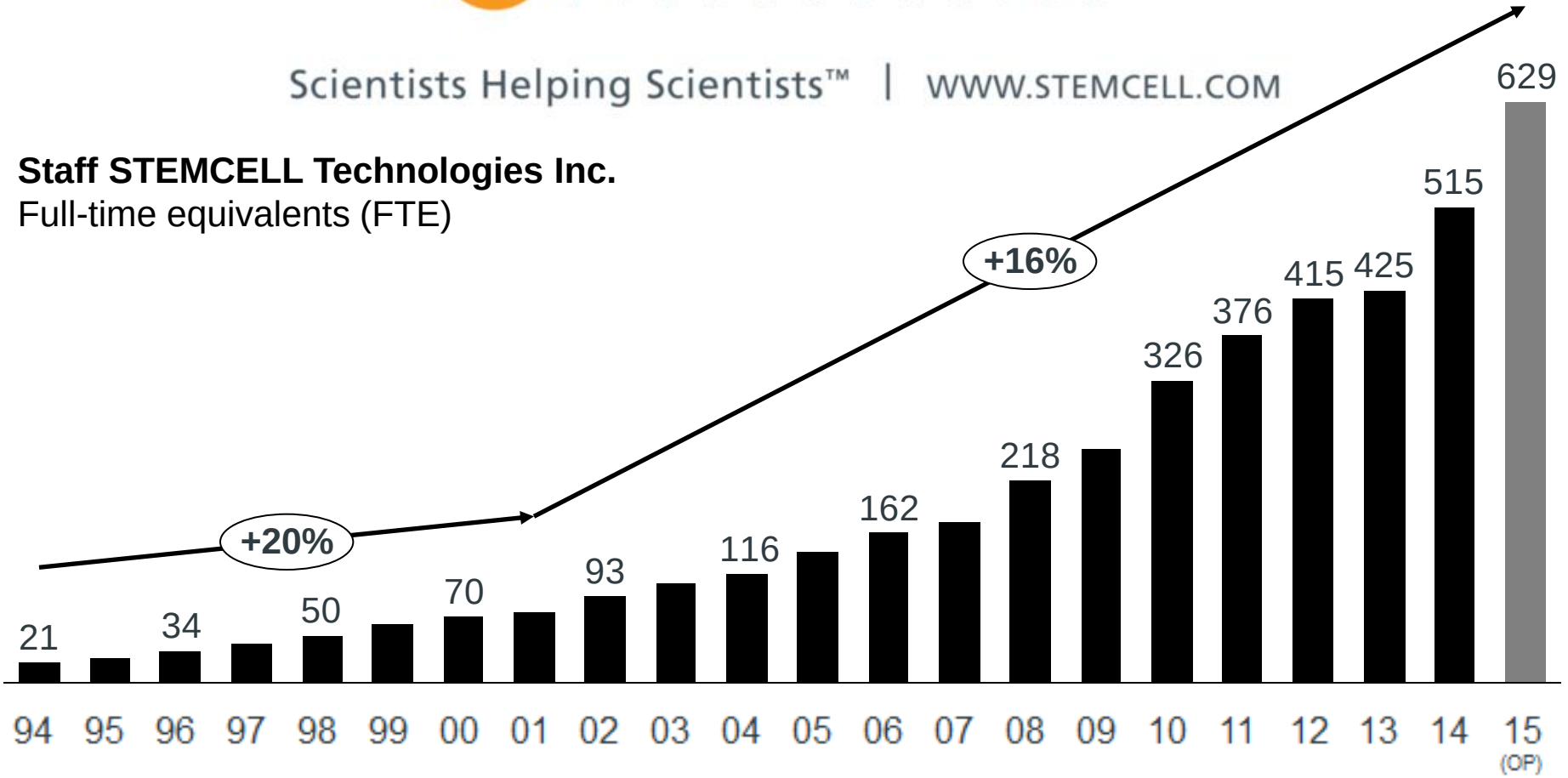
Staff STEMCELL Technologies Inc.
Full-time equivalents (FTE)



Keeping up with growth

Growth demands changes to our processes

Changes in scale create challenges for existing processes, transition from problem solving to process driven

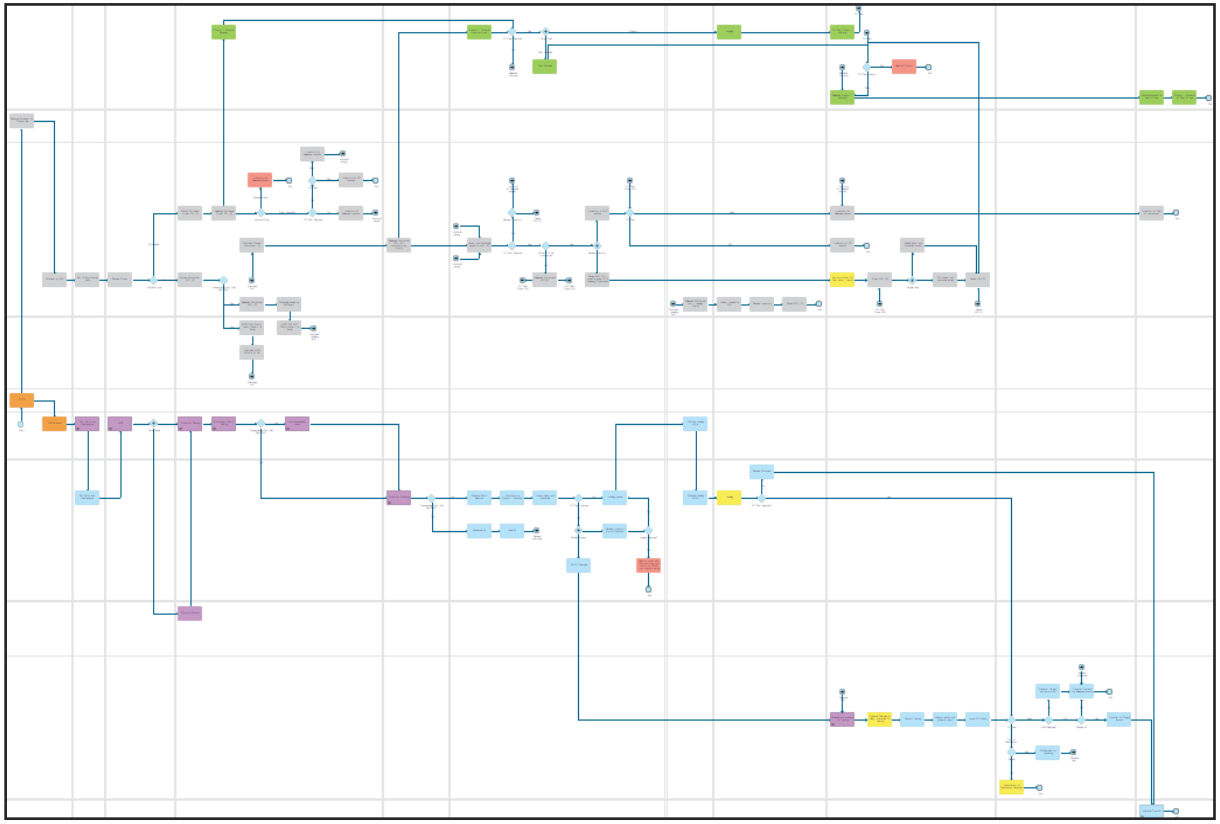
Make flow visible – Optimize inventory, maintain service level

Create system efficiencies, generate better data & improve metrics

Operational objective – Improve Plan to Produce

- Improve service levels while maintaining the optimum inventory level – establish and maintain optimum inventory, control oscillation
- Establish process efficiencies in the Plan to Produce process by optimizing the use of the ERP and supporting systems
- Develop and establish the required datasets to support the Plan to Produce process and its continuous improvement

Evaluating our Planning Processes



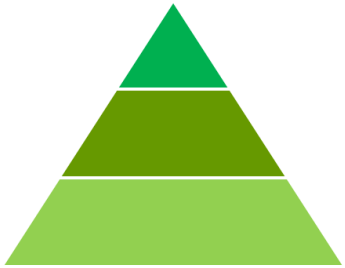
Process Analysis:

Plan to Produce Value Stream Map

Process Scope - Demand Signal to Product on the Shelf

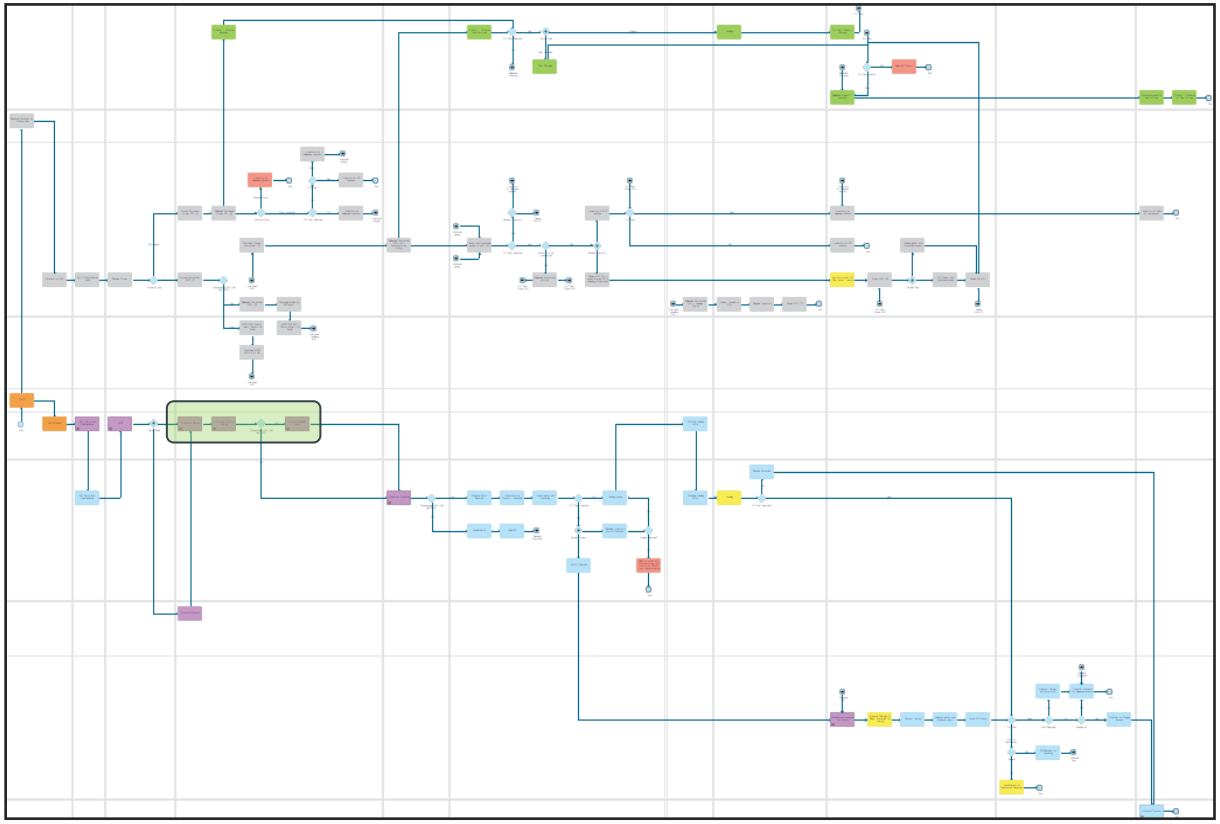
Map the flow of:

- Materials
- Information
- Activities



<u>Identify and define problems and their causes</u>

Evaluating our Planning Processes



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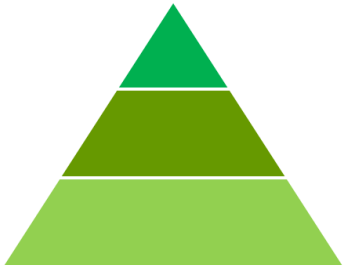
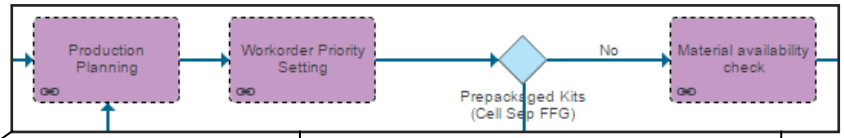
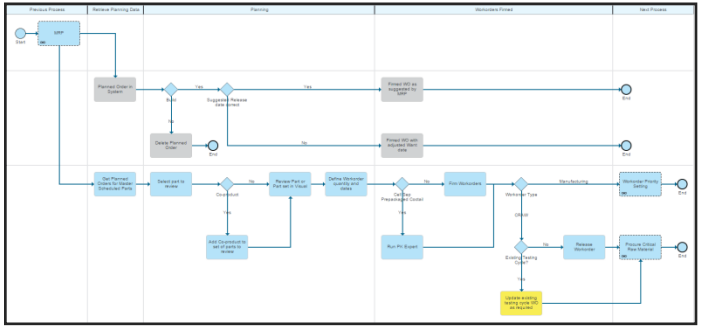
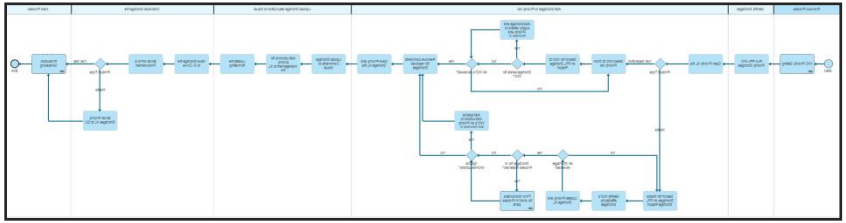
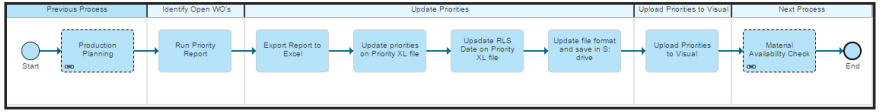


Planning before DDMRP









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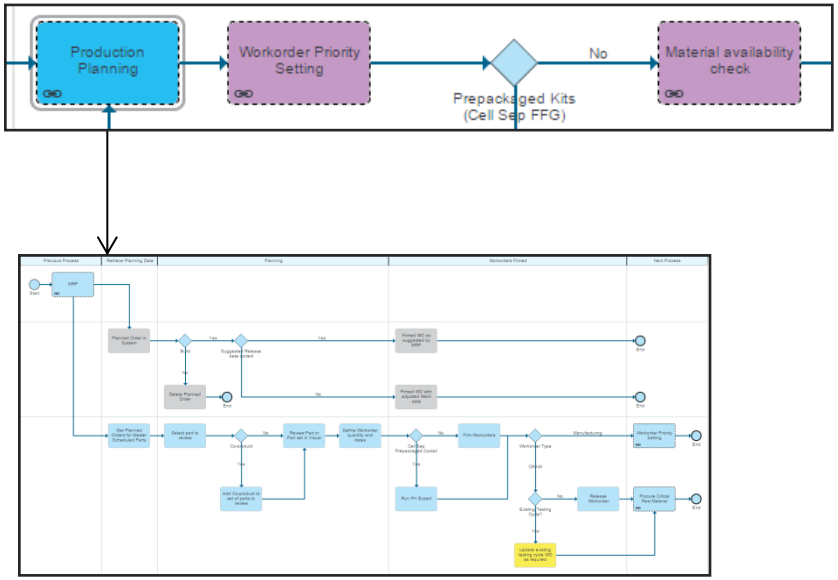


