‘Making the Difference.’ LEMAC

Jeff Watson

Jeff Watson

- Chartered Engineer, currently Managing Director at Growthquest Ltd
- Previous roles include Operations Director, Head of Performance Improvement.
- Worked with Network Rail, the BBC and currently the NHS implementing change programs.
- Goldratt School trained in 2005 as a TOC Application Expert.
- Working in partnership with Levee/Goldratt UK on the Lemac implementation.

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Making the Difference – Lemac

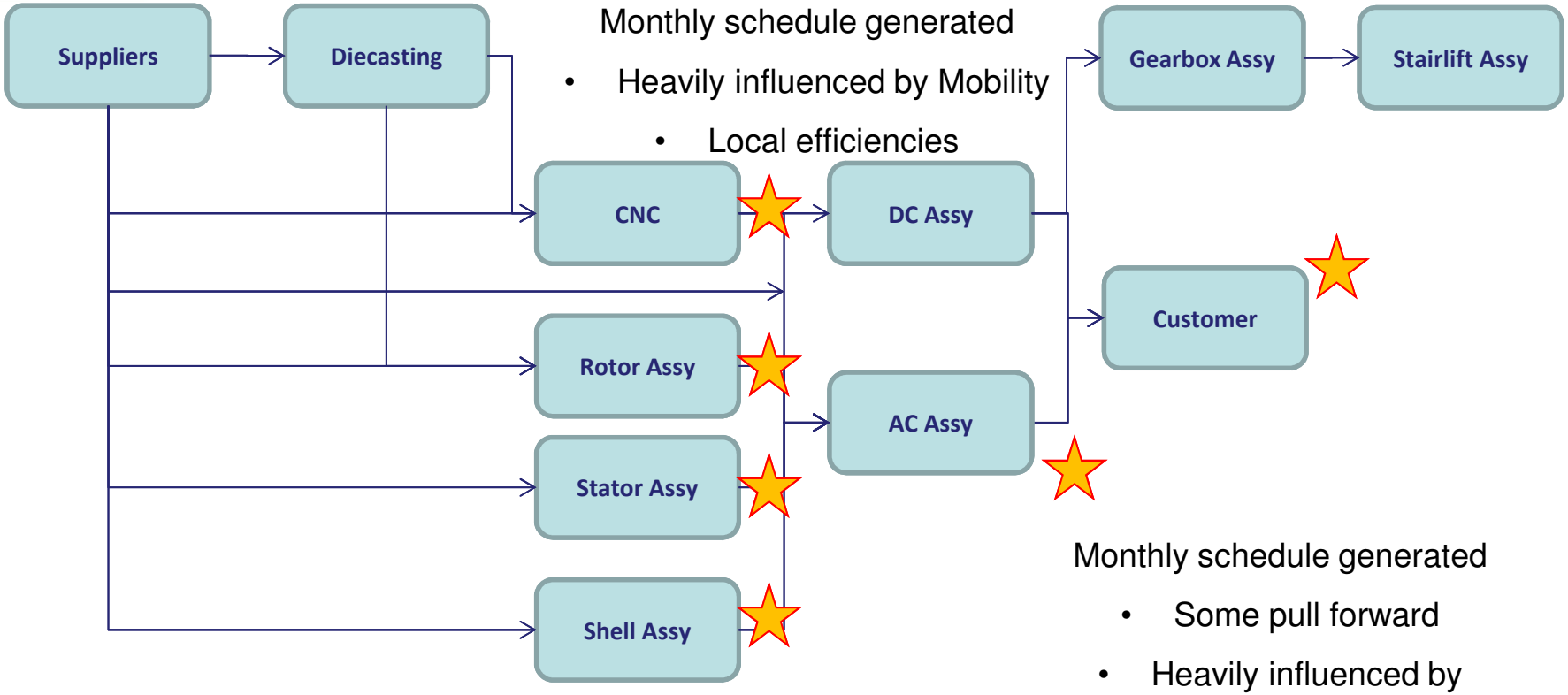
- Lemac are a manufacturer of AC and DC motors for both their own mobility business and other well known domestic appliance suppliers across a number of sectors, including power showers and vacuum cleaners.

- Whilst the growth in their Mobility business has been significant over the last few years, the situation in the Motor business has been more a steady rise in sales revenues over the last 2 years, with margins tight, and hence the application of TOC to help the organisation target further growth.

Making the Difference – Lemac

- The Lemac business is split into Mobility and Motors from both a management and profitability perspective, with Motors contributing well to the turnover.
- The motor manufacture consists of the AC and DC motor sections, with the manufacture comprising of components made on site and purchased parts to assemble the finished goods.
- Management decided to focus on improving the performance of the motors business initially, which due to the use of the DC motors on the Mobility business would give benefit here also.
- Current performance within motors was:
  - OTIF – Declared 60% however, this has now been found to be overstated and nearer 10%.
  - Lead-times – 6 weeks quoted (orders released 6-12 Wks)

Process Overview



Monthly schedule generated

- Heavily influenced by Mobility
- Local efficiencies

Monthly schedule generated

- Some pull forward
- Heavily influenced by customer requirement

Monthly schedule provided

- Cherry picking
- Starvation upstream

Making the Difference – Lemac

- The Problems:
  - Demands causing a perceived bottleneck in CNC = sub-contracting C£2m/annum.
  - Low OTIF performance on motors.
  - Forecast unreliability for motor manufacture.
  - Shifting priorities and un-realistic lead times.
  - Manufacturing under pressure to increase output on Mobility and improve overall Motor performance.
  - Often unable to complete motor orders on time due to lack of components.
  - Lack of system syncronisation and multiple schedules causing confusion.
  - Un-forecast peak demands causing overload and chaos.

