

The background of the slide is a photograph of several children riding bicycles on a dirt road in a rural, tropical setting. The children are wearing backpacks and are riding away from the camera. The road is surrounded by lush greenery, including palm trees and other tropical plants. The sky is overcast.

Novozymes

Transformation into Demand Driven MRP

SBN SAP Conference 2021
28-10-2021

Welcome

Novozymes A/S



Peter Christian Graae
*Head of supply chain service and
process excellence*

Syncronic a Deloitte business



Stefan Glar-Hammarsund
*Partner | DK Supply Chain Network &
Operations*



Agenda

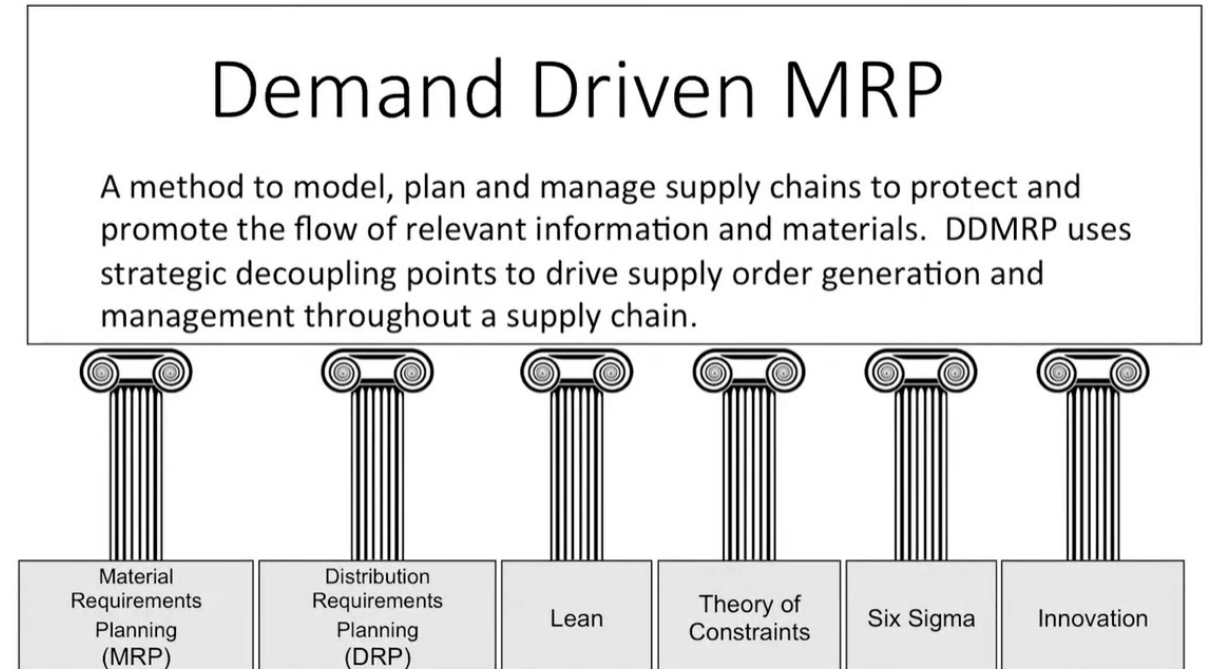
What is Demand Driven MRP

Novozymes DDMRP transformation

Q & A

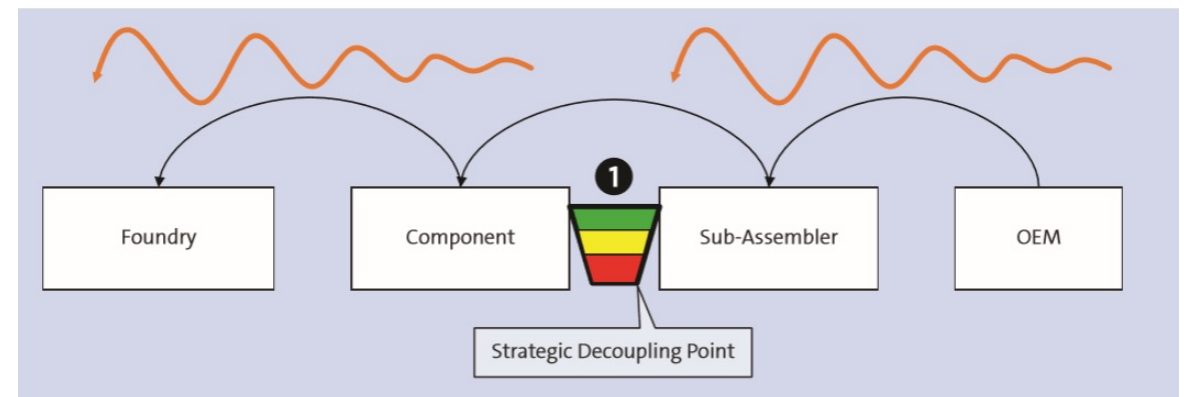
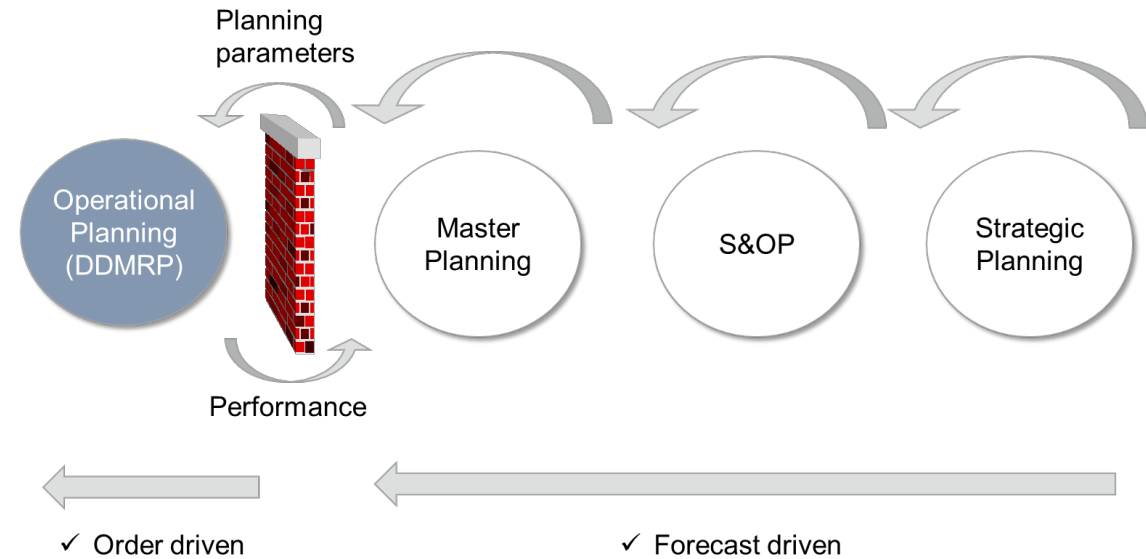
Demand Driven MRP (DDMRP) – The background