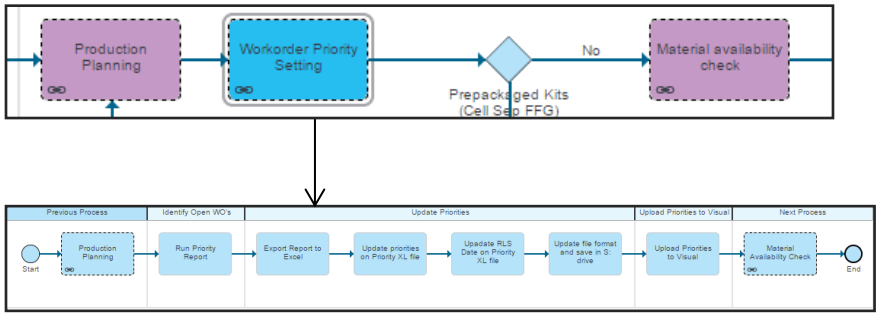
Production Planning

Scope: Identify and qualify demand

Output: Firmed workorders in the system

- Materials – No movement
- Information – Historical sales, sales orders, forecast, manufacturing plan considerations
- Activities – Validate forecast, adjust as required, run MRP, review and firm planned orders

Planning before DDMRP



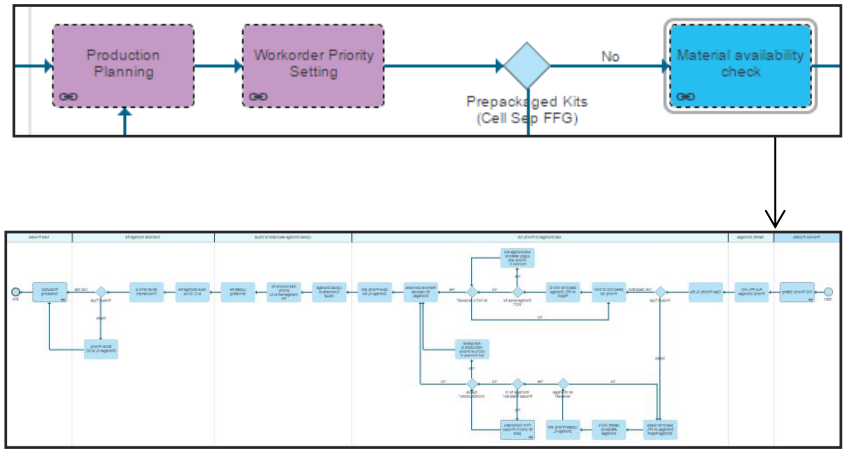
Priority Setting

Scope: Identify and set production priorities

Output: Active workorders prioritized, priorities and release dates entered in the system

- Materials – No movement
- Information – Inventory position, manufacturing leadtimes, active workorders & demand
- Activities – Compile information from a variety of sources, perform analysis, evaluate and assign priority for open orders based on inventory position and demand.

Planning before DDMRP



Material Availability Check

Scope: Verify material availability, expedite as required

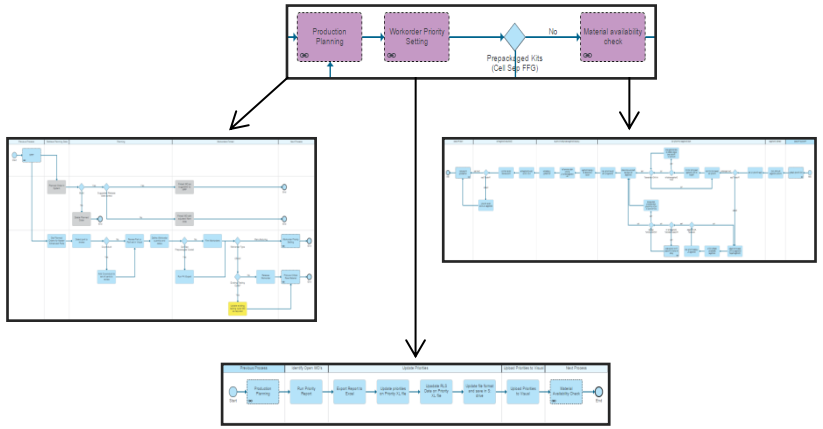
Output: Material availability check performed for active workorders, plan adjusted as needed – date and quantity, expediting plan prepared for shortage review meeting

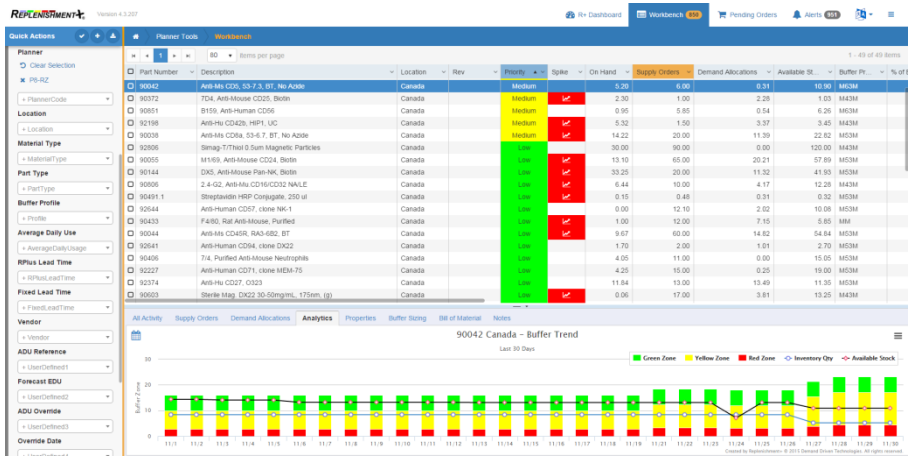
- Materials – No movement
- Information – Active workorders, release date, material requirements, inventory position by lot
- Activities – Confirm material availability for prioritized workorders

Why did we choose DDMRP as a solution?

- DDMRP and the R+ software solution simplify the planning, priority setting and material availability check processes
- DDMRP allows us to build robust metrics on the performance of the planning process and its execution
- Strategic inventory planning and metrics combine to support the optimization of inventory
- Ability to manage inventory to a demand driven target

DDMRP a better fit for our planning goals

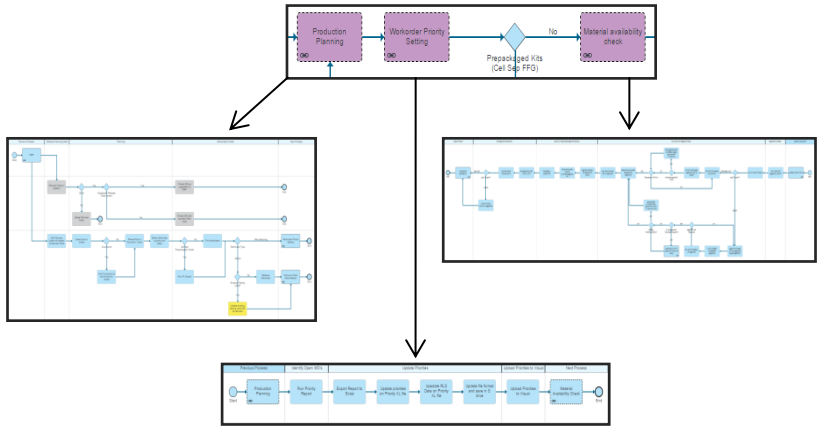


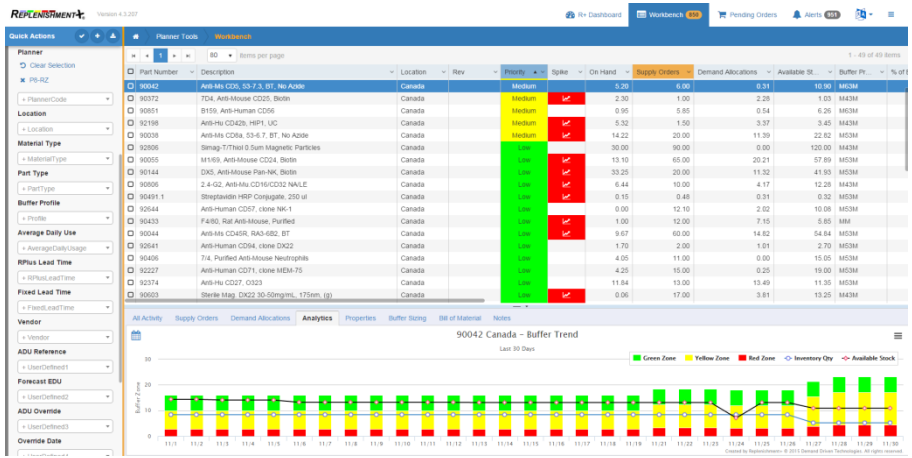


System Comparison

- DDMRP was well aligned with the objectives of our planning processes
- Eliminates manual work to achieve our desired output from the planning process
- The DDMRP model provides simpler and more effective metrics
- System design creates opportunities for process automation

DDMRP a better fit for our planning goals

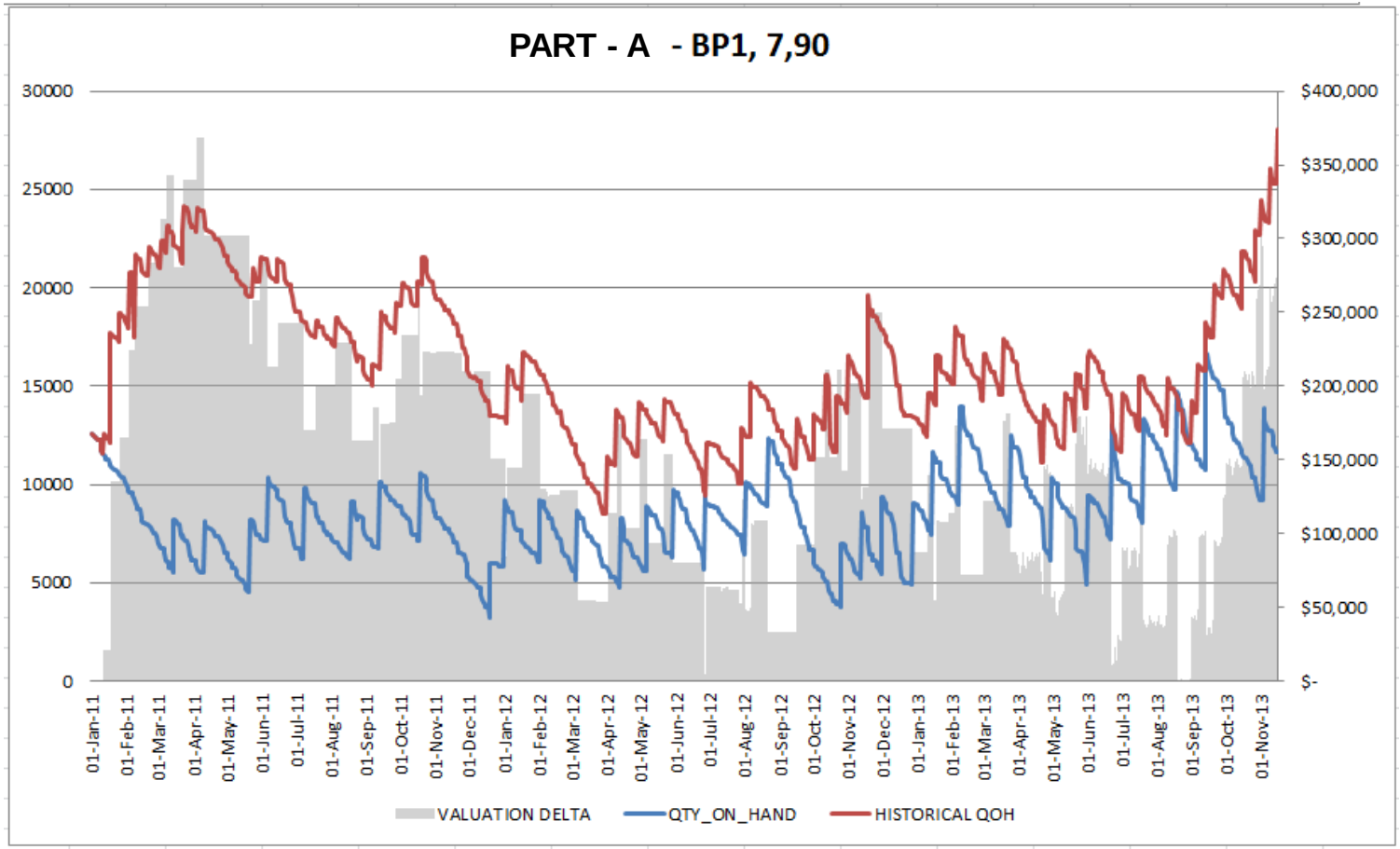




System Comparison

- Promising inventory level results from snapshot prepared by DDTECH
- Simulation based on historical data run by STEMCELL to validate buffer performance and service levels

Simulation sample - ADU vs. variability



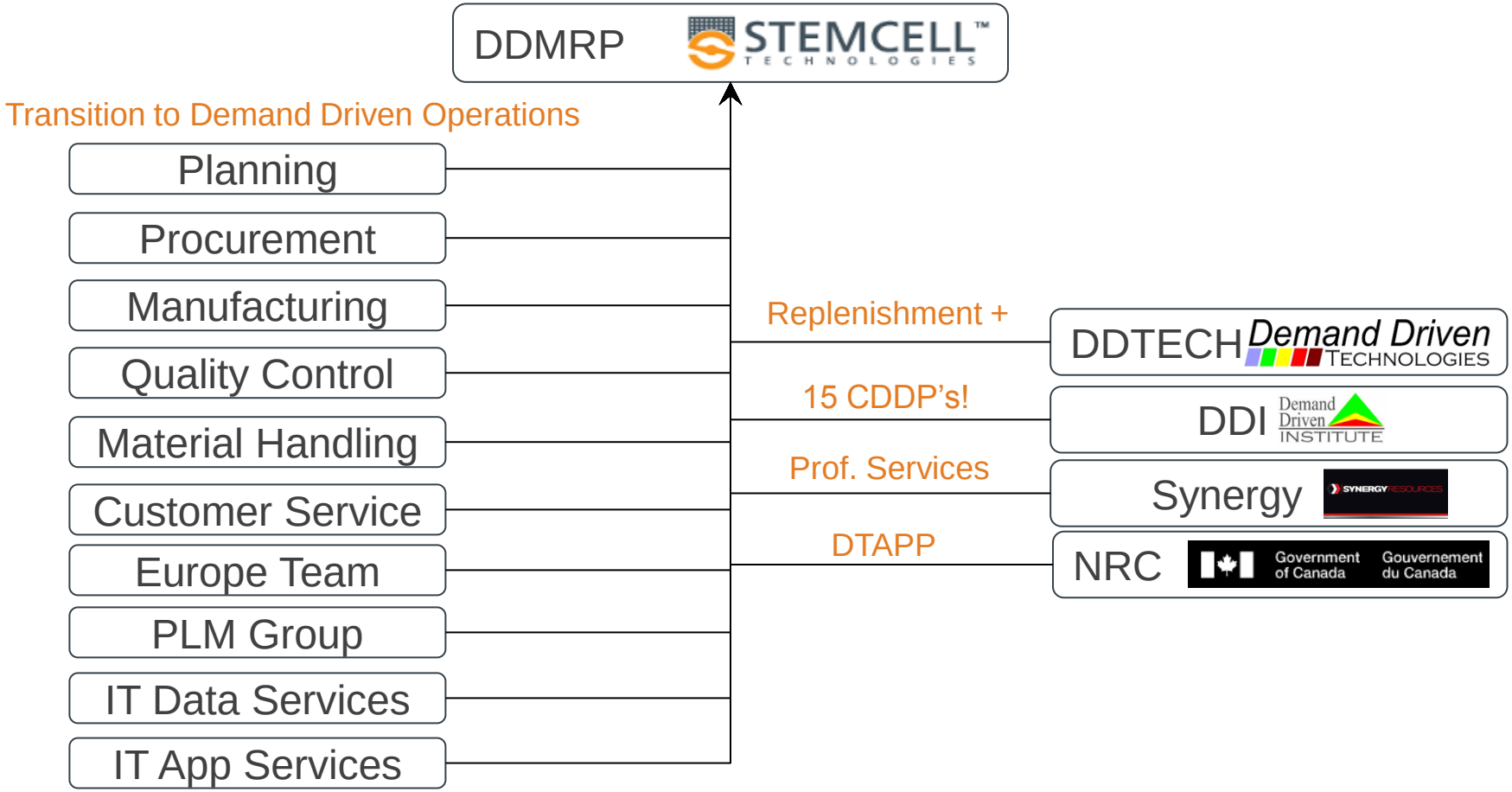
STEMCELL TECHNOLOGIES

Adopting DDMRP

Implementing DDMRP

- Partnered with Synergy Resources – Mike Lilly and Darryl Walker
- ERP consulting to complement process analysis and validate BOM designs
- Selected R+ as our planning software snapshot prepared by DDTECH

Implementation team



Conceptual design, implementation proposal

- 3 day workshop to develop DDMRP implementation plan – Mike Lilly & Paddy Ramaiyengar
- Developed and validated initial DDMRP system design
- Selected DDMRP Pilot parts
- Prepared implementation plan – identified dependencies for process updates, BOM redesign, training and system rollout
- Kick off!