The Underlying Process (5 Steps)

Step 1: Find the system's constraint

Customers who come to buy.

Step 2: Set exploitation rules to stop wasting the system's constraint

Ensure product is available within the tolerance time when the customers want it through High DDP and Service Levels.

Step 3: Subordinate everything else to the above decision

Internal Processes Rules and Policies support having the product when customers want it.

- Introduction of MTA to suit customer/business needs
- Ability to ultimately deliver MTO in remarkably short lead times
- Operations have enough protective capacity to satisfy any reasonable demand
- Ensure a buffer of appropriate work is upstream of the component manufacture

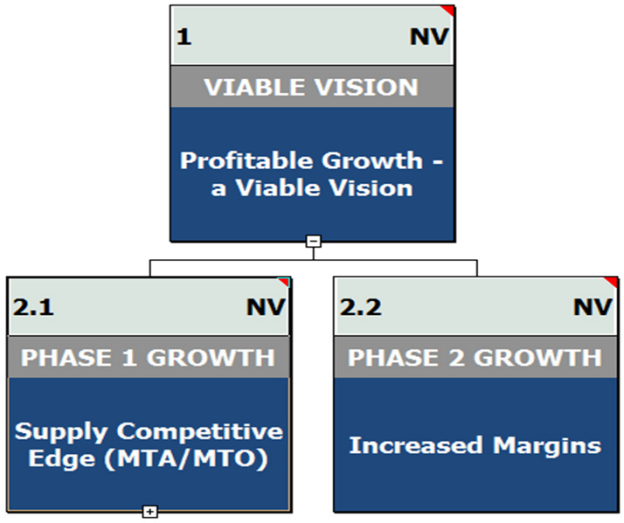
Step 4: Elevate the system's constraint

Develop Market Offer – Reliable/Rapid – MTO and MTA/VMI

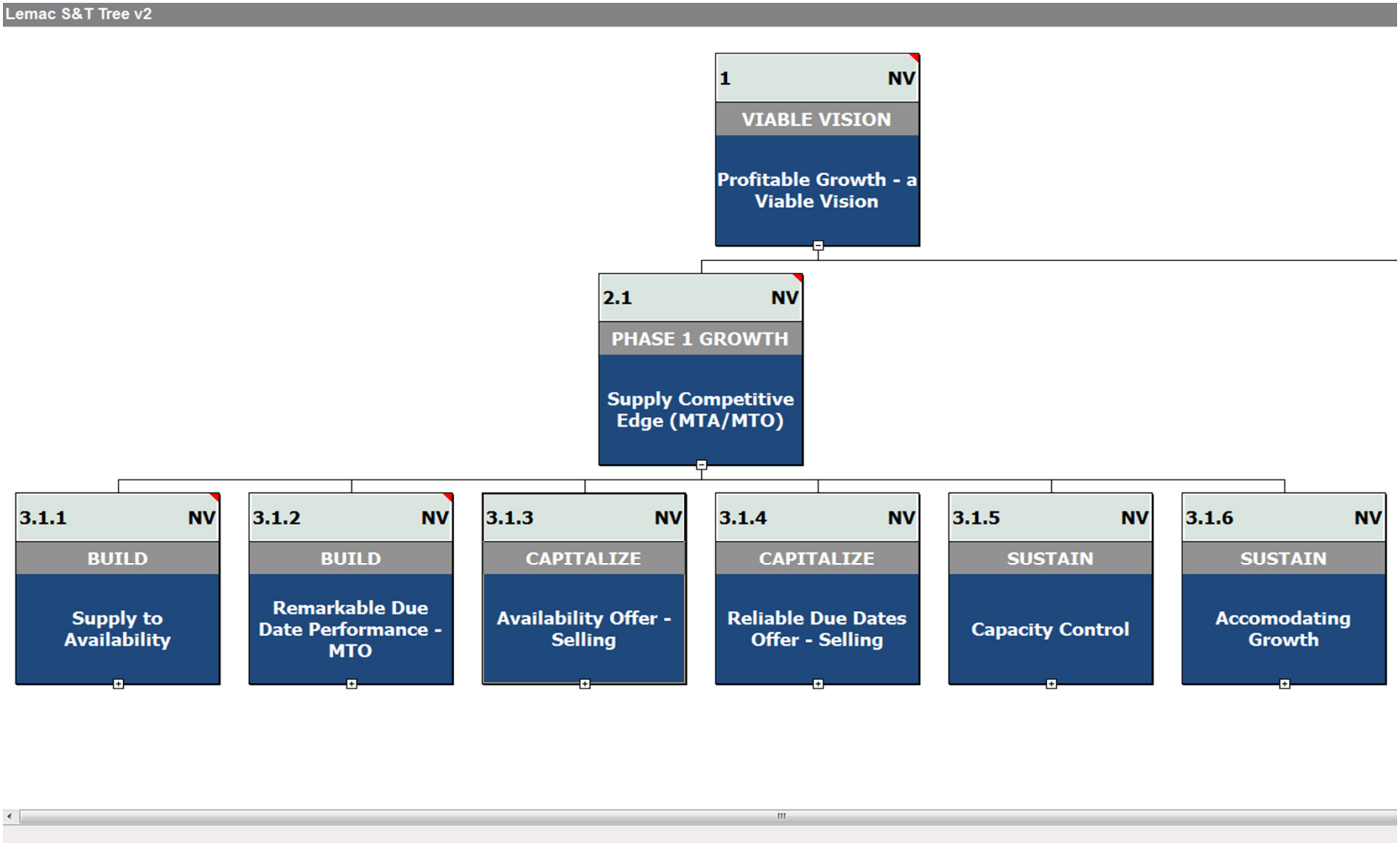
Step 5: Check the rules are still valid, find the next constraint