- MRP invented in the 1950s - still used
- MRP fueled by forecast – results in:
 - Chronic shortages
 - Excess inventories
 - High operational cost
 - Spreadsheet planning
- Demand Driven MRP:
 - To address MRP challenges – new concept
 - Defined in 2011 after 15 years of research
 - Promoted by the Demand Driven Institute
 - Mix of known concepts and new innovations

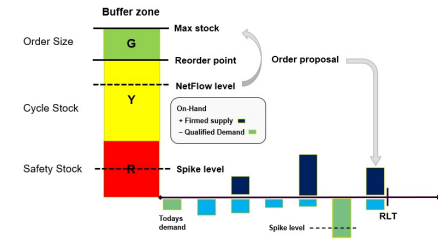
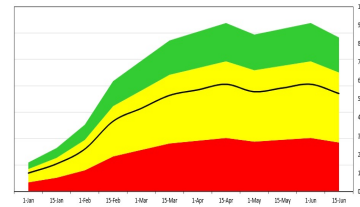
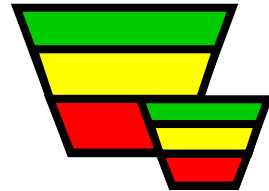
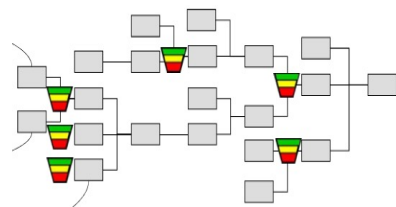
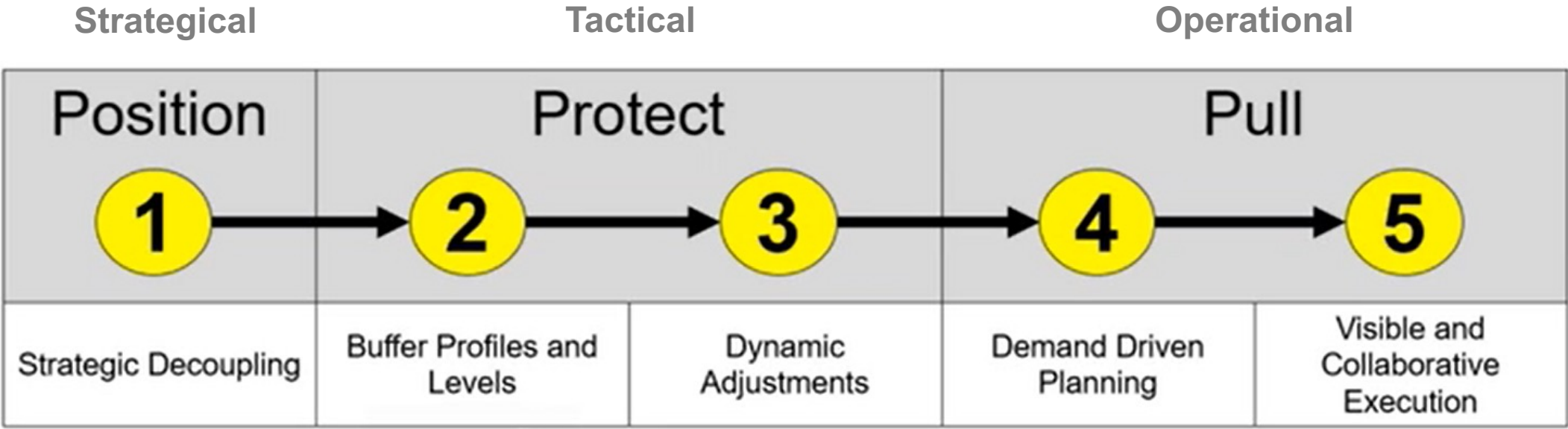


DDMRP basic principles

- Re-order point approach
 - Forecast used as re-order point
- Demand driven
 - Real demand used as signal to act
- Operational planning concept
 - Integrated with SOP through parameters
- Flow based planning
 - Considers availability in lead time
- Buffer zones removes bull-wip
 - Placed at de-coupling points
- Alert based planning
 - Buffer status drives priorities
- Intuitive planning solution
 - Roughly right better than precisely wrong