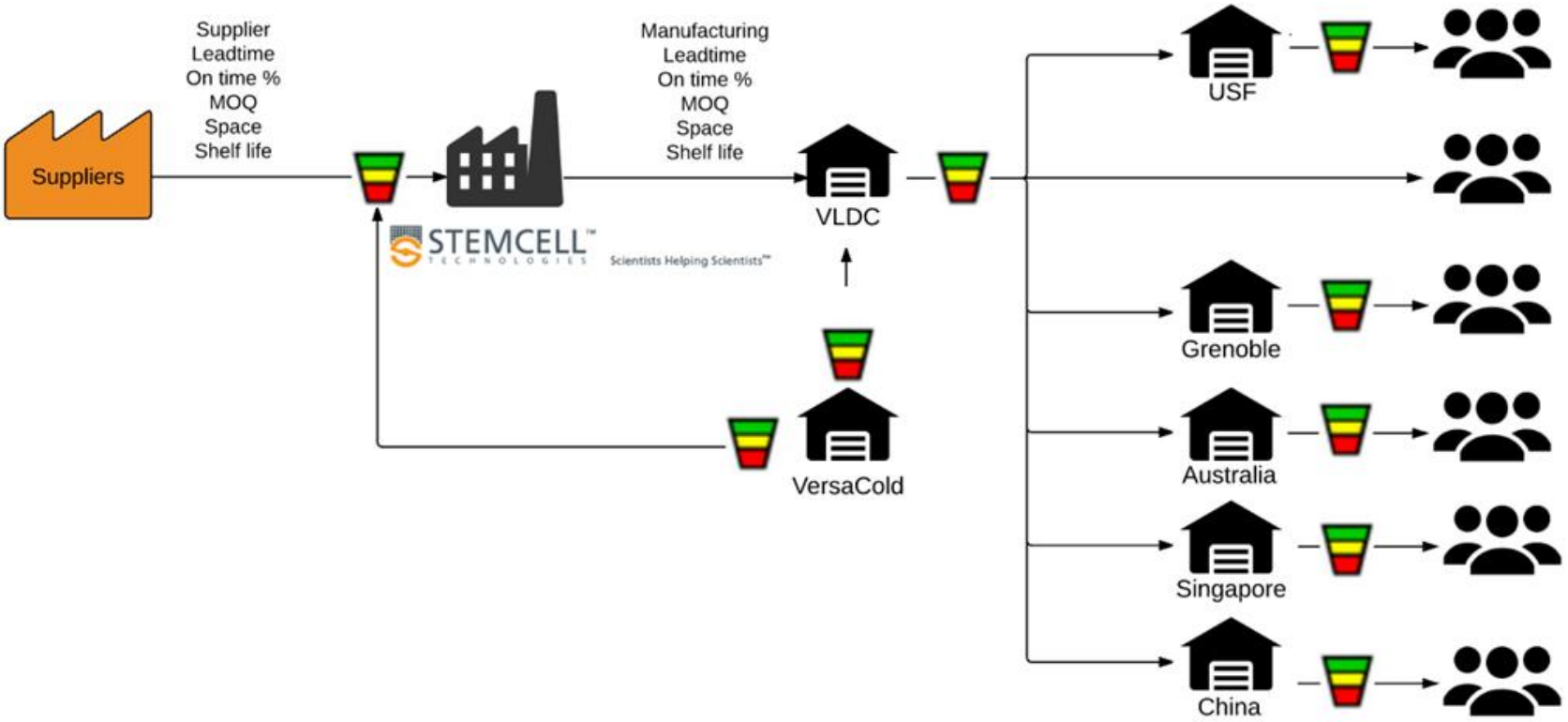
Setting the foundation & going live

- Update BOM configurations to support strategic inventory positioning
- Capture complete demand and supply pipeline on ERP system – (some information for special cases on other systems)
- Certify Planning and Procurement teams – 15 CDDP’s
- Go-live Asia Pacific June 2014
- Go-live with select purchased parts August 2014 North America
- Go-live Europe September 2014

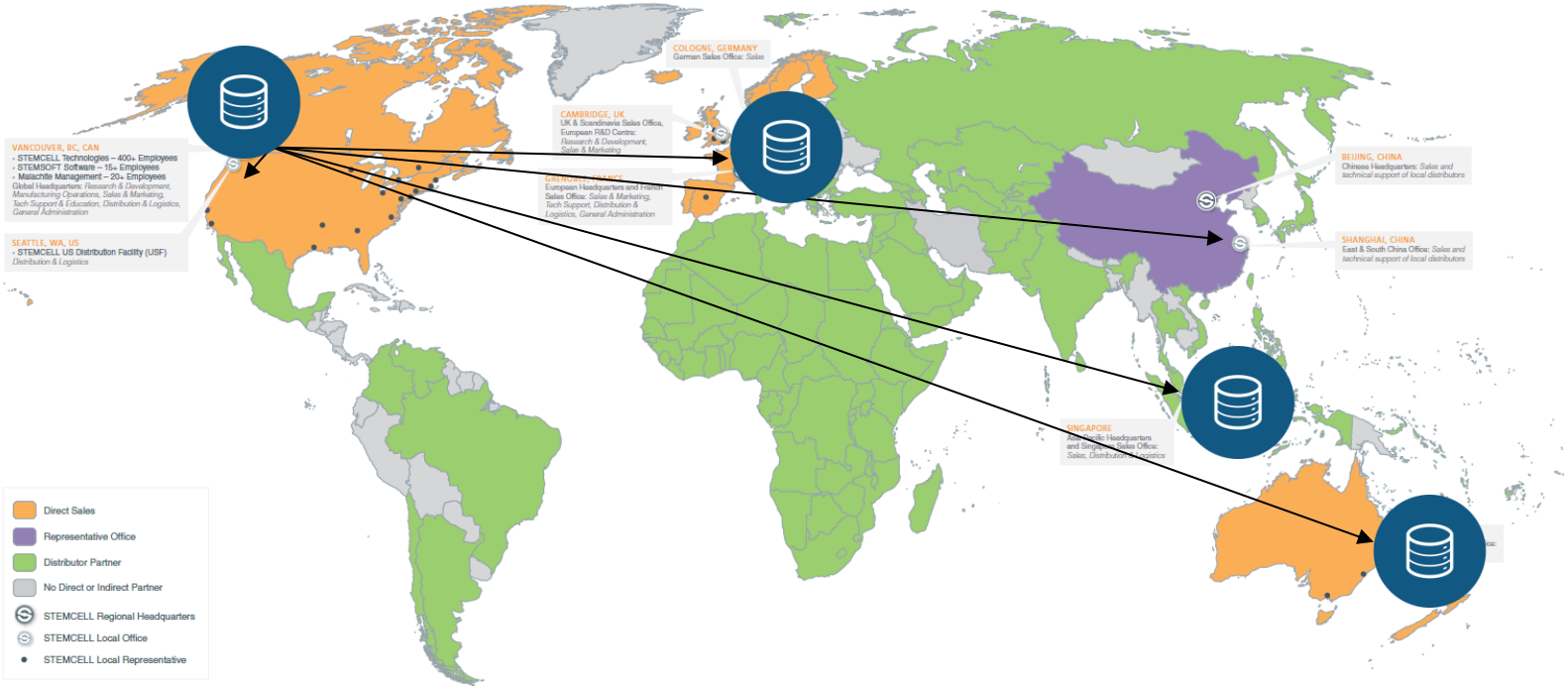
System Design Overview

- Distribution Network & System Architecture
- STEMCELL's Product implications & constraints
- Flow Map
  - Bill of Materials updates
  - Strategic Buffering
- Operating considerations – Visible and collaborative execution
- Data Quality and Metrics

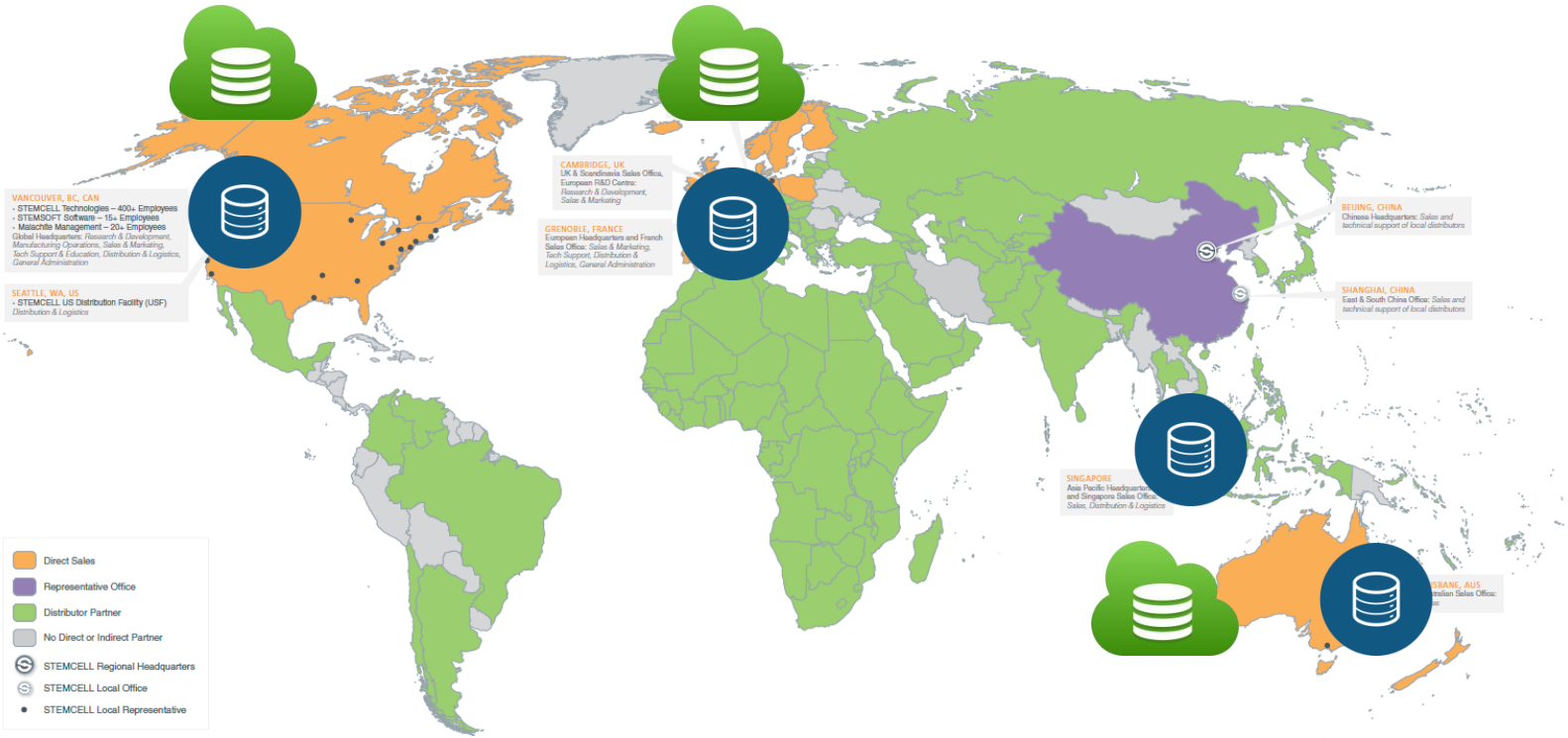
System Design – Distribution Network



Distribution Network – 4 ERP Instances



Multisite System Design & Integration



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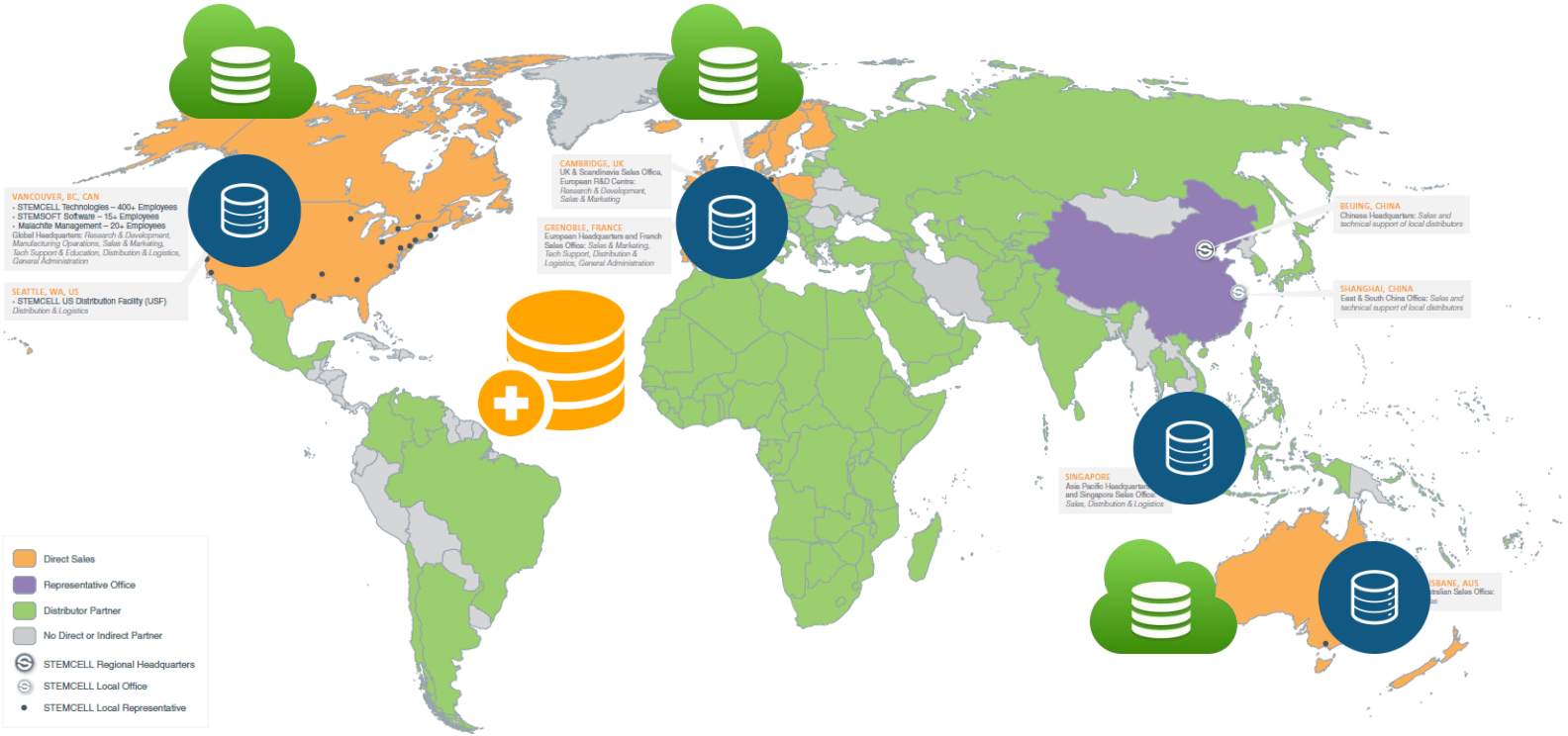