AC & DC Motors – S&T Tree

Lemac S&T Tree v2



AC & DC Motors – S&T Tree



Making the Difference – Lemac

- The Direction of the Solution: Phase 1 (current)
  - Development of the on site team to achieve sustainability.
  - De-couple the supply of in-house manufactured components for MTA to protect sub-assembly capacity.
  - De-couple the sub-assemblies to protect final assembly capacity for MTA.
  - Develop an initial manual control system to enable all site synchronisation for Motor Manufacture.
  - Establish MTO buffers and due date setting system to protect MTO DDP.
  - Ultimately integrate software solution to support above and give DBM and load management visibility.

Making the Difference – Lemac

- The development of on-site team
  - Senior Team, Section Leaders, Engineering and Stores staff:
    - Simulator, Red Light game, Dice game.
    - MTO/MTA decisions
    - PTA/PTO decisions
    - MTO – SDBR system
    - Load Control
    - RYG – Priority management
    - Due Date quoting
    - Cost/Throughput Worlds
    - DBM

Making the Difference – Lemac

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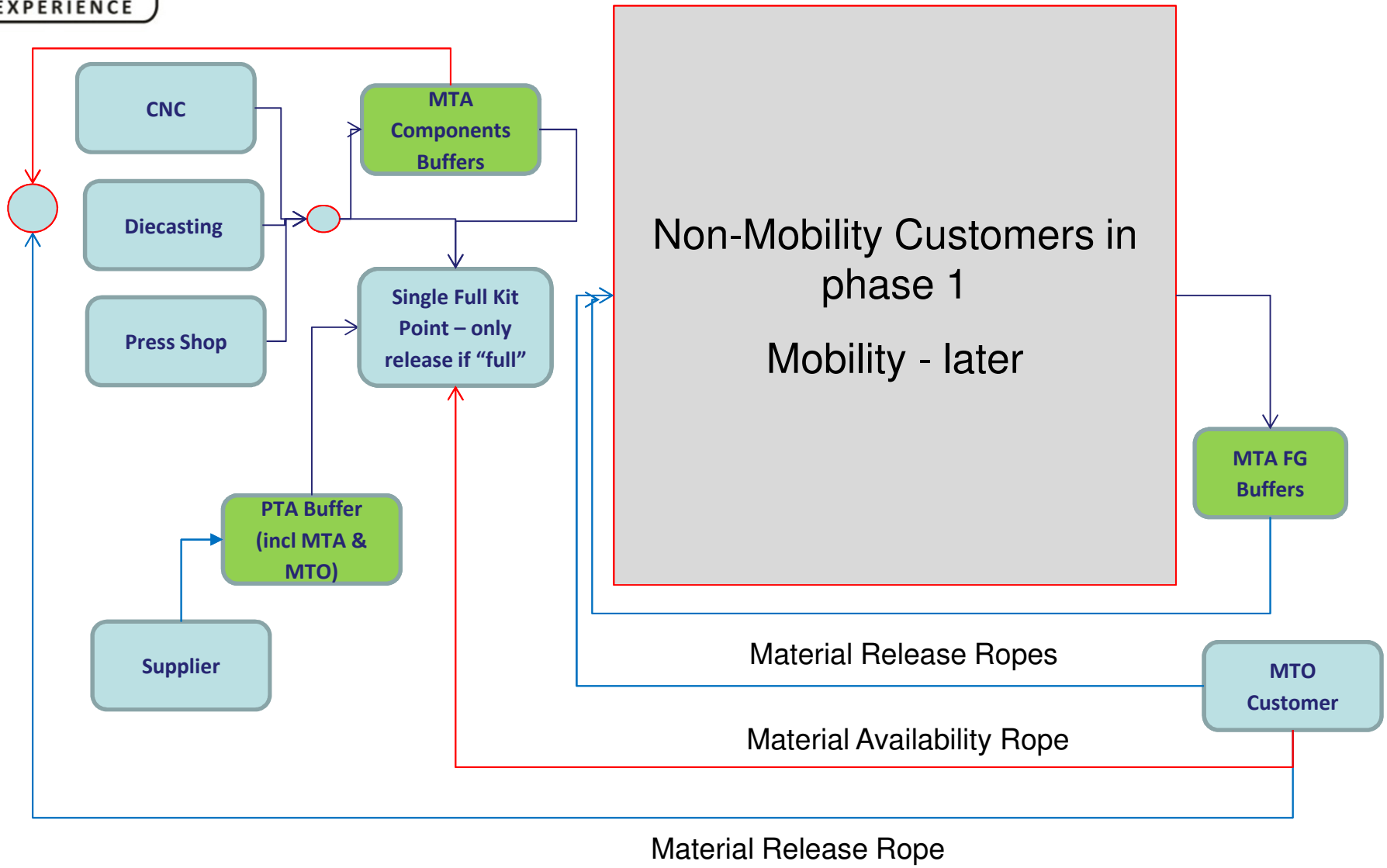
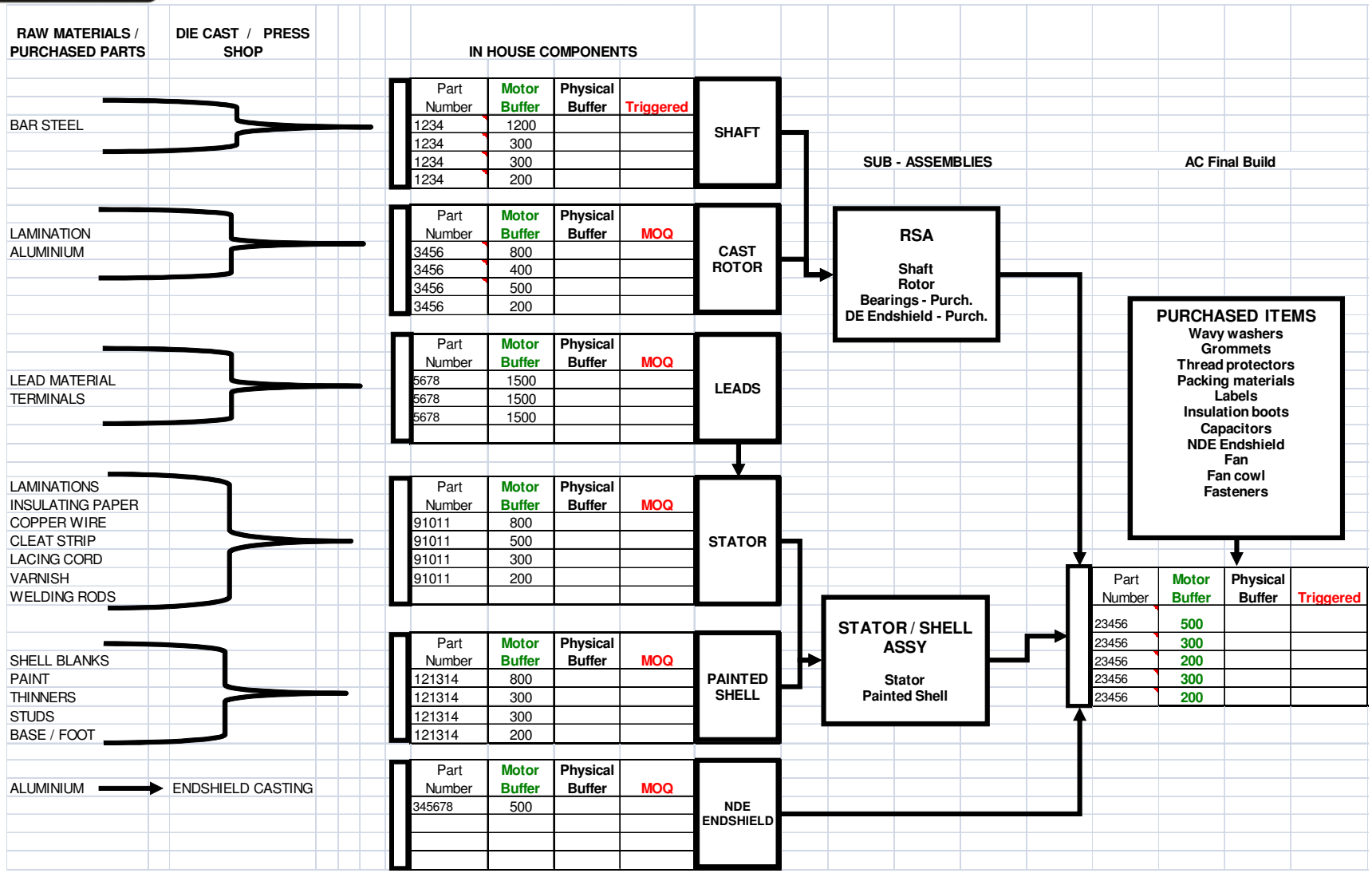
AC & DC Flow – Direction of Solution