5 steps in setting up and executing the DDMRP process



Order #	Due Date	Buffer Status
MO 645181	05/14	RED - 13.2%
MO 845172	05/13	RED - 36.2%
MO 831162	05/12	YELLOW 62.1%
MO 831145	05/12	YELLOW - 72.1%
MO 821158	05/12	YELLOW - 87.2%

Benefits of DDMRP – Typical improvements



Inventory Reduction

Typical inventory reductions of 30-45% are achieved while improving customer service



Improved Customer Service

Users consistently achieve 95-100% on time fill rate performance



Lead Time Compression

Lead time reductions in excess of 80% have been achieved in several industry segments



Reduced Total Supply Chain Cost

Costs for expedite activity and false signals are largely eliminated (rush freight, partial ships, cross ships, schedule break-ins)



Easy and Intuitive

Planners see priorities instead of constantly fighting the conflicting messages of MRP



Agenda

- What is Demand Driven MRP
- **Novozymes DDMRP transformation**
- Q & A

Rethink tomorrow

DDMRP implementation at Novozymes

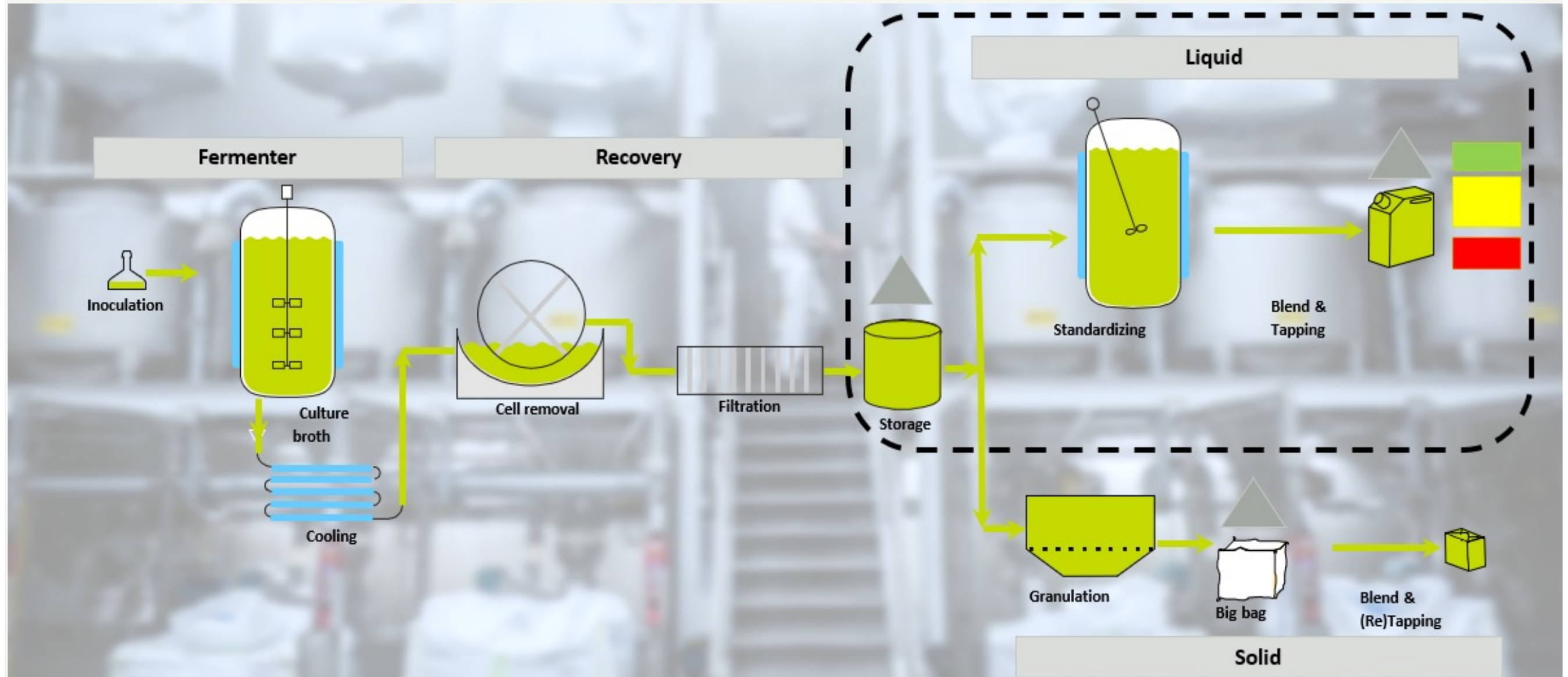
PCG (Peter Christian Graae)

23/09/2021



novozymes® 

Process overview

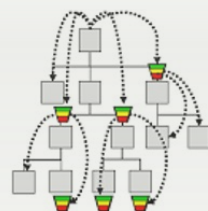


2018

2019

2020

Demand Driven Material Requirement Planning operating model



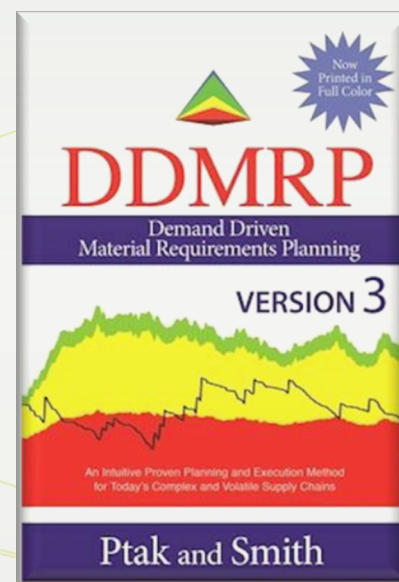
Strategic decoupling Points

The Demand Driven Operating Model uses **strategically placed decoupling points to compress lead times**, shorten planning horizons and **dampen demand and supply variability**.