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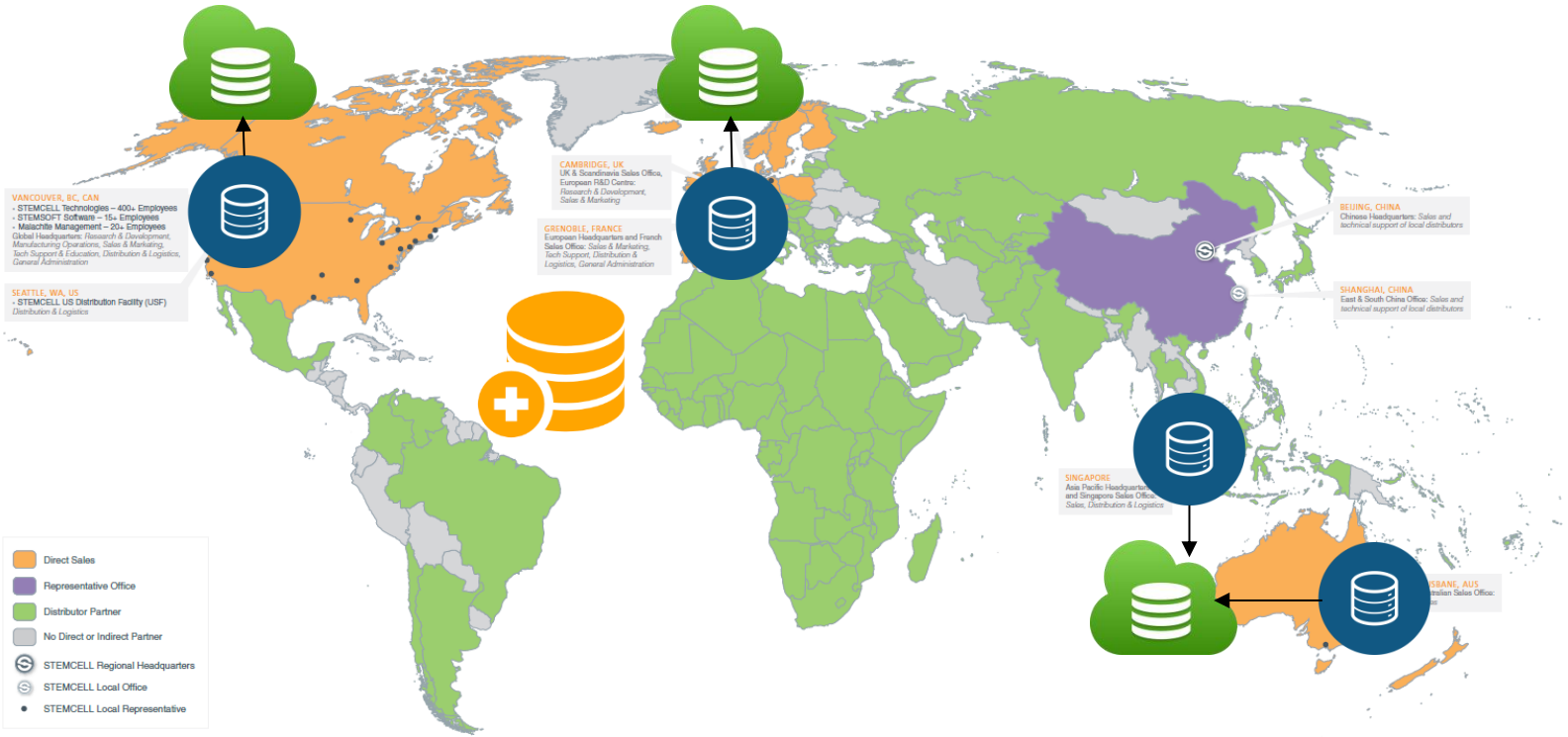

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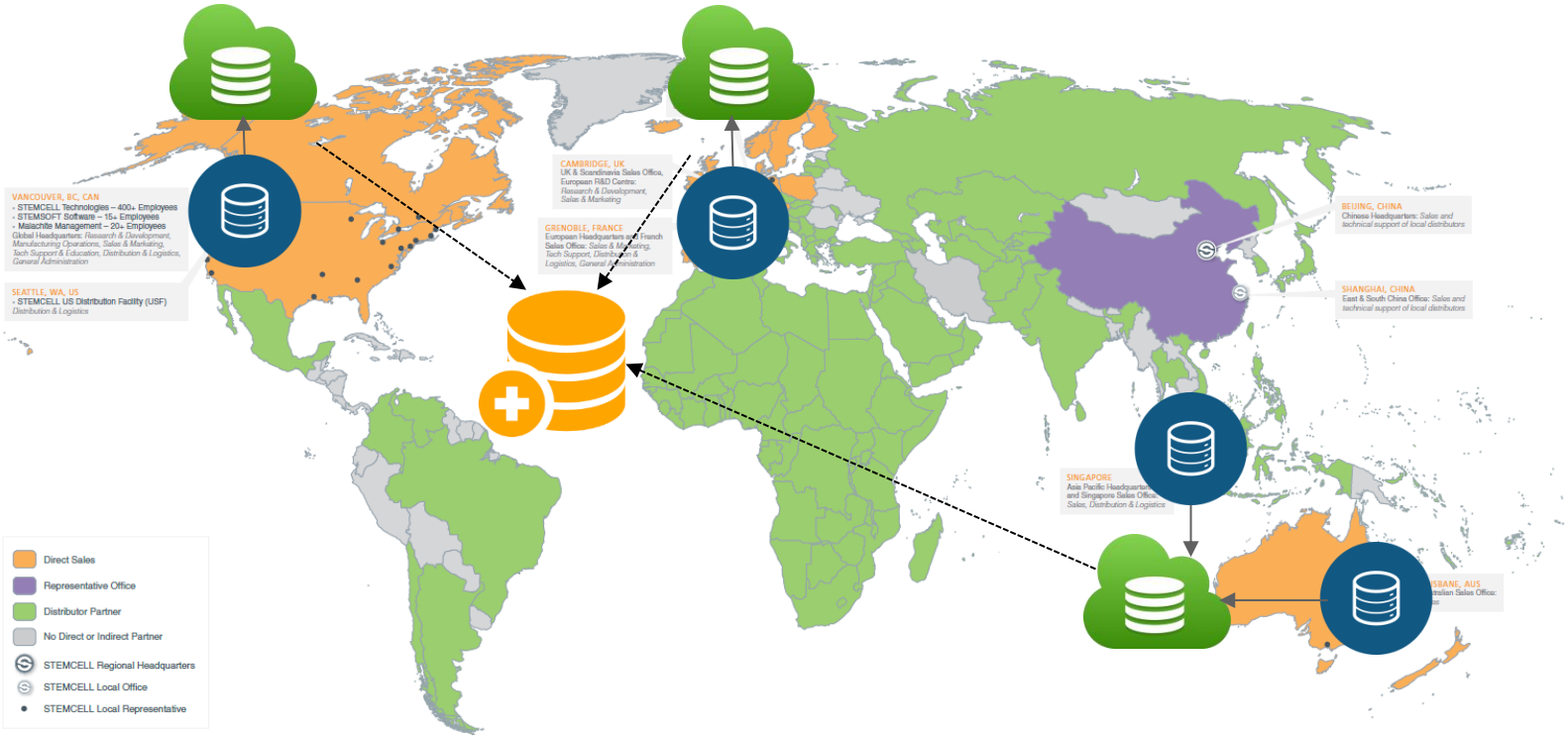

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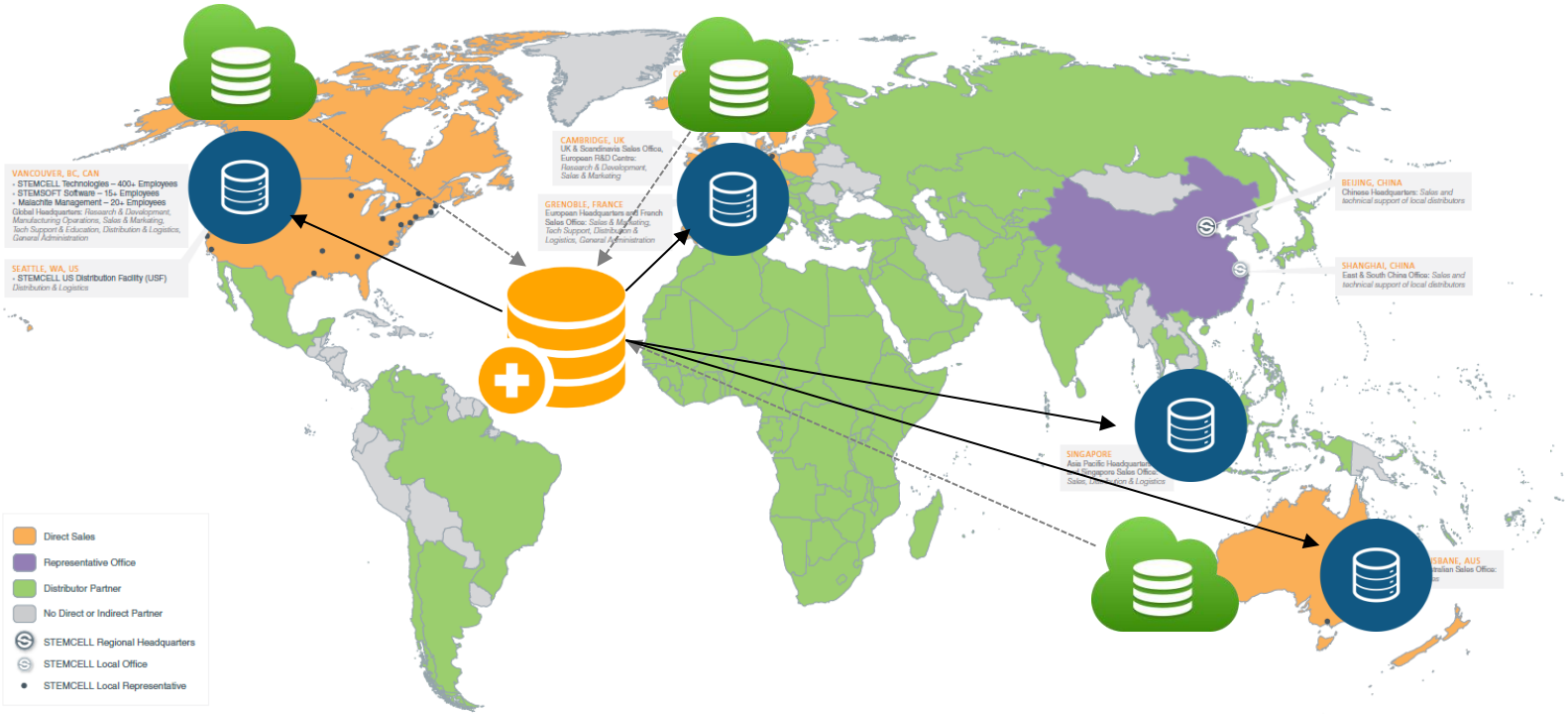
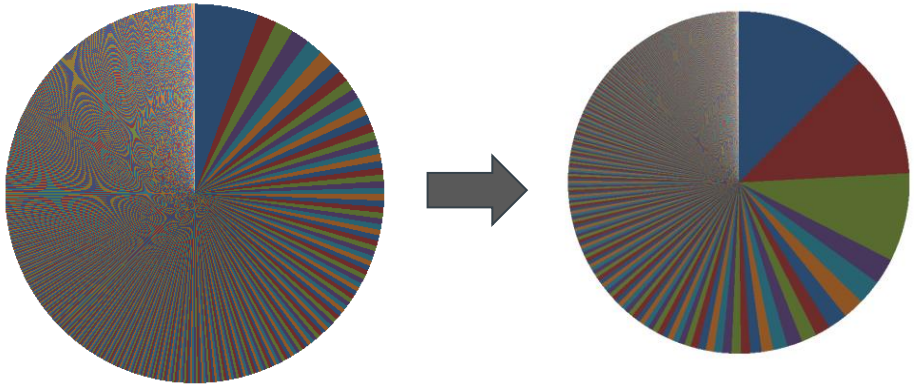


