



pepsi.®

# Implementing SAP IBP within Supply Chain

A look at the whole story

February 28, 2020

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Demand Planning Manager



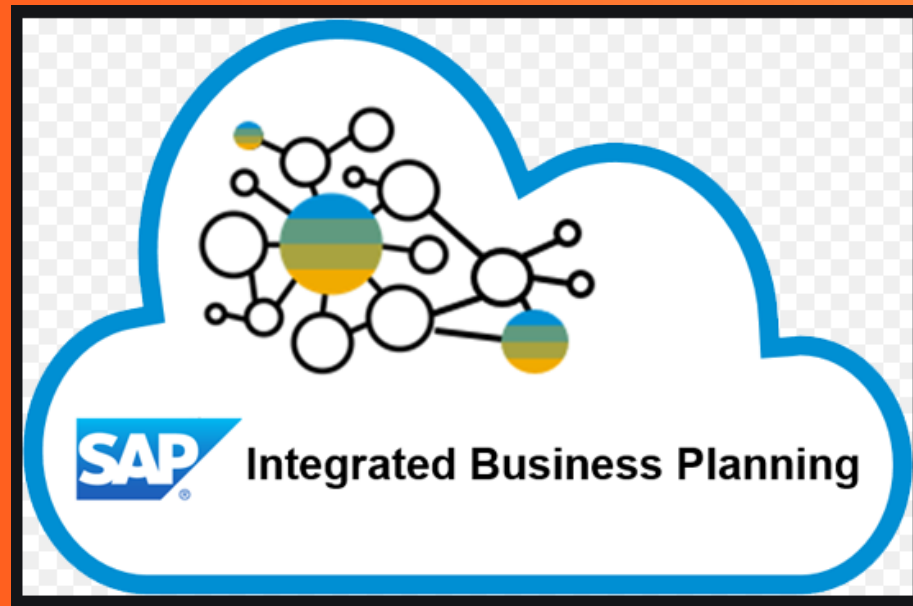
# Agenda

- ❑ IBP Demand as part of Supply Chain Transformation (Project 20/20)
- ❑ IBP Demand implementation challenges and how we overcame them
- ❑ Demand forecasting cycle
- ❑ A view of the finished product

# Pepsi Bottling Ventures



- ❑ Largest Privately-held Bottler in North America
- ❑ **Ownership**
  - **65% Suntory, Ltd.**
  - **35% PepsiCo**
- ❑ Headquartered in Raleigh, NC
- ❑ **4 manufacturing and 17 distribution facilities**
  - **North Carolina, Maryland, Delaware, Virginia, South Carolina**
- ❑ 2500 Employees
- ❑ Serving over 9 million consumers



# Project 20/20

Project 20/20 is an investment in the PBV Supply Chain Planning and Warehouse execution software and business processes.

## Business drivers

- Improve Service to Sales
- Support Innovation and SKU Complexity
- Maximize Revenue

## Why now

- Aging Legacy Solution
- Business Complexity Continues to Grow

## Benefits

- OOS Reduction (Cases)
- Plant production labor savings during peak periods
- Inventory- Days Supply reduction
- Waste reduction in Break Shrink

# Project Intangible Objectives

## Intangible savings:

- Can perform what-if scenarios
- Smoother business operations enabling us to support growing business needs
- Proactive planning; reduced reactive management
- Eliminate strategic risk of existing aging software
- Improved data visibility throughout PBV (planning, warehouse, production, transport, sales, finance)
- Allows for potential collaboration between sales, finance and operations
- Opportunity for development of single process to handle independent demand forecasts and sales (contract sales, commissary and warehouse)

# Challenges

## □ SIZING

- Lowest level: Sold To, Product
- IBP sizing came to 18 TB
- MAX size for IBP 6 TB
- Lowest level now: IBP Customer (telescoping), Delivery Location, Sales Region, Product



# Challenges

## DATA REALIGNMENT

- Master data and actual sales history is reloaded fully each week – and hence automatically realigned to changing master data
- Key figures that are manually entered or generated within IBP need to be realigned to reflect changing master data
- External Microsoft C# program provides data realignment capability for these key figures

# Challenges

## SAP Cloud Platform Integration (CPI) issue

- When loading data into IBP from SAP ECC, we would get 'unique constraint' error.
- When extracting large number of records (44 million) from IBP to on-premise server, the behavior was inconsistent. Job would fail, every so often, with inadequate visibility to what actually happened.
- Needed to run a special job to clear old 'reporting' tables – to prevent unique constraint error.
- SAP support struggled to resolve this issue
- Eventually, after four months, we found that we need to be using Window Server 2016 instead of Windows Server 2012 for our on-premise SAP CPI agent server!