Paces to actual demand

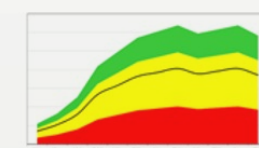
The Demand Driven Operating Model **uses only actual demand** for supply order generation and not forecast as traditionally MRP. Going from **push to pull strategy**



STD Product	Priority	Netflow(%)
3215089-010	Alert	14-
3875301-010	Alert	0
3215077-010	Alert	1
6120086-010	Create	0
6125019-010	Create	44
6125013-010	Create	58
3745010-010	Create	64
3565110-010	Create	69
6455007-010	Create	79
3215124-010	Create	86
3265592-010	OK	84
3745201-010	OK	88
3875337-010	OK	91

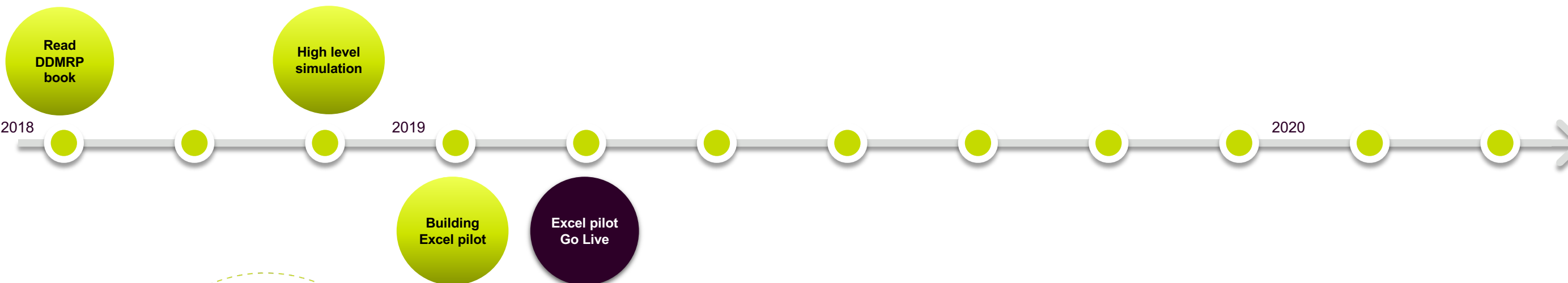
The Demand Driven Operating Model are enabling alert based planning which provide **an prioritization** when firming orders.

Prioritization planning Based on real demand



Dynamic inventory buffering

The Demand Driven Operating Model protects its decoupling and control points through **dynamic stock, time and capacity buffers**

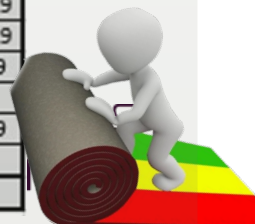


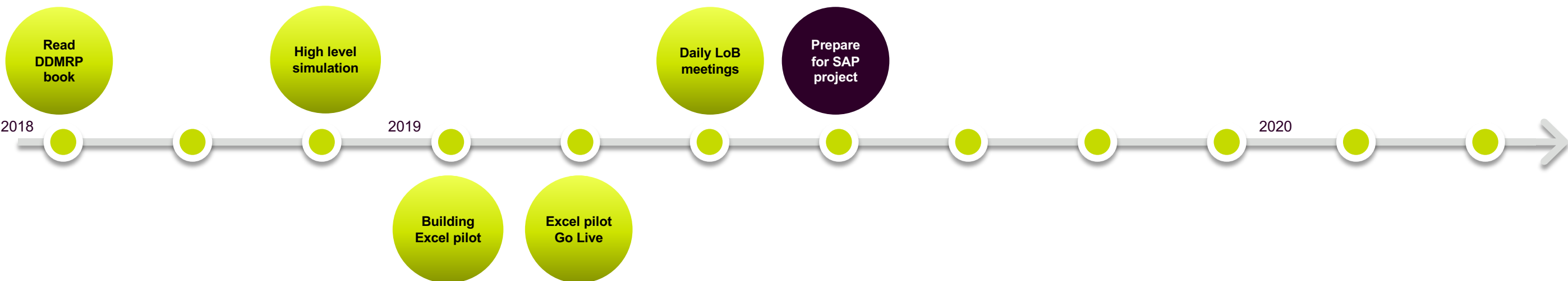
Pilot :