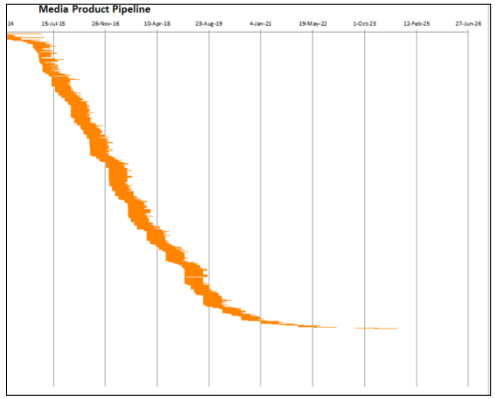
STEMCELL's Planning Considerations

STEMCELL's Planning Puzzle – Global, High Mix, Low Volume

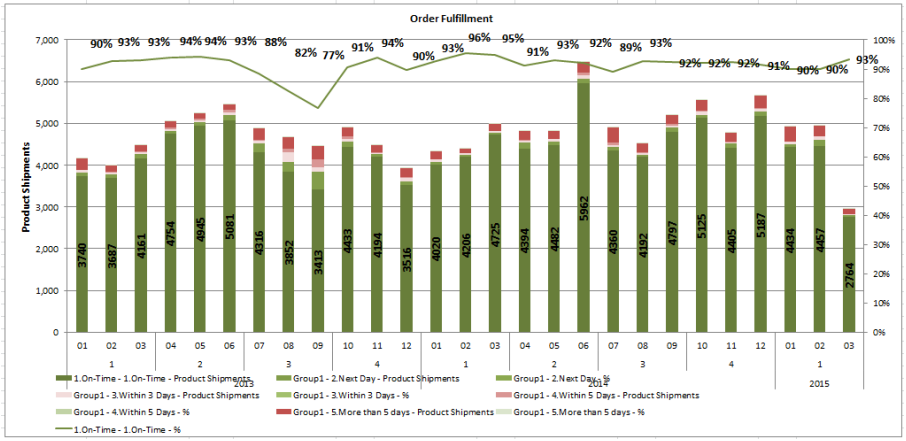


Inventory by product

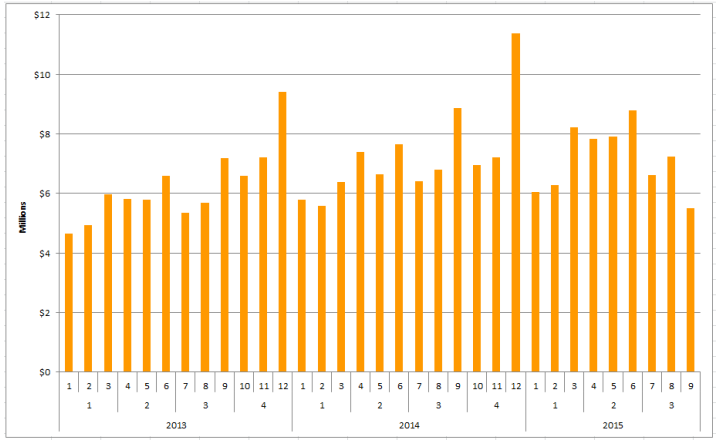
Sales by product



Planned Product Introductions 5 years



Off the shelf sales



Seasonality and growth

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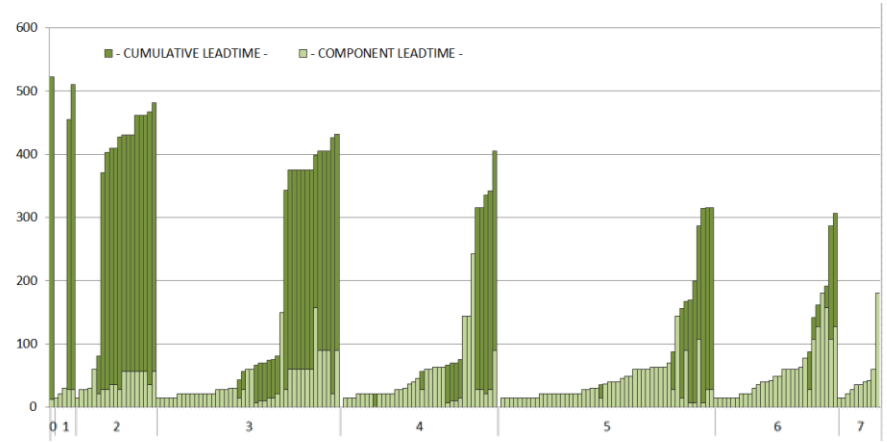
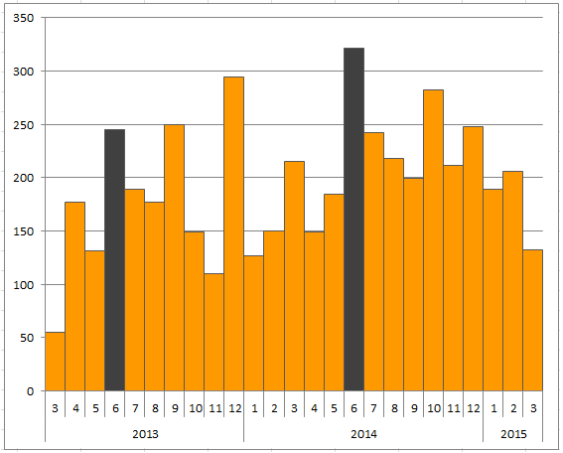
Deep Bills, Long lead times & growth

Cell Separation Cocktail – Bill of Material, LT & CLT



Changing Demand

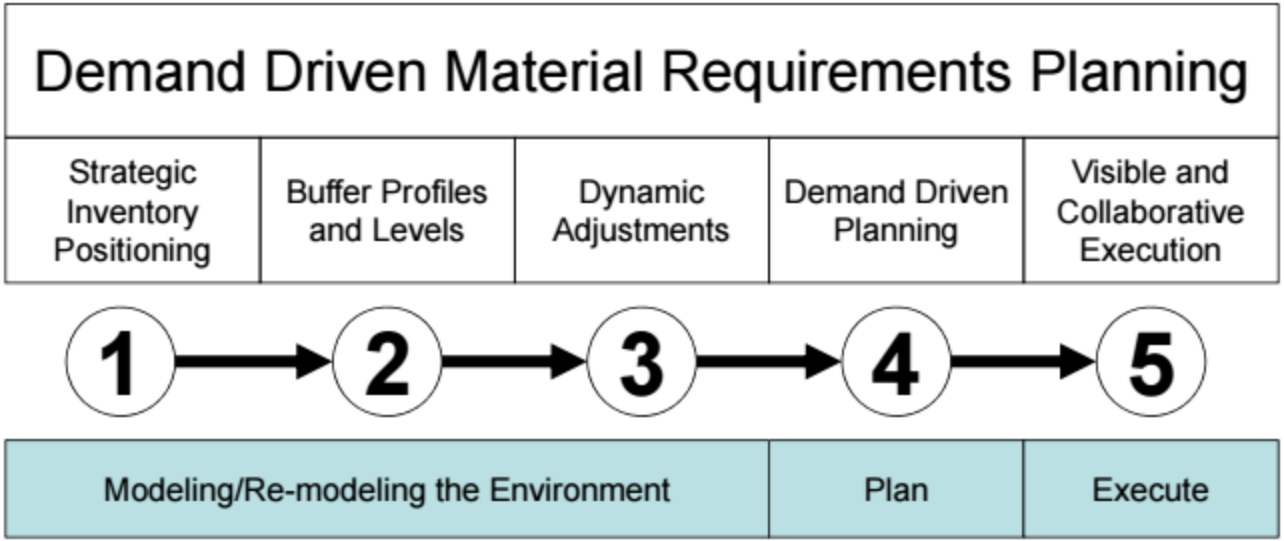


- 517 day cumulative leadtime, 300 days in prequalified base raw material, difficult to obtain, requires QC qualification - strategic part
- Supports multiple products within a family – 239 finished goods
- Growing sales and product lines require buying for growth
- Lot Consistency and Shelf life constraints – intermediates and their effect on FG

Manufacturing constraints - MOQ

- Sample based QC testing significant LT, capacity constraint – (i.e. 55 of 56 days)
- Dedicated equipment for some product lines – long setup vs run time – strategy is to size batches of low volume product to cover long periods and maintain equipment availability – minimum equipment batch size
- Inventory footprint is low
- Manufacturing variability – multiple possible uses for certain parts – use is test result based
- Shelf life synchronization considerations component lasts longer than parent, lot mixing constraints

Implementation process



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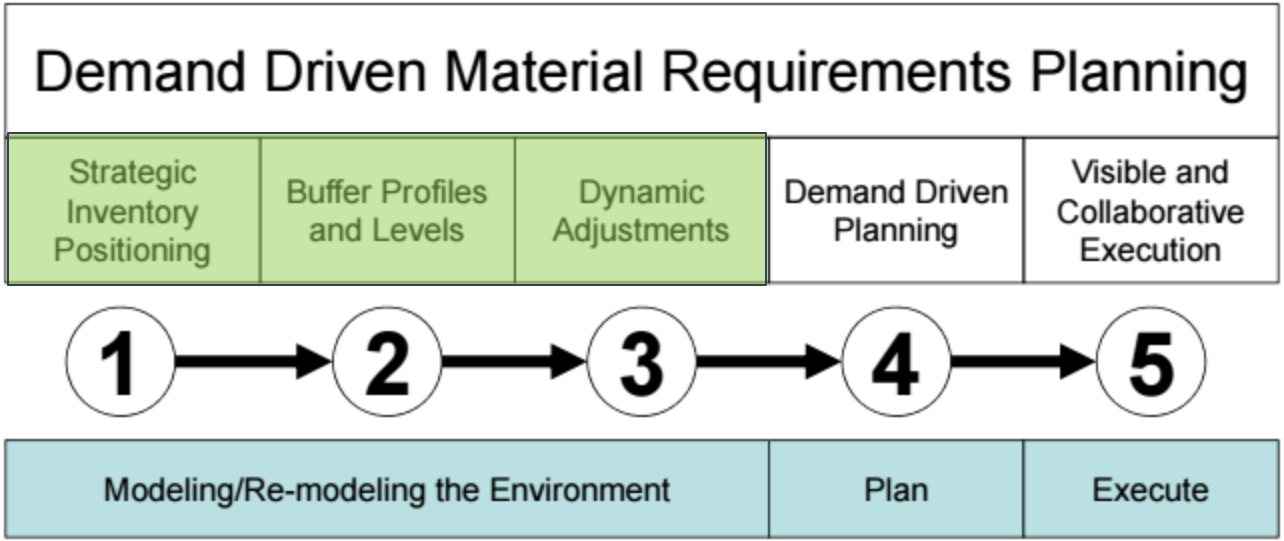
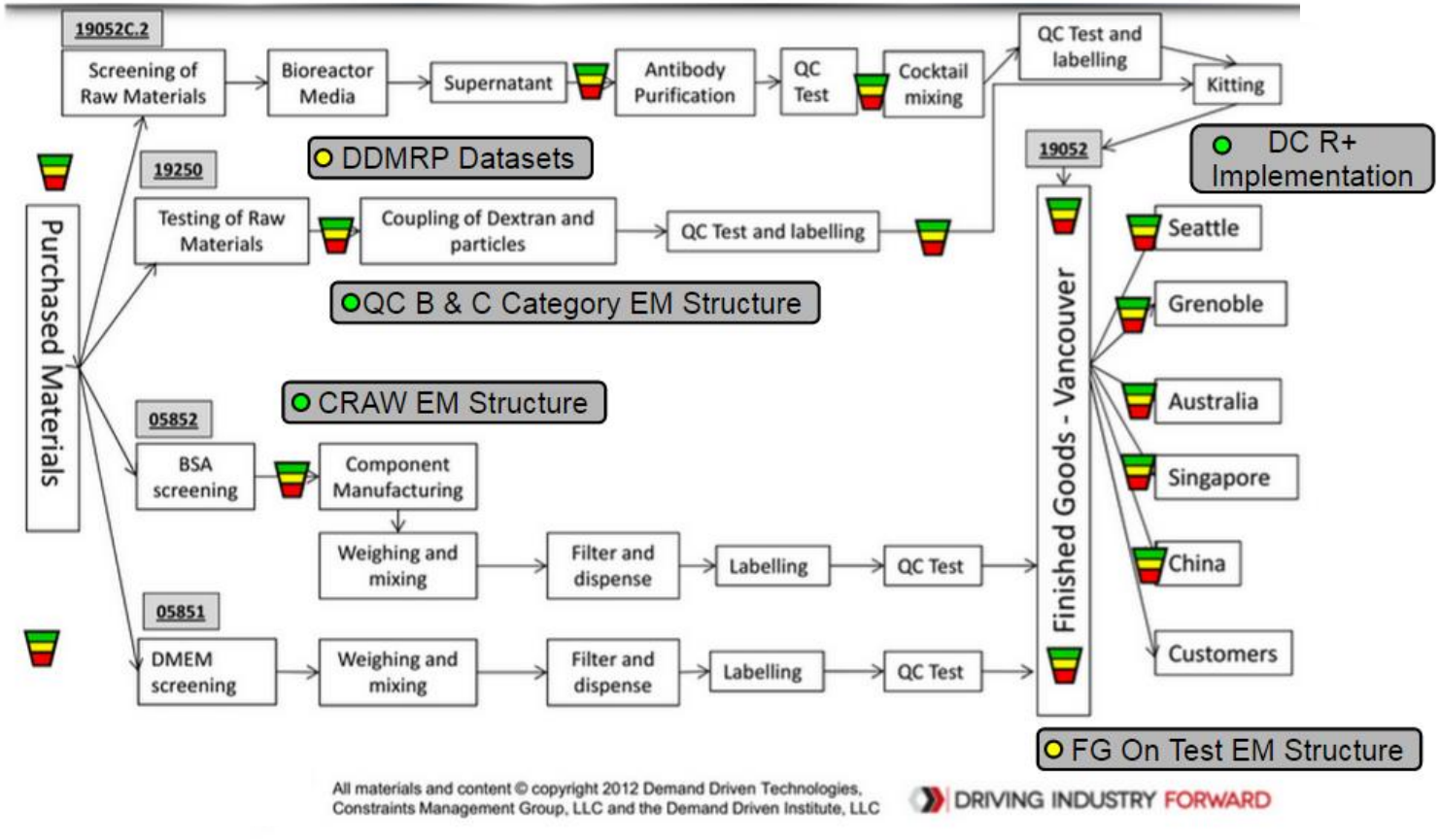