MTA - Buffer Sizing



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MTA – Priority System

DATE ISSUED: 28-Nov-12

DATE : 12/12/2012

TIME : 11:30

Wk 50	SCHEDULE
reviewed :	12/12/2012

BUFFER LEVELS

Cust. Target Buffer	Cust. Physical Buffer	Cust ref	Motor ref	Target Buffer	Physical Buffer	Triggerred parts	Suggested release	
1100				800	500	300	0	
400				300	300	0	0	
400				200	0	200	0	
400				200	100	100	0	
100				100	0	100	0	
400				200	100	100	0	
100				100	0	100	0	
				1800	1000	800	0	

	wk 49		
	Cust demand		
	1400		
	600		
	200		
	400		
	100		
	800		
	100		
	3600	0	

ASSEMBLY BUILD SCHEDULE

Input data in these columns only!

	Assy date	Wk	CUSTOMER	MOTOR REF	Works Order No	Qty	SHAFT	ROTOR - m/c	DE E/S	RSA	NDE E/S	STATOR	SHELL	STAT/ SHELL
Thur	06/12/12		Customer 1		Shipped	100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Thur	06/12/12				Shipped	100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Thur	06/12/12					100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Fri	07/12/12					100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Fri	07/12/12					100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Fri	07/12/12					100	37115-704	44326-058/258	31543-213	44426-125	31543-217	44525-205	41431-908	44625-012
Mon	10/12/12					100	37115-704	44326-058/258	31543-213	44426-125	31543-217	44525-205	41431-908	44625-012
Mon	10/12/12					100	37115-704	44326-058/258	31543-213	44426-125	31543-217	44525-205	41431-908	44625-012
Mon	10/12/12	1				100	37125-536	44326-011/211	31543-206	44426-132	31543-206	44525-225	41431-928	44625-042
Tue	11/12/12					100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Tue	11/12/12	2				100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Tue	11/12/12	3			assy now	100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
Wed	12/12/12	5				100	37125-511	44326-004/204	31543-206	44426-113	31543-206	44525-205	41431-914	44625-024
Wed	12/12/12	6				100	37125-511	44326-004/204	31543-206	44426-113	31543-206	44525-205	41431-914	44625-024
Wed	12/12/12	4				100	37115-707	44326-056/256	31543-213	44426-137	31543-219	44525-232	41431-934	44625-050
Thur	13/12/12	7				100	37162-432	44326-005/205	31543-206	44426-136	31543-203	44525-206	41431-909	44625-013
Thur	13/12/12	8				100	37115-704	44326-057/257	31543-213	44426-129	31543-217	44525-215	41431-908	44625-023
						1700								

MTO – Priority System

"W & T" CELL

Order no.	Motor ref	Customer Ref	Customer	Qty	Assembly Priority	Works Order Due Date	Assy Buffer Time Work Days	Assembly Cell	Assembly Release Date	Feeder Priority	Feeder Buffer Time Work Days	Feeder Release Date
	9		Customer 9	240	B	22/01/2013	4	W&T Cell	16/01/2013	Black	12	20/12/2012
	10		Customer 10	160	B	23/01/2013	4	W&T Cell	17/01/2013	Black	12	21/12/2012
	11		Customer 11	80	B	24/01/2013	4	W&T Cell	18/01/2013	Black	12	03/01/2013
	12		Customer 12	160	B	24/01/2013	4	W&T Cell	18/01/2013	Black	12	03/01/2013
	13		Customer 13	80	B	25/01/2013	4	W&T Cell	21/01/2013	Black	12	04/01/2013
	14		Customer 14	100	B	25/01/2013	4	W&T Cell	21/01/2013	Black	12	04/01/2013
	15		Customer 15	100	B	28/01/2013	4	W&T Cell	22/01/2013	Black	12	05/01/2013
	16		Customer 16	100	B	29/01/2013	4	W&T Cell	23/01/2013	Black	12	07/01/2013
	17		Customer 17	300	R	30/01/2013	4	W&T Cell	24/01/2013	Black	12	08/01/2013
	18		Customer 18	160	G	01/02/2013	4	W&T Cell	28/01/2013	Black	12	10/01/2013
	19		Customer 19	80	G	04/02/2013	4	W&T Cell	29/01/2013	Black	12	11/01/2013
	20		Customer 20	80	G	04/02/2013	4	W&T Cell	29/01/2013	Black	12	11/01/2013
	21		Customer 21	100	G	05/02/2013	4	W&T Cell	30/01/2013	R	12	14/01/2013
	22		Customer 22	100		06/02/2013	4	W&T Cell	31/01/2013	R	12	15/01/2013
	23		Customer 23	300		06/02/2013	4	W&T Cell	31/01/2013	R	12	15/01/2013
	24		Customer 24	80		08/02/2013	4	W&T Cell	04/02/2013	R	12	17/01/2013
				880								