Easy to create a high level simulation which could visualize DDMRP impact

Excel pilot was created in 5 days

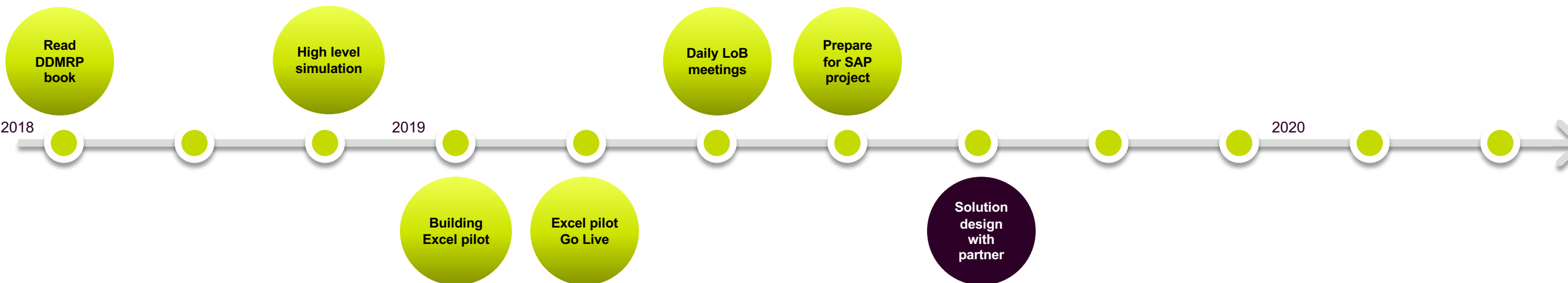
SDT planning report - - Savinase 16 L																		
STD	STD priority	FPP	Order Amount (top of Green)	Planning Priority	Net flow position	Fill-up top of Green	Production LT	Planning LT	Due Date	Backorder date	Total Demand	Split before topup	Fill-up over extra	Tapping proposal	Manuel Tapping proposal	Number of Lot(s)	Coverage	
	88%	3.636E+09	0	299%	67000	0				6/16/2019	59150	31.1%	0					
		3.636E+09	0	475%	6000	0				7/28/2019	5259	0.0%	0					
		3.636E+09	0	88%	3800	525				4/19/2019	21656	25.1%	0					
		3.636E+09	0	192%	30775	-14753				5/19/2019	51895	43.9%	0					
3635969	Total production qty		0							4/19/2019				0	0	0		
SDT planning report - - Termamyl 120 L, Type L																		
STD	STD priority	FPP	Order Amount (top of Green)	Planning Priority	Net flow position	Fill-up top of Green	Production LT	Planning LT	Due Date	Backorder date	Total Demand	Split before topup	Fill-up over extra	Tapping proposal	Manuel Tapping proposal	Number of Lot(s)	Coverage	
	64%	3.615E+09	28125	64%	50973	0				4/14/2019	276706	98.8%	45302	74400			5/13/2019	
		3.615E+09	0	271%	93600	0				6/10/2019	147842	0.0%	0	0				6/10/2019
		3.615E+09	0	124%	7200	0				4/29/2019	1626	0.4%	190	1200				5/5/2019
		3.615E+09	0	MTO	7000						9000	0.0%	0	0				
		3.615E+09	0	231%	15630	0				5/30/2019	12065	0.8%	388	1200				6/4/2019
		3.615E+09	0	MTO	19200						48000	0.0%	0	0				
3615007	Total production qty		28125						4/9/2019	4/14/2019				76800	0	1		





Steps :

- Clarify the APO roadmap with SAP DK
- System architecture (IBP vs. APO)
- Search market for existing solution
- Partner selection (Deloitte/Syncronic)
- Establish project plan and project organization

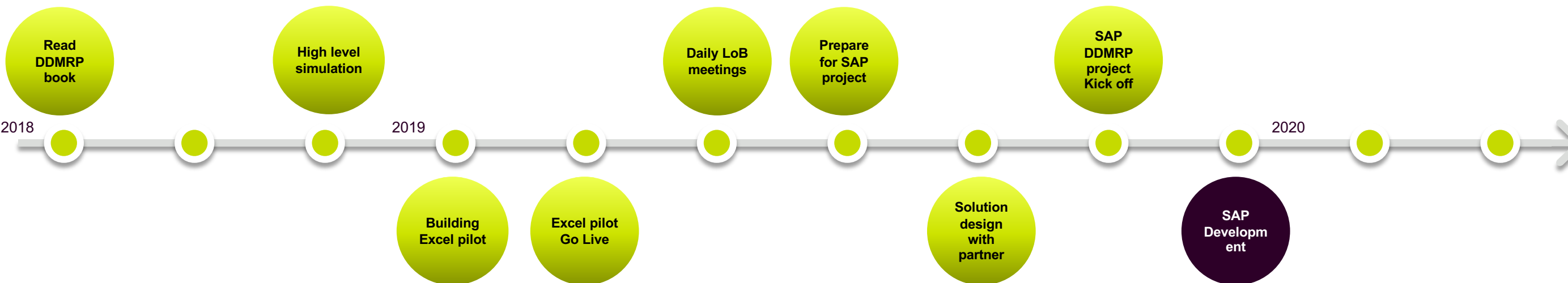


Execution

Mock-up's in Excel was used as solution specification and designing new reports

DDMRP Cockpit																					
Firm flag	PPDS Pl. Order #	Material # (FPP)	DDMRP Priority	Net Flow level (%)	Pl.Order qty	Pl. Order Start date	DOH1 (stock)	Backorder date (stock)	DOH2 (stock + pipeline)	Backorder date (stock + pipeline)	DOH3 (NetFlow proposal)	Backorder date (NetFlow proposal)	Stock On-hand inventory	Qualified Demand	Open Supply	RTL	End of RLT	TOG	TOY	TOR	Comment
x	1240		Alert	25%	1000	15.09.2023	21	29-10-2019	23	31-10-2019	24	01-11-2019	2500	1300	4100	7	15-10-2019	3500	8000	10000	PO has been created by SQRS
x	1239		Re-order	45%	2000	15.09.2022	67	14-12-2019	45	22-11-2019	44	21-11-2019	2300	1100	3900	7	15-10-2019	3400	7900	9900	PO has been created by PCG
x	1237		Re-order	85%	2000	15.09.2020	54	01-12-2019	56	03-12-2019	45	22-11-2019	2100	900	3700	7	15-10-2019	3750	8250	10250	
	1238		OK	97%			65	12-12-2019	78	25-12-2019	46	23-11-2019				10	18-10-2019				
	1236		Over max	120%			60	07-12-2019	78	25-12-2019	46	23-11-2019				7	15-10-2019	0			
	1290		Over max	121%			80	27-12-2019	81	28-12-2019	44	21-11-2019				7	15-10-2019				





Result :