System Design – BOM Structure

Inventory Positioning

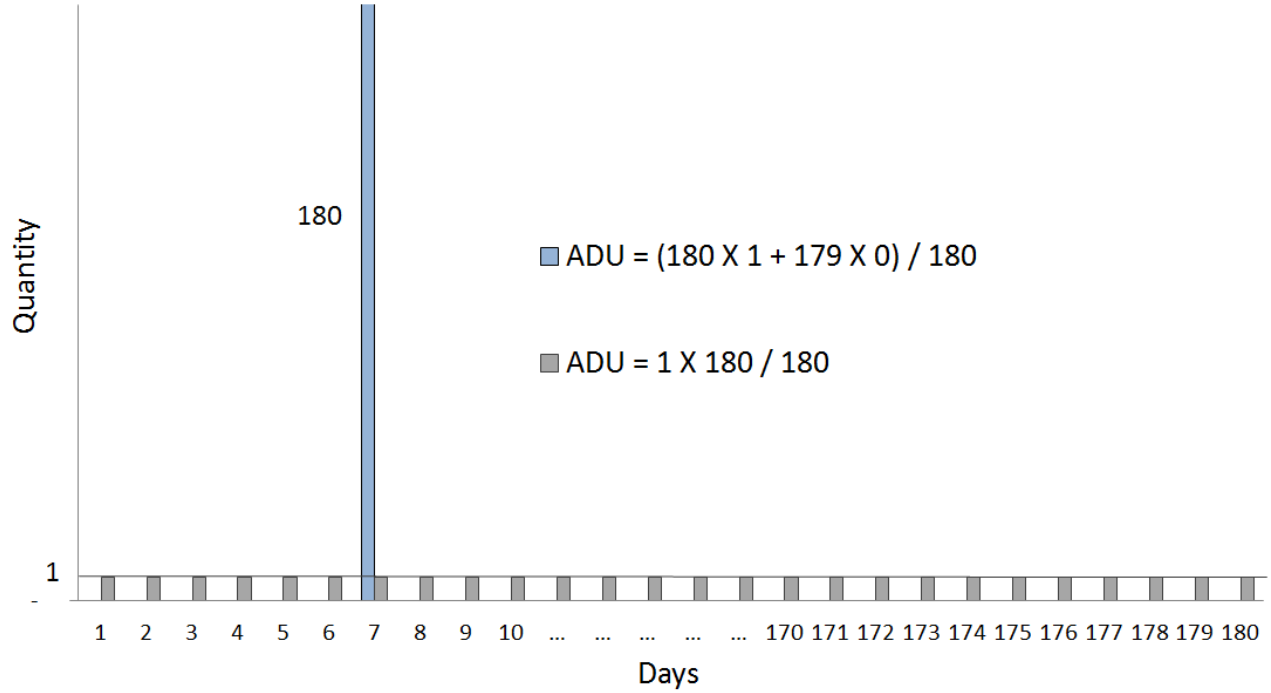
1 2 3 4 5



STEMCELL TECHNOLOGIES

Setting Buffer Profiles ADU / MOQ considerations

Metrics and Analytics – System Inputs
Qualifying ADU

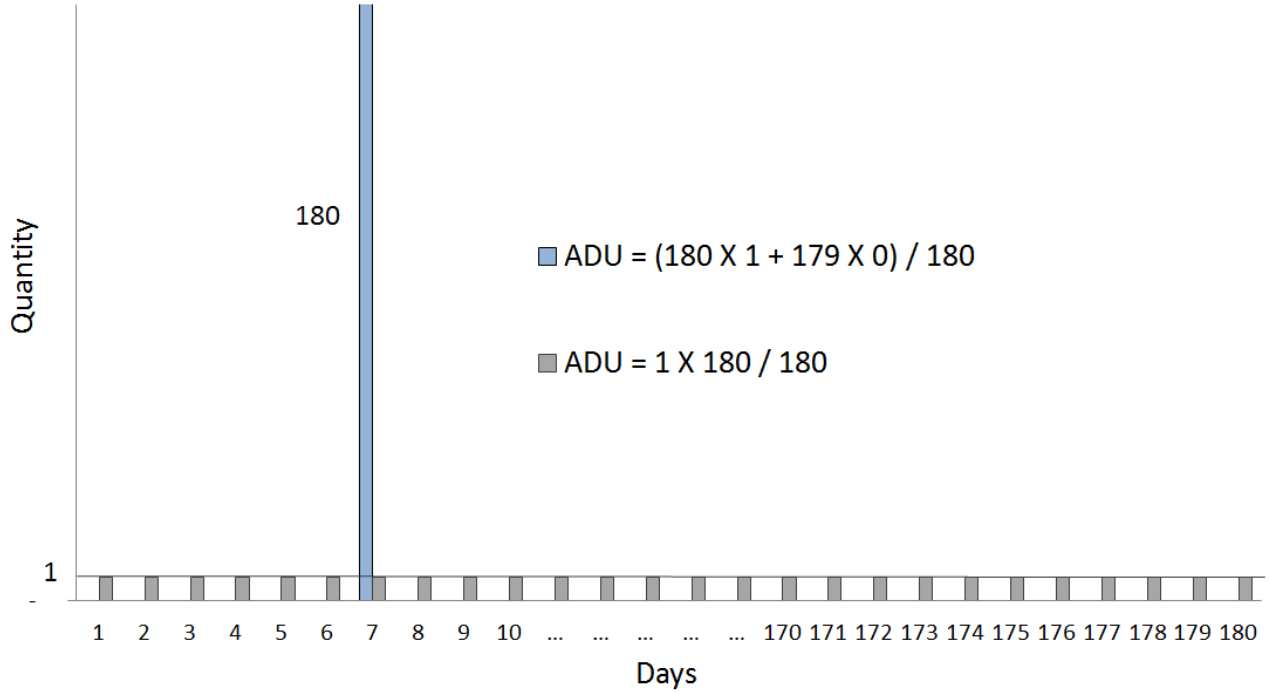


ADU

ADU = 1
ADU = 1

Demand patterns need to be considered, ADU does not always provide the complete picture.

Metrics and Analytics – System Inputs
Qualifying ADU



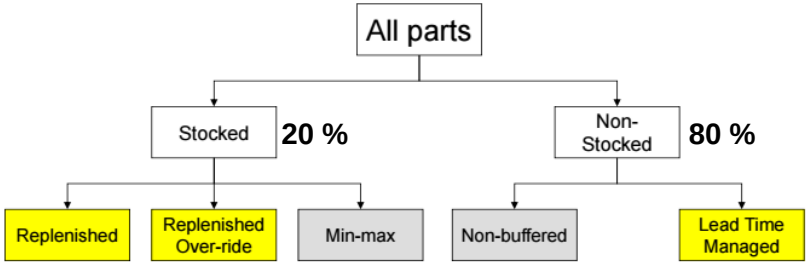
ADU

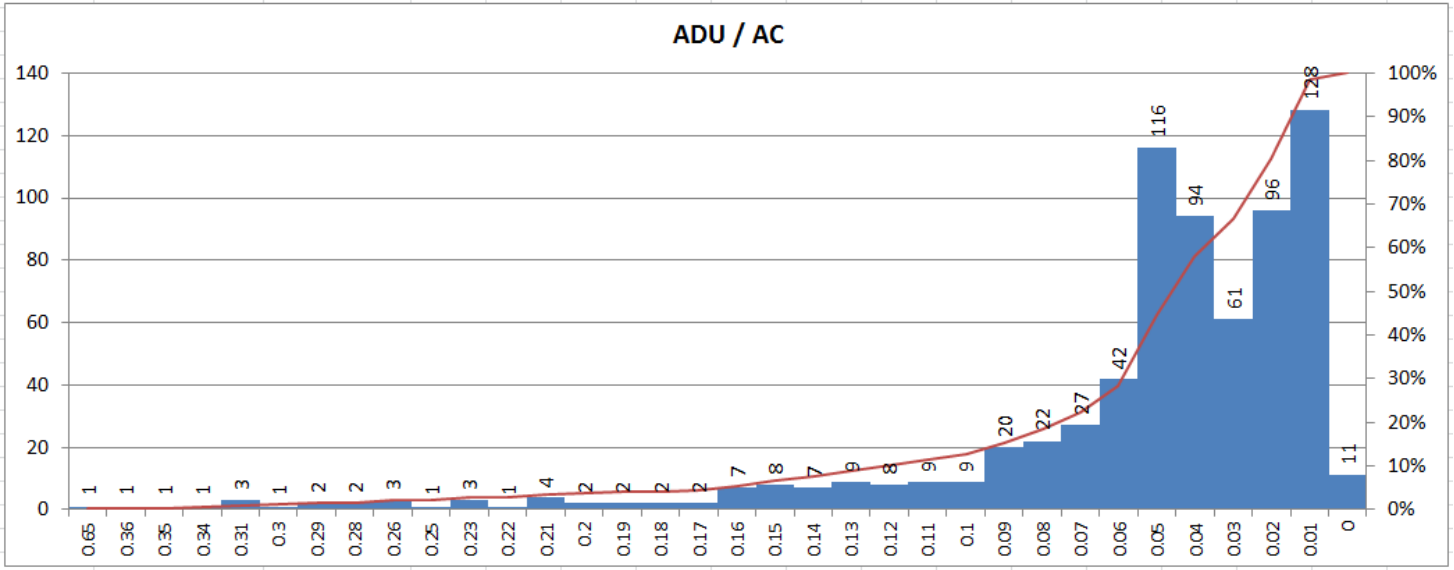
- ADU = 1
- ADU = 1

ADU/AC

- 1/180 = 0.005
- 1/1 = 1

Metrics and Analytics – System inputs, setting part types





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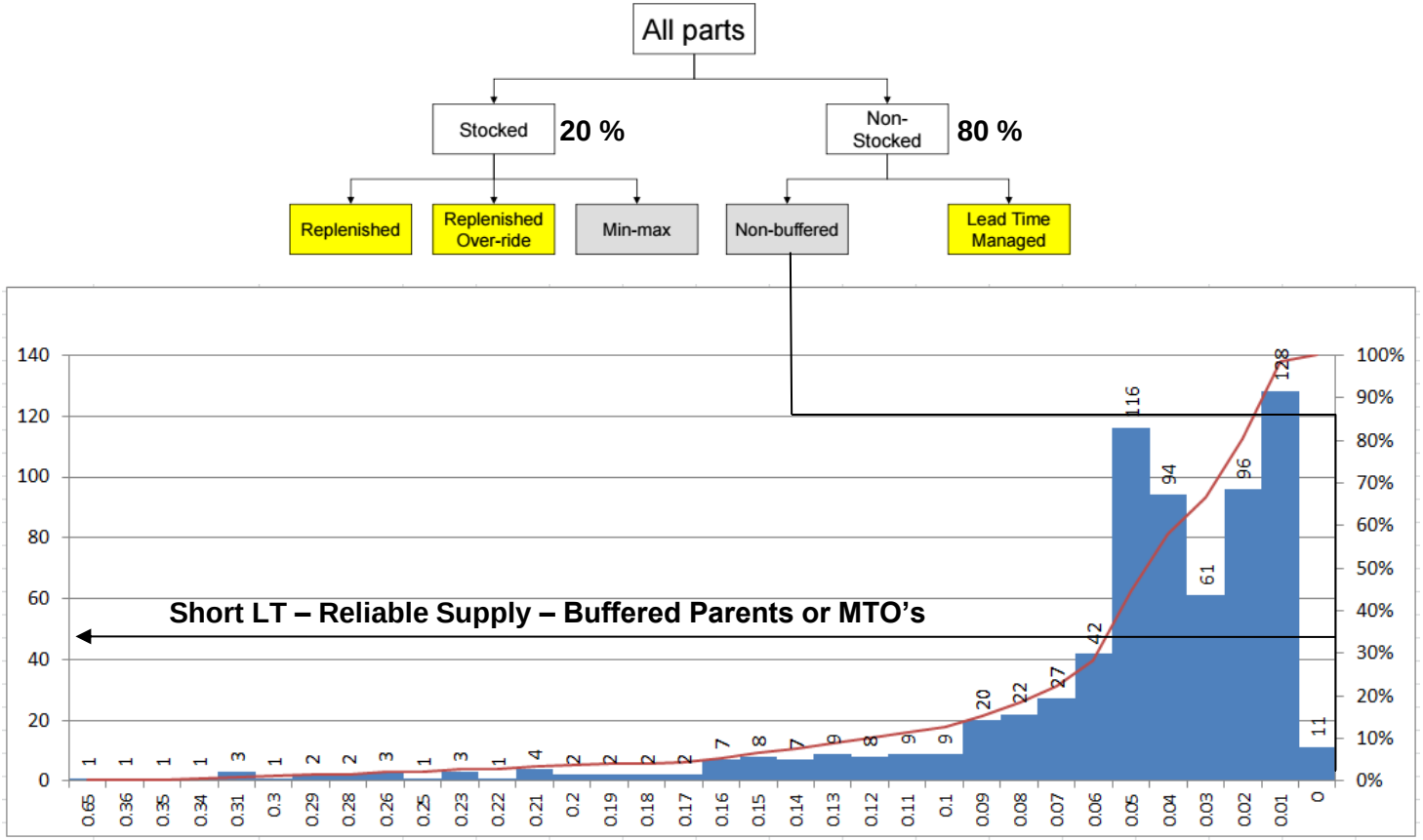

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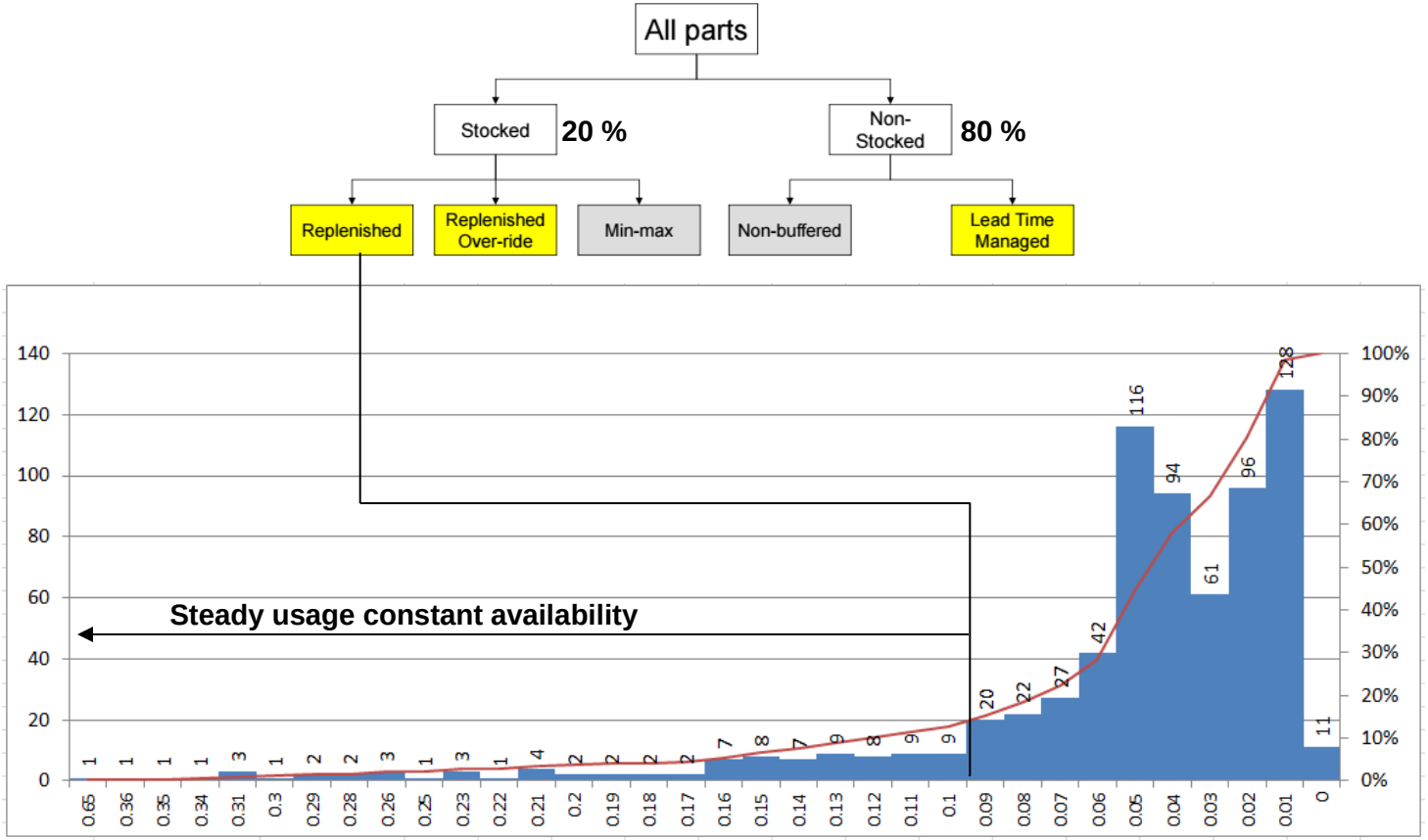
Metrics and Analytics – System inputs, setting part types