MTO – Priority System

= parts complete

Feeder Priority	Feeder Buffer Time Work Days	Feeder Release Date	Assembly Load	D - cast &	P -shop	In House Components						Subs	
				Cast`g	Blank	DE	NDE	shell	shaft	rotor	stator	RSA	ST - Sh
Black	12	10/12/2012			Y	31543-218	31543-218	41431-930	37115-706	44326-055	44525-228	44426-133	44625-044
Black	12	10/12/2012			Y	31543-218	31543-218	41431-930 to paint	37115-706	44326-055	44525-228	44426-133	44625-044
Black	12	11/12/2012			Y	31543-211	31543-203	41431-924	37162-522	44326-001	44525-218	44426-122	44625-037
Black	12	11/12/2012			Y	31543-211	31543-203	41431-925	37162-523	44326-005	44525-219	44426-123 brg & e/sh	44625-038
Black	12	12/12/2012			Y	31543-218	31543-218	41431-930 to paint	37115-706	44326-055	44525-228	44426-133	44625-044
Black	12	13/12/2012			Y	31543-211	31543-203	41431-925	37162-523 40 short	44326-005	44525-219	44426-123 40 avail	44625-038
Black	12	17/12/2012						41431-082	37162-524	44336-006	44535-002	44436-102	44635-003
Black	12	18/12/2012					41463-359	41431-099	37162-528	44336-003	44535-004	44436-106	44635-008
R	12	19/12/2012				31543-218	31543-218	41431-930	37115-706	44326-055	44525-228	44426-133	44625-044

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Due Date Quoting

24 January 2013		AC Motors	
	Customer requested due date	14 December 2012	Date
	Longest lead time PTO purchase for feeders	0	weeks
	Earliest feeder release date	24 January 2013	
	Earliest assembly release date - based on PTO feeder	11 February 2013	
	Longest lead time PTO purchase for assembly	0	weeks
	Earliest assembly release date - based on PTO assembly	24 January 2013	
	Earliest assembly release date - no capacity issue	11 February 2013	
	Earliest due date for finished motors	15 February 2013	
	Pushed forward assembly release date for capacity		Date or blank
	Earliest due date for finished motors	15 February 2013	
	Confirm to customer this date	15 February 2013	