# Challenges

## Promotional Forecasting with Seasonality

- Sales of promoted packages/products in major key accounts contributes to majority of forecast variability
- So, we need promotional forecasting that considers the following:
- Promotions, Promotional pricing, Promotional events, & Seasonality
- After several internal attempts, we decided to get expert statistics practitioner's help.

## Depromotionalize

Remove effect of promotions from historical sales:  
Generate base demand signal using Trigonometric  
Fourier Transformation (MLR1);  
Retain effect of seasonality and trend

Capture effect of promotions:  
Use MLR2 to get coefficients

Microsoft  
C#  
with R

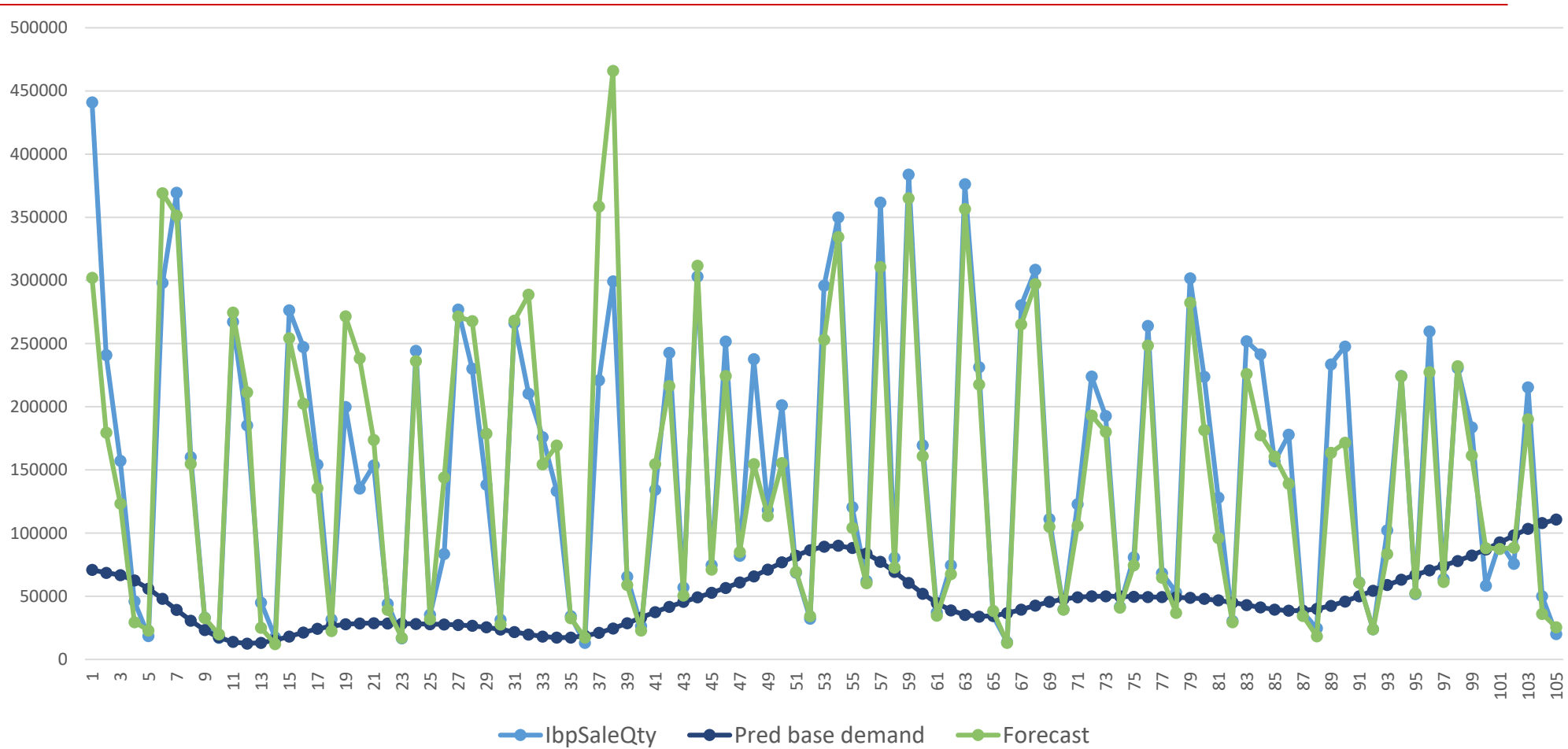
## Forecast with seasonality and trend

SAP  
IBP

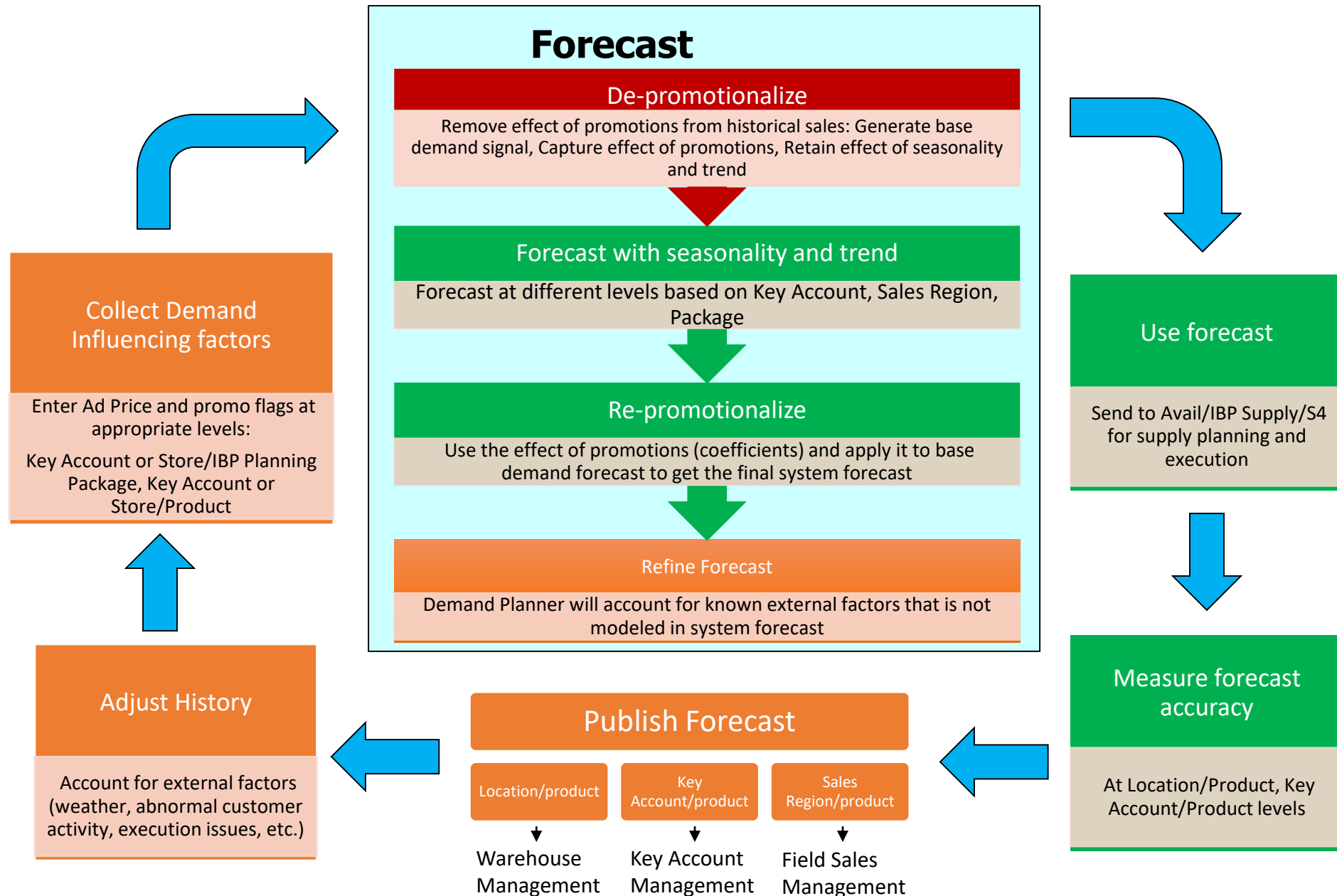
## Repromotionalize

Use the effect of promotions (coefficients) and apply it to base demand forecast  
to get the final system forecast