STEMCELL TECHNOLOGIES

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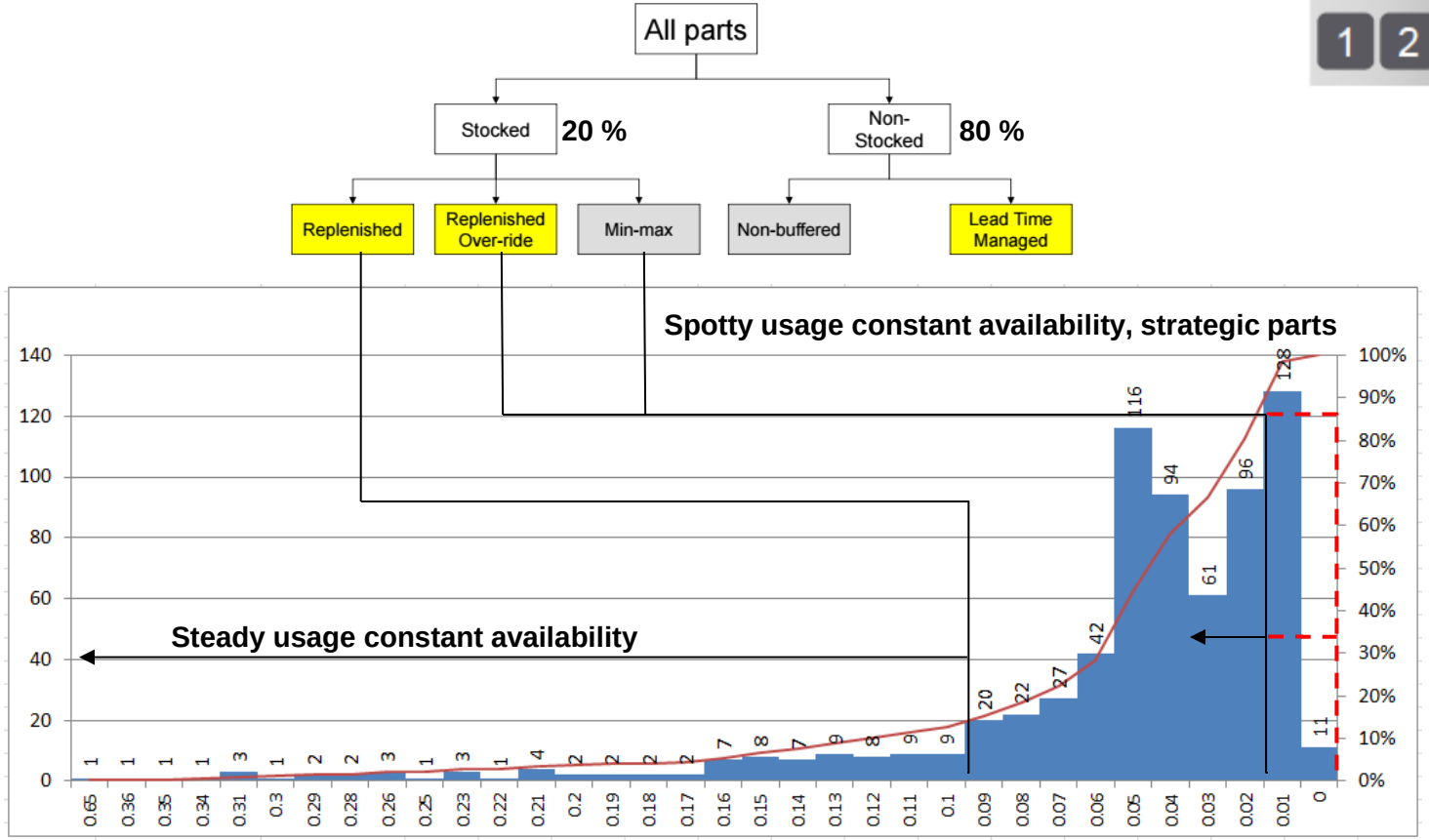

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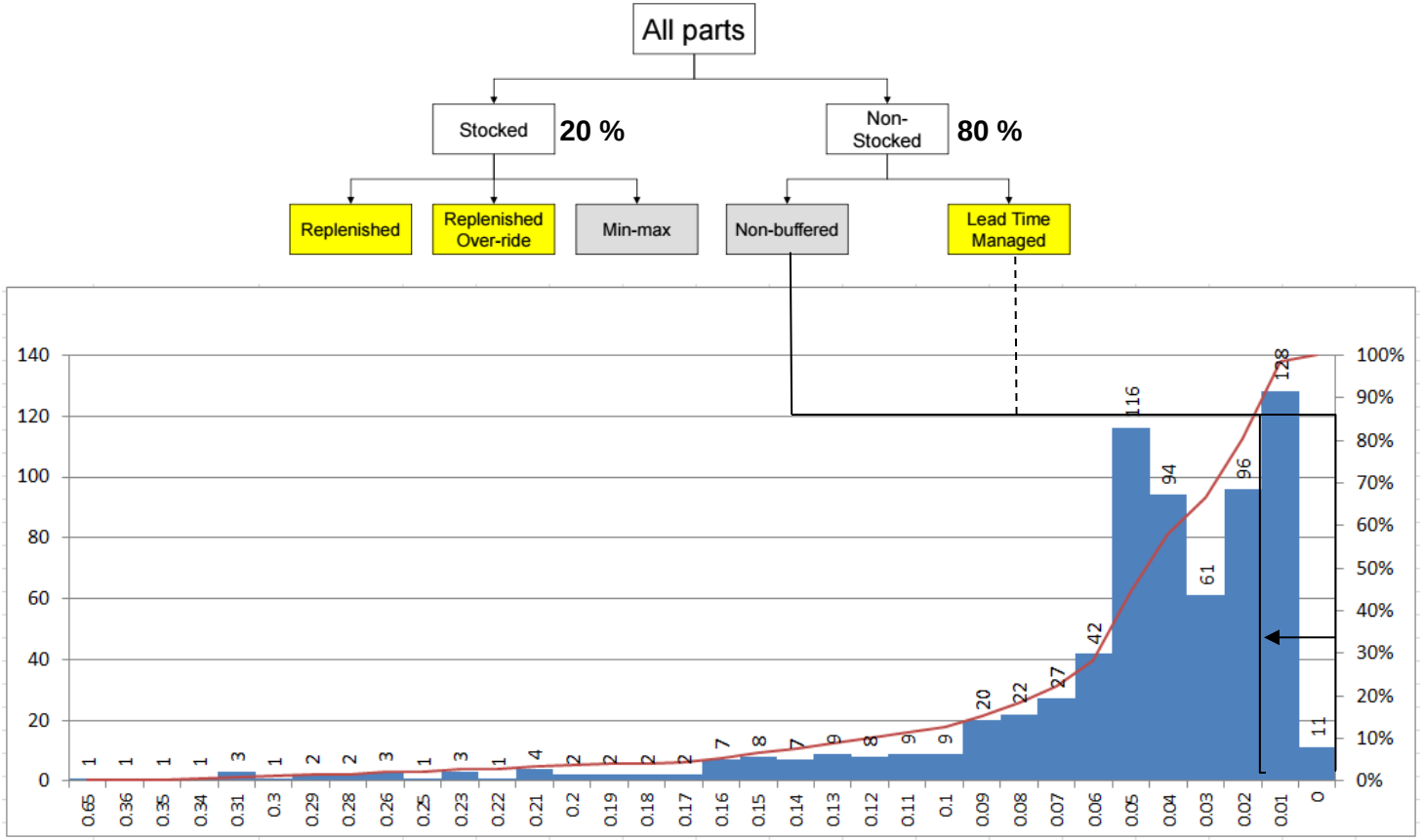
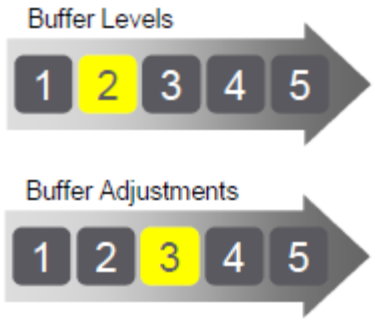


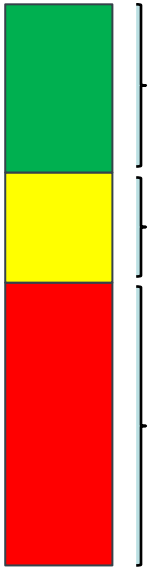
Configuring buffers to handle special cases



Significant number of parts with irregular consumption patterns are not a natural fit for replenishment buffers.

- Parts with sporadic usage and significant spikes
- Strategic supply, very significant MOQ's
- High mix low volume

Sporadic usage with significant spikes

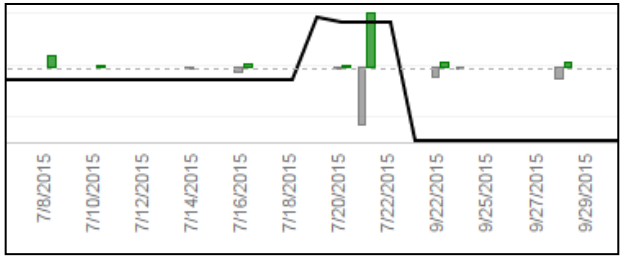


ADU X ASRLT X Factor or MOQ

ADU X ASRLT

Greater of:

- Maximum daily consumption rolling 180 days, historical
- Maximum Batch demand (Qty per parent batch), forward looking



Where Used - 90027

Work Order/Master	Seq #	Piece #	Quantity Per	Scrap %	Fixed Qty	Unit Of Measure
M 14236C-4	20	10	300.0000	0.000	0.00	ug
M 14236C-4/R01	20	10	300.0000	0.000	0.00	ug
M 14236C-4/R03	20	10	300.0000	0.000	0.00	ug
M 19015C.1-23	10	10	30.0000	0.000	0.00	ug
M 19015C.1-19/R01	10	10	30.0000	0.000	0.00	ug
M 19015C.1-23/R02	10	10	30.0000	0.000	0.00	ug
M 19055C.1-23	10	10	30.0000	0.000	0.00	ug
M 19055C.1-23/R01	10	10	30.0000	0.000	0.00	ug
M 19055C.1-23/R02	10	10	30.0000	0.000	0.00	ug
M 19515C-49	10	10	5.0000	0.000	0.00	ug
M 19515C-49/R01	10	10	5.0000	0.000	0.00	ug
M 19555C-16	10	10	5.0000	0.000	0.00	ug
M 19555C-16/R01	10	10	5.0000	0.000	0.00	ug

Method – RO buffer dynamically calculated by ERP Middleware and loaded into R+

Standing orders

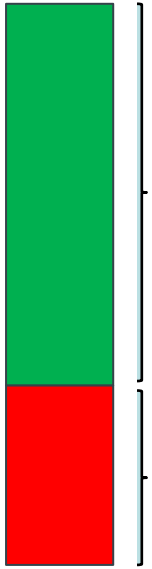
Order Cycle or ADU X LT X Factor

ADU X LT

ADU X LT - Factor

Usage Location

Standard buffer, demand driven replenishment
Draw supply from Standing Order Buffer



Contract amount – Red Zone

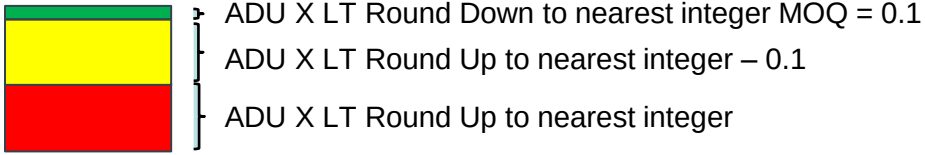
Units needed to cover contract negotiation time + Safety

Vendor Location

Min Max Buffer represents Standing Order – i.e. Annual Contract
Quantity on Hand always zero
Available Stock at Min triggers renewal of standing orders
Deliveries triggered by Demand Driven Buffer

Method – Buyer sets up vendor location and manages Min Max buffer

High mix low volume – Retail buffer*



This buffer is used to support new product introductions where we have a wide variety and an expectation of low initial demand with no knowledge of which products will grow rapidly.

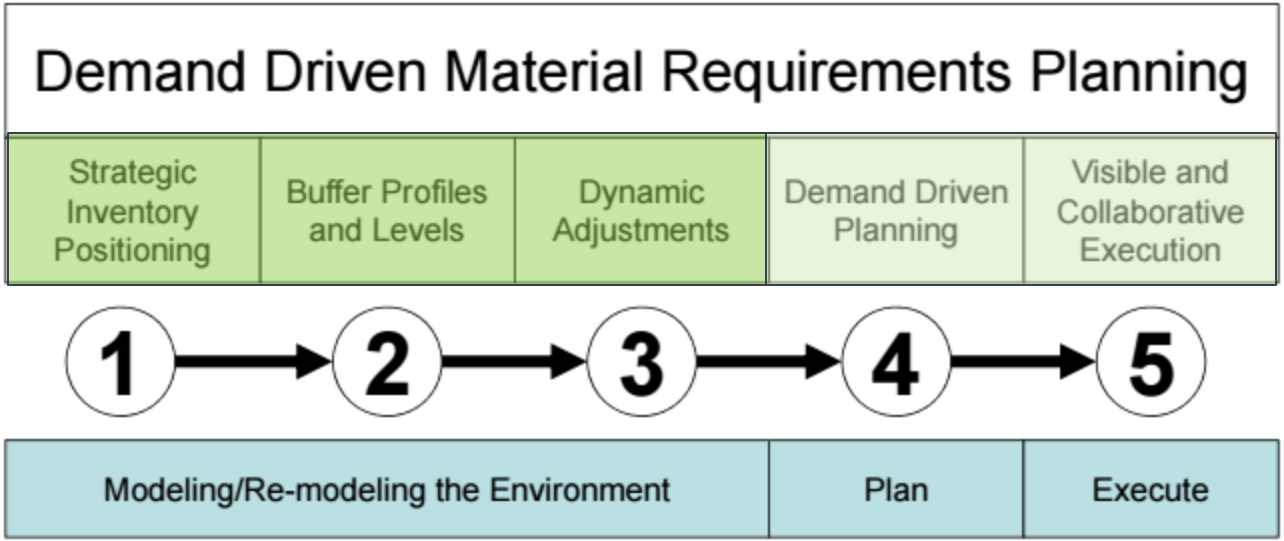
Buffer mimics Min Max set to 1 and 2 and grows with ADU

* Thanks to David Poveda for sharing this approach at Demand Driven World 2015

Supporting the transition

- Compare the new recommendations to the existing system
- Order comparison tools – MRP vs. R+ vs. historical inventory levels
- Forecast driven EDU – ADU validation for new products
- Simulation – make a change and test vs. historical demand
- Use metrics to monitor system performance and trends