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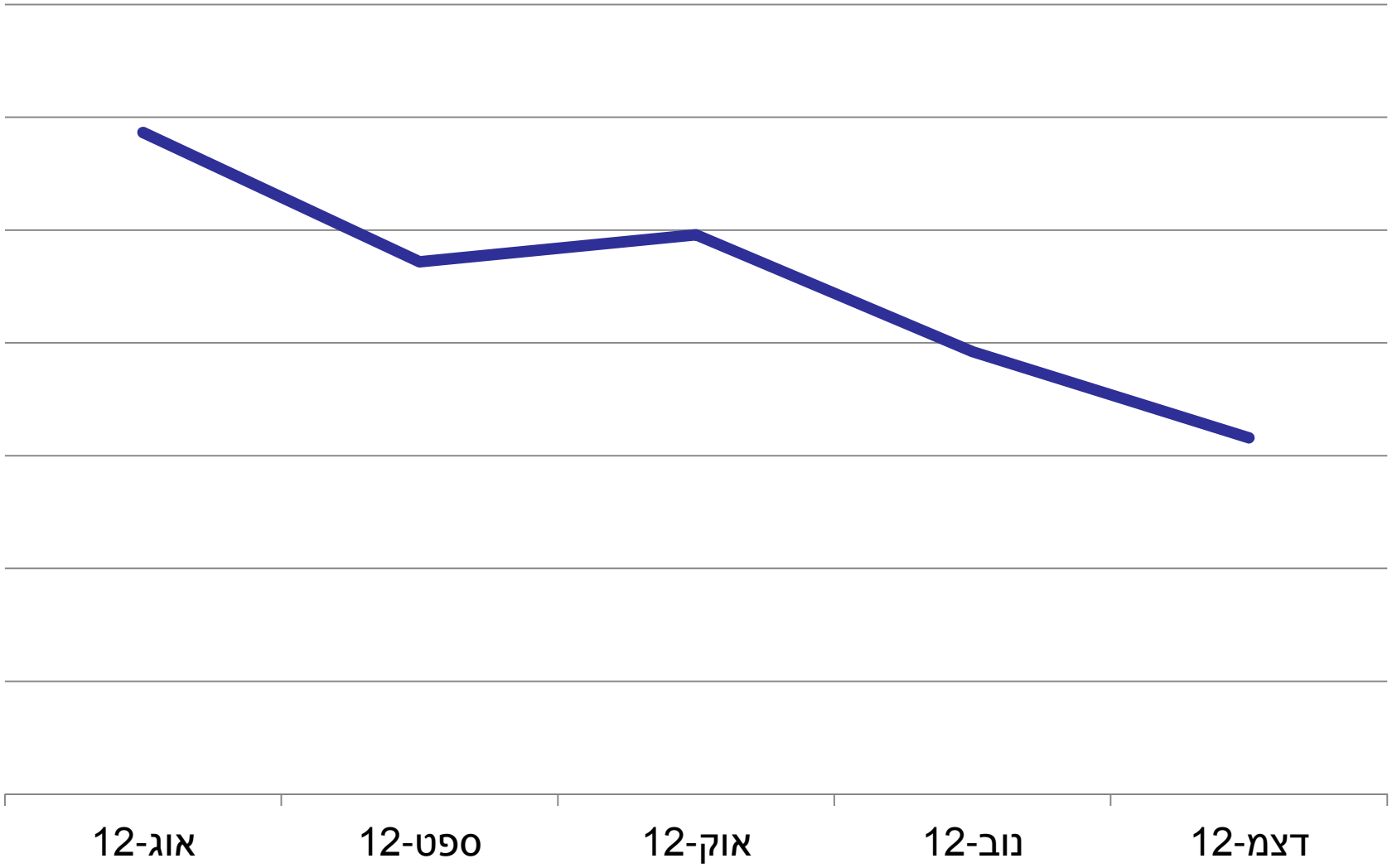
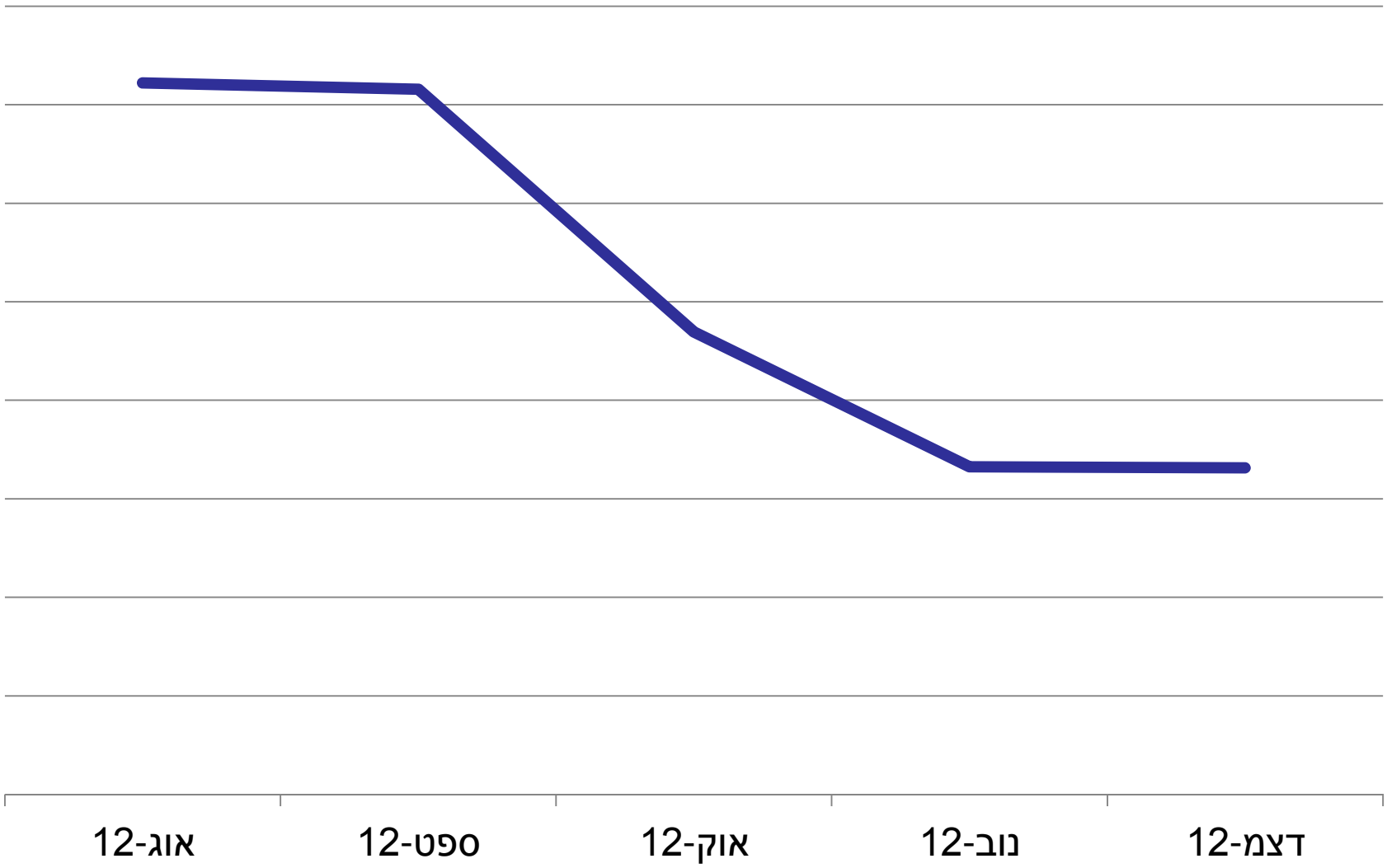
INITIAL RESULTS