# Promotional forecasting: Sample



# Demand Forecasting Cycle





# Demand Planning Calendar

## Period Planning

- Raw Material 90-Day Forecast
- Annual Warehouse Review: Review one warehouse per period
- Period Focus Meeting

## Quarterly Planning

- Quarterly Capacity Planning
- Quarterly Capacity Report
- CV Seasonal Analysis:
  - Determine the appropriate records for MLR promotional & pricing planning

## Annual Planning

- Holiday Volume Planning
  - Christmas
  - Beach
  - Other
- Educational Channel
- Annual Capacity Planning

## Monday

7:00 am SYSTEM IS READY

Prepare Monday AM reports:

- RSMOVP scorecard
- IBP Accuracy Report
- Gatorade Report
- Executive (S&OP) Scorecard

Prepare for a snapshot and release:

- Review/adjust forecasts
  - Update the release filter
- Prep for Monday pm Coefficient Run

7:00 pm COEFFICIENT BATCH JOB RUN

REALIGNMENT JOB PER EFFECTIVITY DATE

## Tuesday

- Plan to release the Demand Plan to Supply Planning today (ad hoc) or tonight (scheduled job).

AFTERNOON

- Review Coefficient Report(s)

7:00 pm DEMAND PLAN RELEASE and SNAPSHOT

- The snapshot will be used for calculating accuracy metrics

REALIGNMENT JOB PER EFFECTIVITY DATE

## Wednesday & Thursday

- Maintain the "Product" Table.
- Review new products transitioning to "Active" this week.
- Manage the "MLR Promo Package Pricing" Table
- Adjust Sales History
- Update forecast models
- Manage historical promotional flags and pricing

REALIGNMENT JOB PER EFFECTIVITY DATE

## Friday

PRICING AND PROMOTION MANAGEMENT

- Run KAP Report for future pricing and promotions
- Update new pricing
- Update new promo flags

PRE-WEEKEND SALES CHECK

- Run UXT Weekend Report
- Check sales patterns for upcoming Weekend

ENSURE COEFFICIENTS ARE PUBLISHED BY END OF DAY

REALIGNMENT JOB PER EFFECTIVITY DATE

## Weekend

CPI batch Jobs:

- Master Data
- Transactional Data

IBP batch Jobs:

- Stat Model Planning Run
- Statistical results snapshot

7:00 am Monday: SYSTEM IS READY:

- Master data has been updated
- Sales history is loaded
- Stat models have been run
- Stat snapshots were REALIGNMENT JOB PER EFFECTIVITY DATE



Filter:

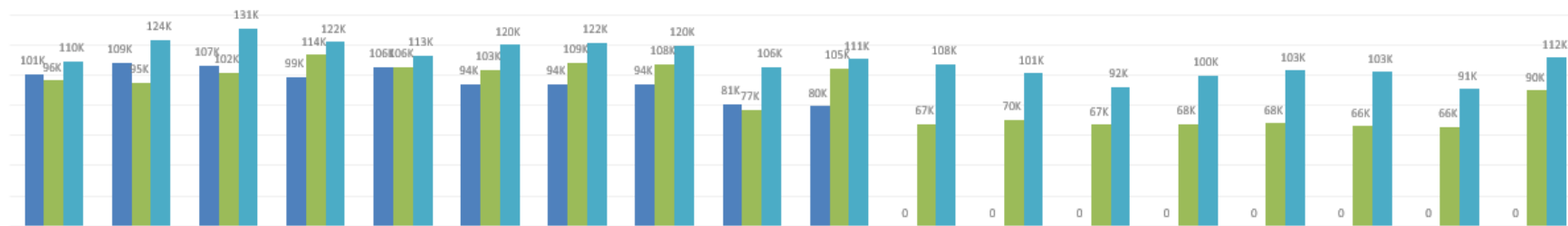
(Ad Hoc Filter) (6 criteria):  
Master Key Account = WAL MART MKA

Chart:

Series: Filter:

Adj. Act. Qty Sales  
Final Demand Plan  
Actual Sales PY

Adj. Act. Qty Sales Final Demand Plan Actual Sales PY



Master Key Account	Pricing Package	Key Figure	2019W32	2019W33	2019W34	2019W35	2019W36	2019W37	2019W38	2019W39	2019W40	2019W41	2019W42	2019W43	2019W44	2019W45	2019W46	2019W47	2019W48
WAL MART MKA	CN 12QZ 12/2	Active Promo Horizon	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		Actual Qty Sales	68,269	72,623	72,848	68,787	70,913	63,356	65,073	64,690	45,019	42,002							
		Adj. Act. Qty Sales	68,269	72,623	72,848	68,787	70,913	63,356	65,073	64,690	45,019	42,002	0	0	0	0	0	0	0
		Actual Sales PY	79,464	92,101	96,921	92,786	82,582	87,327	88,321	87,002	79,036	82,875	80,124	76,029	69,024	73,555	76,844	74,926	66,712
		Retail Price PY	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.33
		Actual Qty Returns	531	673	748	1,004	604	512	401	518	547	741	0	0	0	0	0	0	0
		Depro Adj Sales Qty	57,237	60,831	60,975	57,554	59,328	53,086	54,480	54,206	37,940	33,954	0	0	0	0	0	0	0
		Depro Prop Factors	46200.30899	46997.80972	47239.00607	48127.04626	49493.62631	50165.52823	50809.49819	52276.8307	54142.36334	54135.9341	51240.9794	55781.55591	55790.08093	55733.69305	55780.08738	55680.0256	55724.1805
		Depro Stat Forecast Qty	46,700	48,306	48,850	49,204	50,052	52,196	51,897	52,638	53,917	53,606	51,115	59,862	59,906	59,788	60,105	60,193	60,185
		Lift Factor Low Lv	1.23419	1.23419	1.23419	1.23419	1.23419	1.23419	1.23419	1.23419	1.23419	1.23419	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
		Promoted Stat Forecast Qty	55,664	57,547	58,218	58,645	59,639	62,215	61,864	62,759	64,361	66,943	25,555	37,648	37,682	37,598	37,800	37,857	37,855
		DPISat Variance	4,669	2,232	4,218	15,835	12,173	7,443	7,797	6,944	-19,619	0	0	0	0	0	0	0	0
		Final Demand Plan	60,334	59,779	62,437	74,479	71,812	69,658	69,661	69,703	44,742	66,943	25,555	37,648	37,682	37,598	37,800	37,857	37,855
		DP Fest (1W Lag)	71,042	71,180	72,275	76,519	71,812	69,658	69,661	69,703	44,742	26,749	25,555	37,648					
		EDV Price (Pr Pkg Level Ave)	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68
		Ad Price (Pr Pkg Level Ave)	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68
		Retail Price	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$3.48	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68
		Cannibal Disc %																	
		Price Delta % Low	26%	26%	26%	26%	26%	26%	26%	26%	26%	0%	0%	0%	0%	0%	0%	0%	
		PR Post Booster																	
		PR Pre Promo																	1
		PR Post Promo											1						
	CN 12QZ 24/1	Active Promo Horizon	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		Actual Qty Sales	32,544	36,052	33,737	30,026	34,661	31,104	29,228	29,538	35,843	37,734							
		Adj. Act. Qty Sales	32,544	36,052	33,737	30,026	34,661	31,104	29,228	29,538	35,843	37,734	0	0	0	0	0	0	0
		Actual Sales PY	30,164	31,688	34,158	29,391	30,561	33,032	33,527	33,017	26,493	28,084	27,419	25,212	23,430	26,286	26,333	27,580	24,167
		Retail Price PY	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.98	\$ 6.48	\$ 6.48
		Actual Qty Returns	200	152	211	142	255	169	137	178	152	402							
		Depro Adj Sales Qty	27,215	30,154	28,214	25,112	28,999	26,019	24,443	24,703	30,107	22,490	0	0	0	0	0	0	0
		Depro Prop Factors	29035.9851	29020.72486	28355.00843	28120.59493	28594.49282	28528.5041	28119.58343	28438.36128	27762.59617	27764.03874	25623.77867	25835.41467	25864.15827	25857.17044	25840.38918	25819.98734	25798.29181
		Depro Stat Forecast Qty	30,192	29,419	32,744	32,771	27,741	26,600	30,630	30,425	27,107	22,533	24,929	19,760	17,811	18,194	18,298	17,114	16,940
		Lift Factor Low Lv	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440	62.85440
		Promoted Stat Forecast Qty	36,111	35,185	39,160	39,191	33,176	31,610	36,627	36,379	32,266	37,821	41,872	32,739	29,513	30,143	30,315	28,355	28,068
		DPISat Variance	0	0	0	0	684	1,997	2,429	1,447	0	0	0	0	0	0	0	0	0
		Final Demand Plan	36,111	35,185	39,160	39,191	33,860	33,807	39,056	37,826	32,266	37,821	41,872	32,739	29,513	30,143	30,315	28,355	28,068
		DP Fest (1W Lag)	35,966	35,091	39,099	39,125	33,860	33,807	39,056	37,826	45,331	37,821	41,872	32,739					
		EDV Price (Pr Pkg Level Ave)	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88	\$7.88
		Ad Price (Pr Pkg Level Ave)	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48
		Retail Price	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48	\$7.48
		Cannibal Disc %	26%	26%	26%	26%	26%	26%	26%	26%	26%	0%	0%	0%	0%	0%	0%	0%	
		Price Delta % Low	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	