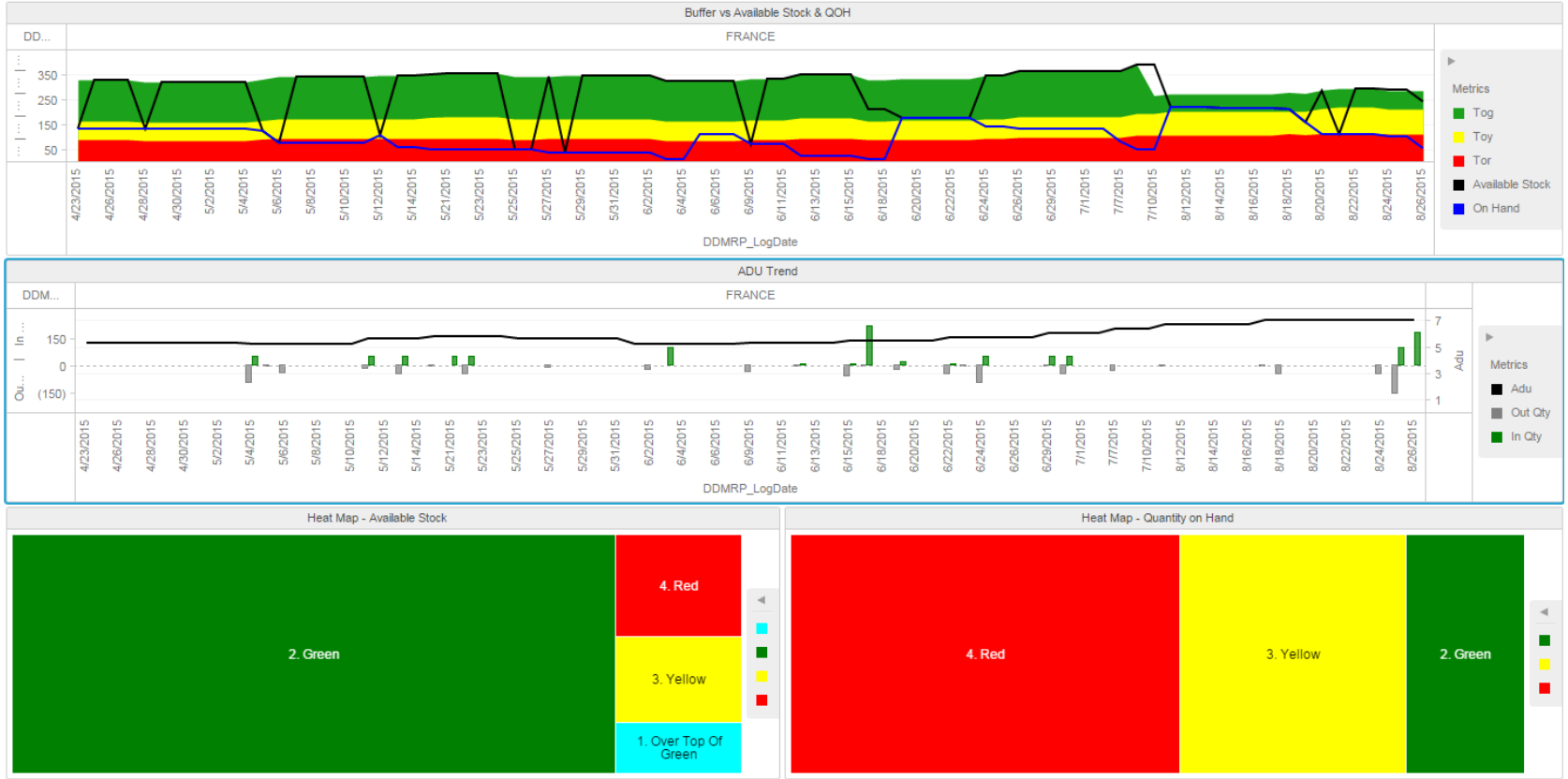
Monitoring System Performance



Metrics and Analytics – Available Stock and QOH

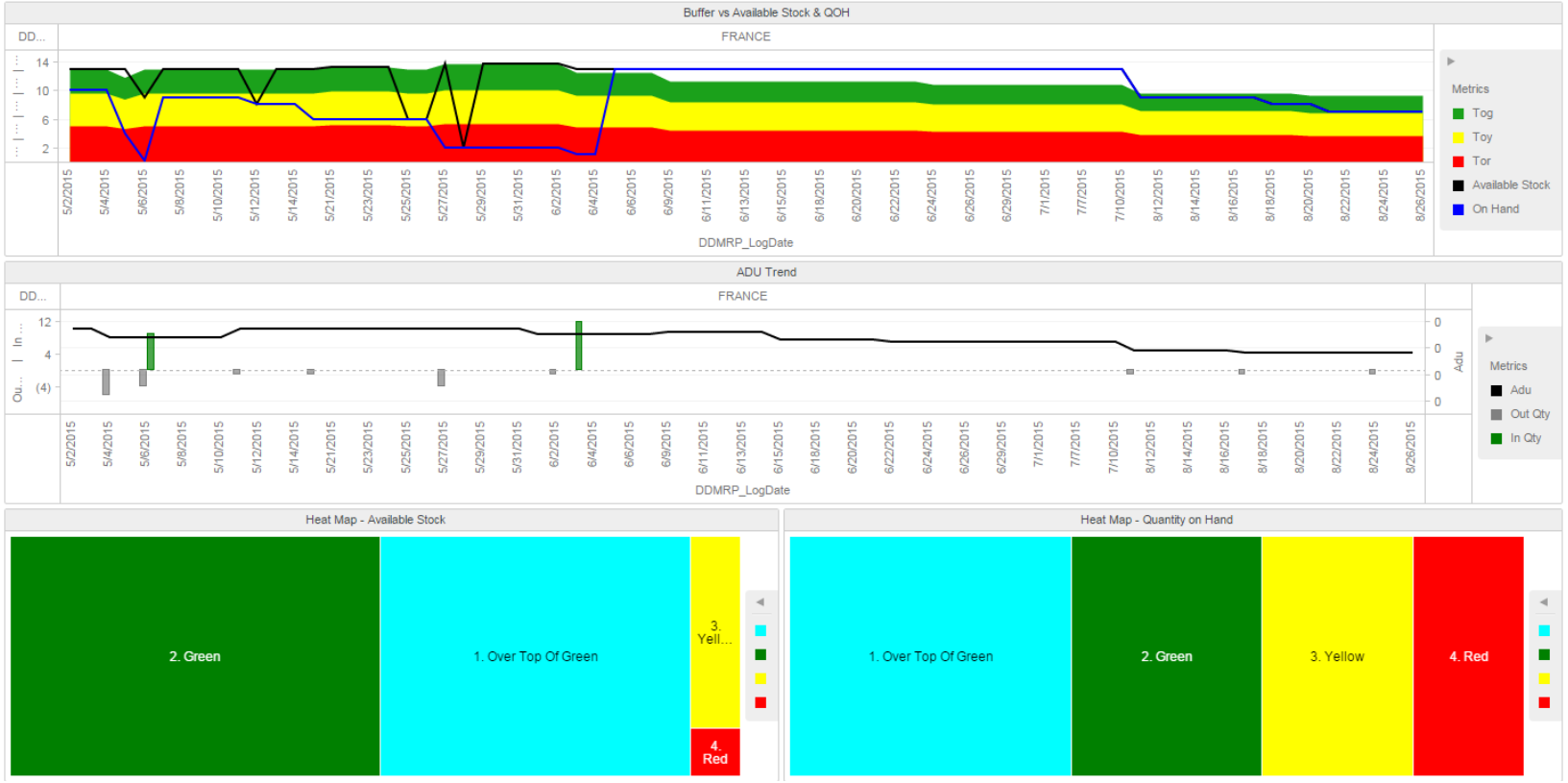
Part on Target

Metrics and Analytics – Available Stock and QOH



Part needs review – Frequent penetration into Red Zone, increase Red Zone

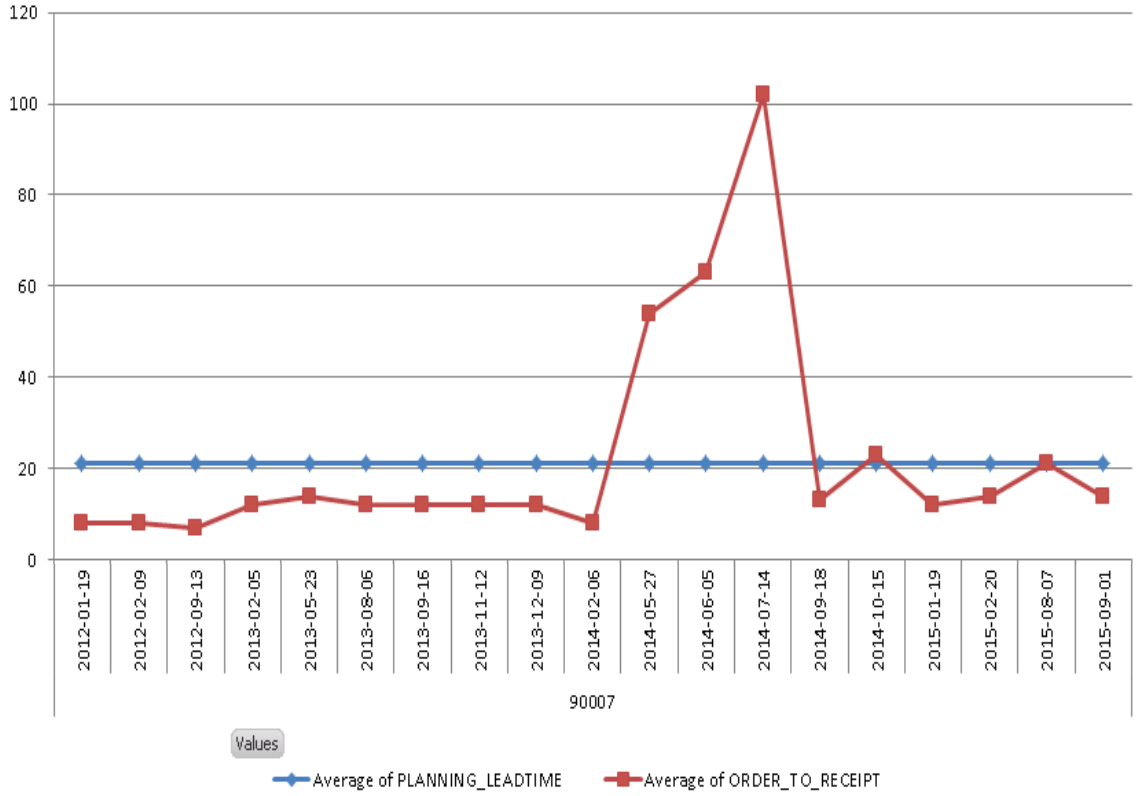
Metrics and Analytics – Available Stock and QOH



Part needs review – Available Stock on green or Over, frequent penetration into Red Zone, decreasing ADU

Measuring & Validating System Inputs

Leadtime, measure and validate



- Proactively verify leadtime accuracy before initial setting
- Set values to account for variability level
- Ongoing monitoring for changes

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ADU Exception report

DATESTEMP	PART ID	LOCATION	ADU	PRE ADU	Percent%
12/01/2015	00181	Canada	0.010	0.020	100.00%
12/01/2015	00235	USA	0.050	0.040	20.00%
12/01/2015	00299E-DI	FRANCE	0.050	0.040	20.00%
12/01/2015	01300	FRANCE	0.010	0.000	100.00%
12/01/2015	01350	FRANCE	0.020	0.010	50.00%
12/01/2015	01630	FRANCE	0.380	0.240	36.84%
12/01/2015	02646	Canada	0.010	0.000	100.00%
12/01/2015	04045	FRANCE	0.010	0.000	100.00%
12/01/2015	04045	USA	0.030	0.020	33.33%
12/01/2015	04236	Singapore	0.070	0.020	71.43%
12/01/2015	04434	AUSTRALIA	0.080	0.100	25.00%
12/01/2015	05112	Canada	4.320	5.340	23.61%
12/01/2015	05113	Canada	2.980	4.010	34.56%
12/01/2015	05120	USA	0.020	0.010	50.00%
12/01/2015	05121	USA	0.020	0.010	50.00%
12/01/2015	05122	USA	0.020	0.010	50.00%
12/01/2015	05123	USA	0.020	0.010	50.00%

- Monitor ADU changes
- Update buffer settings as required
- Adjust horizon
- Use PAF’s or ADU override

Key implementation factors at STEMCELL

- Secure executive sponsorship by demonstrating value – Simulation with your data helps

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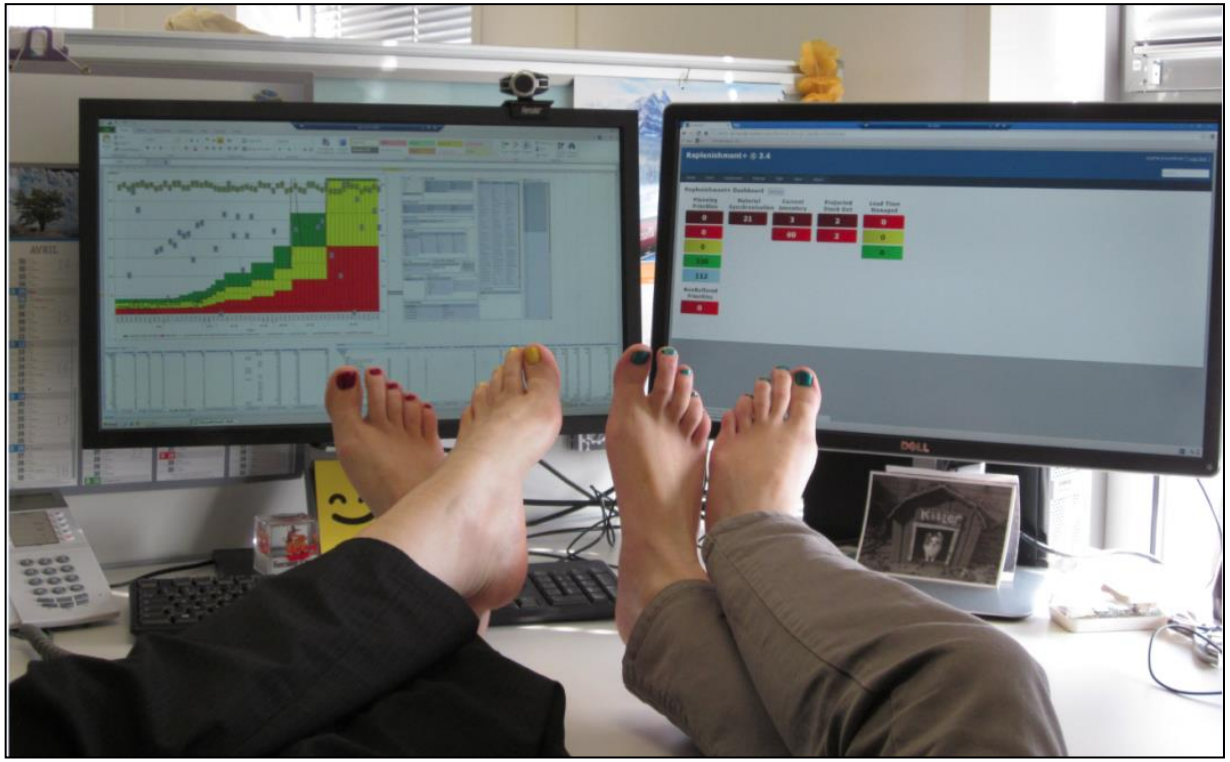
- Plan the integration of the planning system into all related processes

Don’t forget to celebrate Make it FUN!



Greetings from the Vancouver CDDP team

STEMCELL TECHNOLOGIES

Questions & Discussion