Motors – Work in Progress



Motors Finished Goods

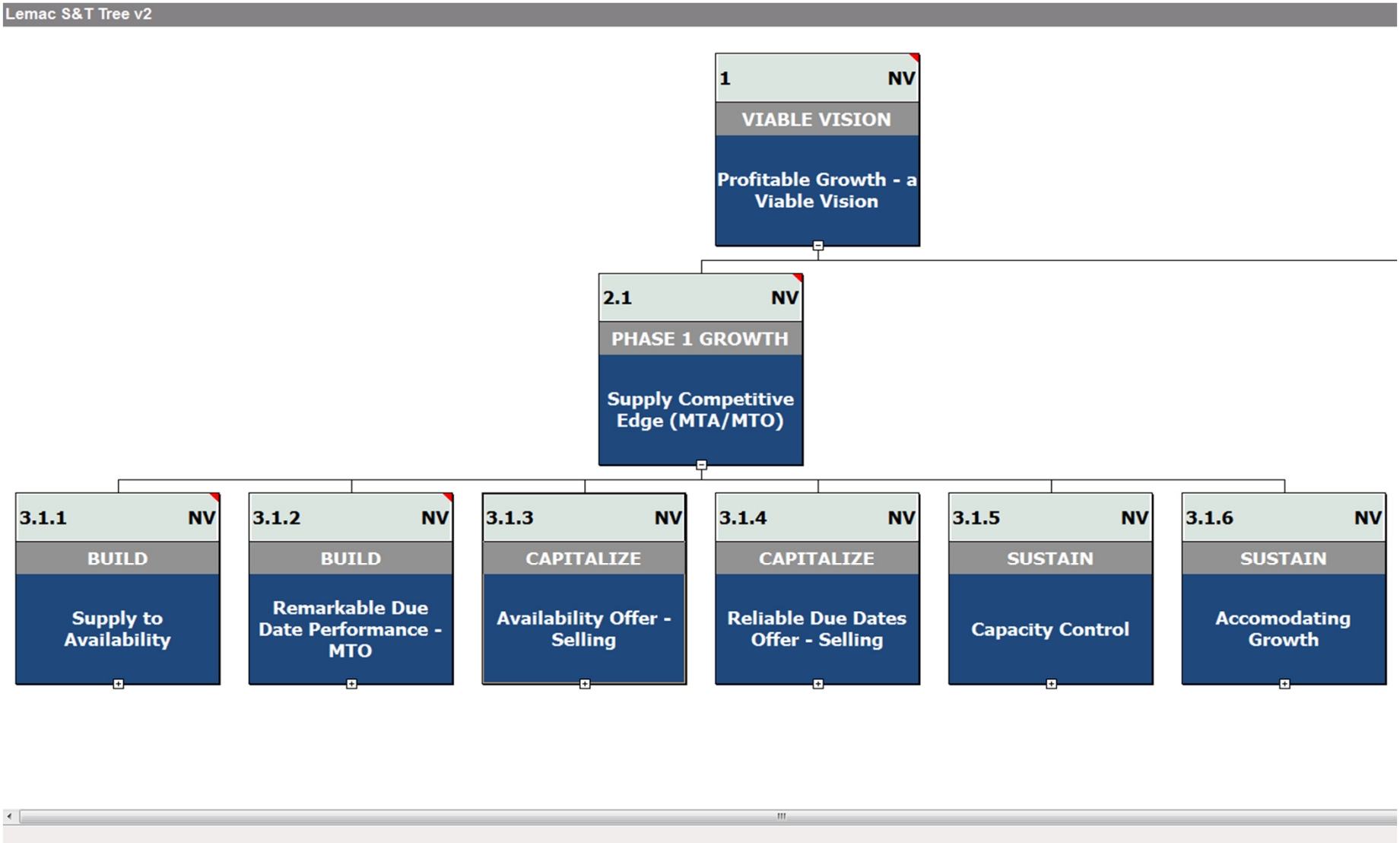


Making the Difference – Results to date

- Measured:
  - WIP reduced by 15%
  - FG reduced by 42%
  - Lead time reduced from 6 weeks to 16 days (not offered)
- Non-Measured:
  - Site syncronised
  - Common priorities
  - Clearer focus, common language.
- Site quotes:
  - “Seems like we are now all swimming in the same lane” MD
  - “We now have a better / clearer priority system for the sub-assembly areas that ensures we are working on the right things at the right time“ - Motors Business Manager
  - “It’s much easier now, I don’t have to do 3 schedules a day!” CNC Mgr.

PHASE 2

AC & DC Motors – S&T Tree



Making the Difference – Lemac

- The Direction of the Solution: Phase 2 (end Feb)
  - Continue to development the on site team.
  - Introduce software to enable single point priority system, load control, purchasing and DBM.
  - Stabilise ability to supply in short lead times.
  - Analysis of Throughput for existing orders and new orders.
  - Analysis of capacity (particularly machining to check whether more work can be insourced.
  - Complete market analysis identifying significant needs of market segments.
  - Analysis of current and new customer opportunities to increase sales and magnitude and timings.

THANK YOU!