Filter:  
Gatorade (3 criteria):  
IBP Demand Product Status = A

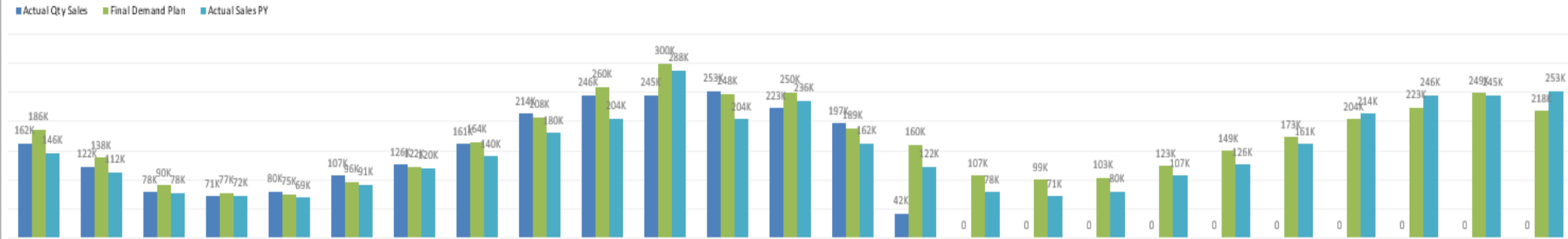
Chart:

Series: Actual Qty Sales, Final Demand Plan, Actual Sales PY

Filter:

### PBV 20-28oz Gatorade

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IBP Demand Product Key Figure		2018P10	2018P11	2018P12	2018P13	2019P01	2019P02	2019P03	2019P04	2019P05	2019P06	2019P07	2019P08	2019P09	2019P10	2019P11	2019P12	2019P13	2020P01	2020P02	2020P03	2020P04	2020P05	2020P06	2020P07	2020P08
A	Actual Qty Sales	162,250	121,748	78,281	71,145	79,586	106,716	125,529	161,481	213,585	246,086	245,281	252,632	222,850	197,243	42,124	0	0	0	0	0	0	0	0	0	0
	Adj. Act. Qty Sales	190,629	130,099	84,870	76,716	86,690	102,753	125,764	161,531	212,408	244,886	244,729	251,953	222,573	197,218	42,124	0	0	0	0	0	0	0	0	0	0
	Actual Qty Returns	1,695	1,180	1,330	1,156	1,429	2,584	2,834	2,613	2,904	2,011	1,449	1,884	3,061	2,705	334	0	0	0	0	0	0	0	0	0	0
	Actual Sales PY	146,370	111,963	77,515	72,139	68,546	91,469	120,307	139,791	180,096	204,495	288,017	203,918	236,189	162,250	121,748	78,281	71,145	79,586	106,716	125,529	161,481	213,585	246,086	245,281	252,632
	Promoted Stat Forecast Qty	191,682	145,754	92,229	75,003	74,486	96,522	109,605	141,616	175,415	253,786	252,844	253,397	221,959	185,953	165,806	105,246	99,269	103,143	122,919	149,174	172,711	204,388	223,424	249,149	218,372
	DP/Stat Variance	-5,487	-8,204	-1,765	1,896	18	-196	12,261	22,840	32,392	6,075	46,713	-5,366	27,637	2,705	-6,201	1,455	-103	-7	0	0	0	0	0	0	0
	Final Demand Plan	186,195	137,551	90,464	76,898	74,503	96,326	121,866	164,456	207,808	259,861	299,557	248,031	249,596	188,658	159,604	106,701	99,166	103,136	122,919	149,174	172,711	204,388	223,424	249,149	218,372
	DP Fcst (1W Lag)	188,032	134,575	91,347	78,248	74,535	105,139	128,010	166,726	207,812	254,846	309,473	239,480	250,406	202,209	123,013	0	0	0	0	0	0	0	0	0	0