- 2 cockpits were created and a planning book
- User friendly and alert based planning in new APO reports
- Integrated it with available to promise check (ATP)

Firming button

List of my products

DDMRP priority => Firm order when in Yellow/Red

DDMRP "MRP" calculation = NetFlow

DDMRP proposals for firming (placed on RLT)

DDMRP buffer zone (re-order point level)

Product	Description	Planning	Priority	NetFlow (%)	NetFlow Qty	Stock On Hand	Restricted Stock	Open Supply	Qualified Demand	Order Qty	Order Text
Novozyme 300 MG K*H*N*FG - B	60	Alert	29	1.440	1.680	0	0	240	6.000	DDMRP plorder	
Novozym 27631 K*H*N*FG - A	60	Create	35	440	1.080	0	0	640	2000	DDMRP plorder	
BAN 500 MG K*H*N*FG - BIB2	60	Create	49	7.840	0	4.040	12.000	0	6000	DDMRP plorder	
Novamyl Conc. BG US K*H*N*H	60	Create	61	470	960	0	0	490	2000	DDMRP plorder	
Gluzyme Mono 10000BG K*H*	60	Create	81	17.080	16.580	0	0	5.520	4000	DDMRP plorder	
Lipopan Xtra BG K*H*N*FG - B	60	Create	88	2.960	3.180	0	0	220	4000	DDMRP plorder	
Shapelit Biscuit K*H*N*FG - BI	60	Create	89	859	1.620	0	0	762	2000	DDMRP plorder	
Novacor ABS - BIB20KG - DK	60	OK	89	1.960	2.920	0	0	960	0		
Pentopan Mono BG CN K*H*N	32	OK	100	3.950	8.778	0	0	4.818	0		
Novozym 11039 K*H*N*FG - B	32	OK	100	1.040	1.040	0	0	0	0		
Noopazyme White K*H*N*FG - 32	32	OK	100	0	400	0	0	400	0		
Novozym 27755 K*H*N*FG - B	60	OK	100	0	0	0	0	0	0		
Alpha Amylase SC 400 MG T.*	32	OK	100	180	180	0	0	0	0		
Novamyl Pro 80 BG K*H*N*FG	60	Over max.	109	7.400	8.200	0	0	800	0		
Gluzyme Mono 2K BG K*H*N*FG	60	Over max.	109	3.531	3.800	0	0	269	0		
Pentopan Mono BG CN K*H*N	32	Over max.	111	690	300	0	680	290	0		
Novozym 27417 K*H*N*FG - A	60	Over max.	111	1.180	1.340	0	0	160	0		
CELLULCAST BG K*H*N*FG - 60	60	Over max.	112	3.960	4.120	0	0	160	0		
Fungamyl Ultra WF G K*H*N*F	60	Over max.	118	37.280	31.440	0	12.000	6.160	0		
Lipopan Prime K*H*N*FG - BIB	60	Over max.	120	1.460	1.520	0	0	60	0		
Fungamyl 4000 SG K*H*N*FG	60	Over max.	121	35.200	28.060	0	12.560	5.420	0	29.008 25.721 9.284	
Opticalase 50 BG K*H*N*FG - B	60	Over max.	122	8.800	6.800	0	4.000	2.000	0	7.218 6.782 4.602	
Pentopan 500 BG K*H*N*FG - B	60	Over max.	123	3.140	3.540	0	0	400	0	2.543 2.314 1.170	
Novozym 27691 K*H*N*FG - B	60	Over max.	124	1.062	880	0	660	479	0	853 765 323	

Tapping Split Report: Main screen

STD Product	Description	Priority	Net	Std. Proposal	Lotsize	Log	Stock o	Open s	RLT Date	GR Time	Order Text	Memo Pr.
Shearzyme Plus 2X K*H*N*FG - B	Alert	0	11.200				0	11.190	16.05.20	3,00		112
Saczyme Plus 2X K*H*N*FG -	Alert	9	30.000				0	60.000	16.05.20	3,00		112
Liquanase Evity 3.5 L*K*H - B	Alert	14	20.000				10.556	0	08.05.20	3,00		126
Liquanase 2.5 L*K*H - BULK K	Create	0	7.100				7.120	0	15.05.20	3,00		112
Liquanase 3.5 L*K*H - BULK K	Create	62	75.000				0	20.000	08.05.20	3,00		112
Saczyme Yield K*H*H*FG - BULK	Create	74	50.000				0	50.000	15.05.20	3,00		112
Liquozyme Supra 2.2X K*H*N	Create	78	50.000				0	50.300	09.05.20	3,00		112
Novozym 37071 K*H*N*FG -	Create	83	20.000				0	0	19.05.20	3,00		112
Alcalase 2.5 L*K*H*cb3 - BULK	OK	84	0				2.449	0	10.05.20	3,00		112
Liquozyme X 2X K*H*N*FG - B	OK	88	0				0	0	16.05.20	3,00		112
Shearzyme Plus 2X K*H*N*FG	OK	91	0				0	20.000	16.05.20	3,00		112
Liquozyme Supra 2.8X K*H*N	OK	94	0				0	0	09.05.20	3,00		112
Carnival Evity 16 L*H*UL - BUL	OK	99	0				0	38.000	14.05.20	3,00		126
Spirzyme 2.0 T*K - BULK KG -	OK	100	0				0	0	15.05.20	3,00		112
Alcalase Ultra 2.5 L*K*H - BUL	OK	100	0				0	0	10.05.20	3,00		112