Filter:  
(Ad Hoc Filter) (3 criteria):  
IBP Demand Product Status = A

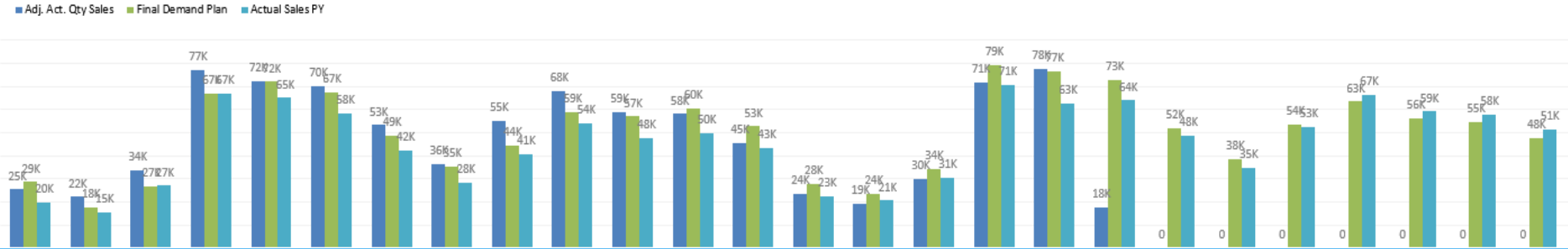
Chart:

Series: Adj. Act. Qty Sales, Final Demand Plan, Actual Sales PY

Filter:

### PBV Education

Last Refresh: 2019-Oct-16 11:50:44



IBP Dem. Key Figure		2018P06	2018P07	2018P08	2018P09	2018P10	2018P11	2018P12	2018P13	2019P01	2019P02	2019P03	2019P04	2019P05	2019P06	2019P07	2019P08	2019P09	2019P10	2019P11	2019P12	2019P13	2020P01	2020P02	2020P03	2020P04	2020P05
A	Actual Qty Sales	22,351	20,380	30,437	70,347	62,706	63,903	48,489	34,586	52,506	66,522	59,090	57,807	51,351	23,477	18,935	29,881	71,716	78,288	17,630	0	0	0	0	0	0	0
	Adj. Act. Qty Sales	25,463	22,204	33,659	77,223	72,371	70,283	53,245	36,284	55,166	67,965	58,819	58,007	45,394	23,506	19,133	29,897	71,468	77,536	17,630	0	0	0	0	0	0	0
	Actual Qty Returns	958	366	640	1,324	1,197	934	914	623	739	1,003	774	579	6,750	911	254	531	1,753	738	74	0	0	0	0	0	0	
	Actual Sales PY	20,036	15,476	26,999	66,683	65,024	58,382	42,423	28,235	40,786	54,242	47,819	49,811	43,300	22,637	20,580	30,651	70,547	62,706	63,903	48,489	34,586	52,506	66,522	59,090	57,807	51,351
	Promoted Stat Forecast Qty	27,744	17,336	23,438	58,577	65,994	63,567	47,815	34,446	43,043	58,017	55,802	52,841	50,434	27,513	23,133	32,537	73,795	69,464	69,486	53,134	39,124	53,579	63,404	56,103	54,557	47,803
	DP Adjustment	121	246	27	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Final Demand Plan	28,683	17,624	26,606	66,647	71,941	67,434	48,609	35,317	44,296	59,031	56,990	60,394	52,672	27,843	23,738	34,059	79,183	76,596	72,623	52,109	38,454	53,600	63,404	56,103	54,557	47,803
	DP Fcst (1W Lag)	28,682	17,561	26,852	66,546	70,783	70,101	50,002	35,274	45,172	58,381	57,226	60,916	53,138	28,007	23,754	34,322	78,550	75,899	55,171	0	0	0	0	0	0	0

# Q & A Session



**Thank you.**