FPP Products

FPP Product	Description	Pl. Priority	Net	Stock	Restrict.	Open	Qualif.	Std. P	Tappin.	DO	DO	DO	RLT	GR TL	Min. L	Round	TOG	TOY	TOR
Saczyme Plus 2X K*	60	Alert	32	9.900	0	17.600	19.800	16.500	16.500	26	26	0	19	8,00	2.200	1.100	23.9	22.0	12.7
Saczyme Plus 2X K*	60	Alert	9	13.575	0	11.400	21.600	34.800	34.800	1	1	2-	19	8,00	2.400	600	37.9	34.4	16.7

Planning Book: [Live] DDMRP PLANNING / DDMRP BUFFER LEVELS

Selected Objects

Product 3505820-158

Type 1000

Location 1000

Product 1000

Design Table Save Graphic Settings 100%

DDMRP

	U	02.09.	03.09.	04.09.	05.09.	06.09.	07.09.	08.09.	09.09.	10.09.	11.09.
Demand (Forecast/Sales Ord)	KG	640	1.200								
Total Demand	KG	640	1.200								
ADU (Average Daily Usage)	KG	470	470	447	405	405	426	379	396	396	396
Green Zone	KG	1.411	1.411	1.342	1.214	1.226	1.278	1.136	1.188	1.188	1.188
Yellow Zone	KG	7.054	7.054	6.711	6.068	6.132	6.389	5.681	5.938	5.938	5.938
Red Zone - DDMRP Adjust	KG										
Red Zone - Safety	KG	7.421	7.421	7.421	7.421	7.421	7.421	7.421	7.421	7.421	7.421
Top of Red	KG	7.421	7.421	7.421	7.421	7.421	7.421	7.421	7.421	7.421	7.421
Top of Yellow	KG	14.475	14.475	14.132	13.489	13.553	13.810	13.102	13.359	13.359	13.359
Top of Green	KG	15.886	15.886	15.474	14.703	14.780	15.088	14.238	14.547	14.547	14.547

DDMRP Buffer Levels

20000

0

DDMRP

DDMRP_BL

DDMRP_BW

DDMRP_NF

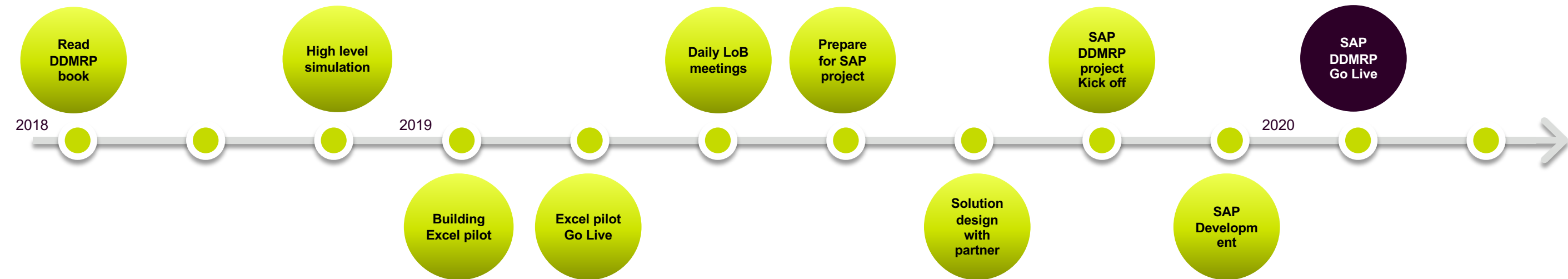
DDMRP_NP

DDMRP_CUST-FC

Top of Red - KG

Top of Yellow - KG

Top of Green - KG



Positive feedback

SAP Go live in week 6 with 71 FPP Liquid products And 17 Standardizations

Successful go live and very positive user feedback

Hypercare period was shorten due to no issues

A great cross functional team effort

Hugh interest from other companies on the concept



Stefan Glar-Hammarlund
Managing Partner
1w •

Stort tillykke til Novozymes efter succesfuld go-live med deres Demand Driven MRP (DDMRP) løsning i SAP!

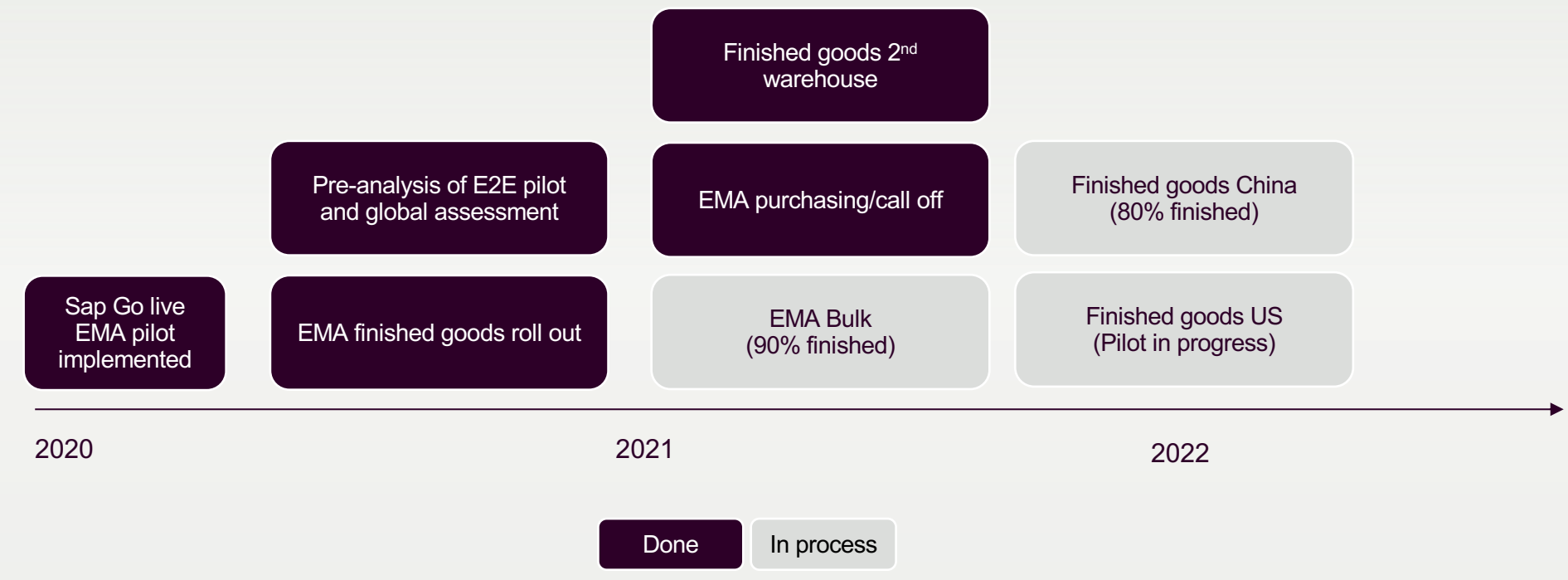
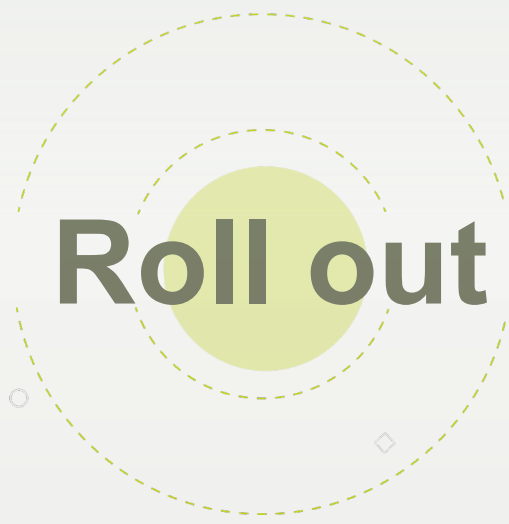
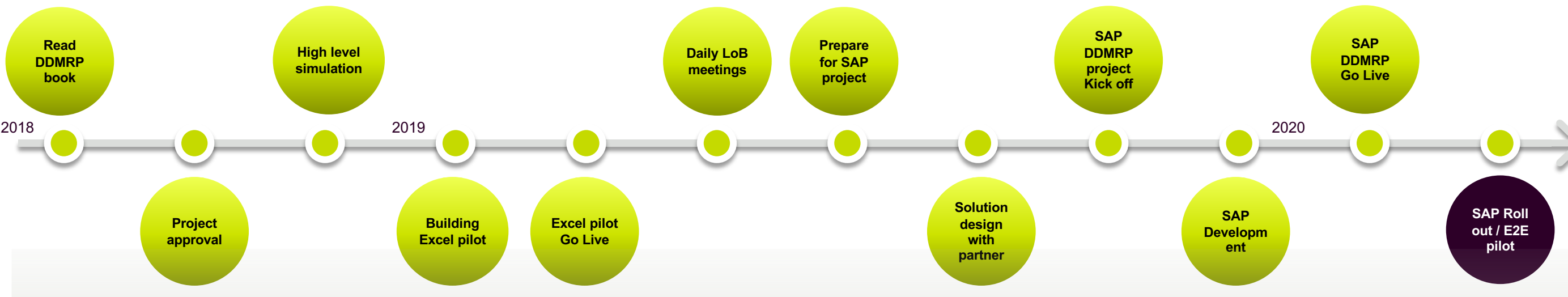
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140 • 8 Comments

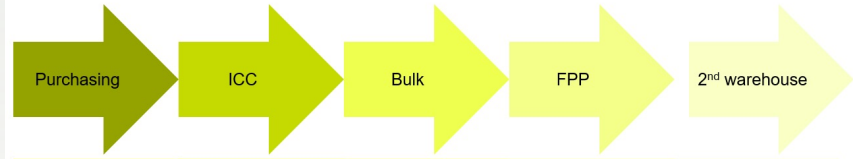
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Learnings

Learnings from Pilot



- ✓ Good fit for NZ for doing DDMRP E2E
- ✓ For 2nd warehouse, finished product and purchasing a good fit for a simple solution
- ✓ Project are 20% IT and 80% change management. Acknowledge that new scheduling and planning processes takes times
- ✓ Take time to convince that DDMRP makes a provides benefit – but when people fully understand concept you have great change agents.

Success

Hej alle, hørte at 1.del af DDMRP "lukkede" i sidste uge

Jeg vil bare sige tak for et super godt samarbejde, det har været fedt at arbejde sammen med jer og en pænt vild rejse 😊

Vi er nået rigtig langt, der er også gået et par år siden vi i Q4-18 startede op.
Vi har nu 198 standardiseringer ud af i alt ca. 290

- 169 kører direkte i Sch.Cellen
- 29 styres i "H" af Planneren

Største fordele på Liquid:

- Mindre lager (klart bedre sammensat)
- Bedre leveringsevne
- Systematisk fokus hver dag
- Tappesplits-optimering

- ✓ simplified planning & scheduling process (all in-one screen)
- ✓ a new DDMRP operating model has be established
- ✓ a full integrated solution in SAP APO
- ✓ a super interesting pioneer project as NZ is first company in DK
- ✓ a good example of future project execution by going through: Theory -> POC -> Prototype in excel -> Integrated SAP solution
- ✓ Reduced inventory while improving product availability



Agenda

- What is Demand Driven MRP
- Novozymes DDMRP transformation
- **Q & A**

BRIDGING BUSINESS AND IT



Thank you

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