Chapter VI

Results and Analysis

In this study, the proposed inventory policies operated to determine the efficiency gasoline distribution. Three inventory control approach generated with one year historical sales data to compare the efficiency of distribution system between the existing system and proposed inventory models with information sharing.

6.1 Continuous review with maximum forecast error approach.

This approach continues review the inventory level at least once a day. The quantity of safety stocks for each gasoline type varies by absolute maximum shortage quantities of forecast error in previous month. The results of this inventory policy shown as figure 6.1 below

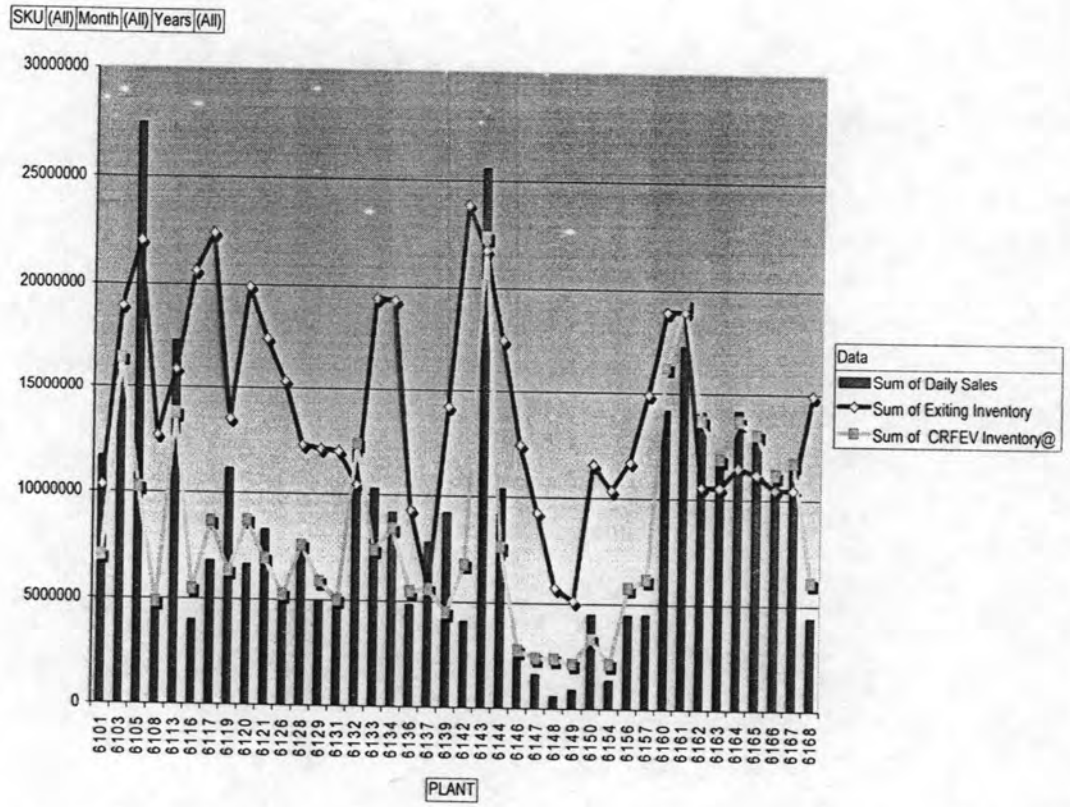

Figure 6.1 End day inventory comparison of existing system and Continuous review method

Figure 6.1 illustrated the comparison of existing inventory system and Continuous review with maximum forecast error approach. The curve indicated that the annually quantities of end day inventory level of Continuous review with maximum forecast error approach has the inventory quantities less than the existing inventory policy. However when considered by product SKU, figured 6.2 – 6.5 indicated the inventory reduction of Benzene oil 95 (500025) and Diesel oil (500033) when apply the Continuous review method. Nevertheless, the proposed inventory system indicated poor results for Benzene oil 91 (500021) and Gasohol (500041). From the figure 6.6 – 6.9, indicated the ratio of success plant which can reduce the inventory quantities when apply the proposed system. Benzene oil 95 can reduced the inventory quantizes for 104,727,750 liters with the ration 64.95% compare with all service station annual end day inventory quantities. There are 38 service stations from 40 service stations that can acquire this successful. As same as Benzene 91, Diesel oil has the successful reduction of end day inventory for 84,070,390 liters with the ratio 47.93% compare with all service station annual end day inventory quantities. The numbers of success service station that can reduce the inventory level are 39 service stations from 40 service stations.

This proposes inventory policy generate poor result for Benzene 91 (500021) and Gasohol (50041) in the number of service stations which successful in inventory reduction. There are 13 services stations from 24 service stations for Benzene 91 and 17 of 31 service stations for Gasohol which successful in inventory reduction with the same ratio 55%. However, Both of Benzene 91 and Gasohol also has a good result of inventory reduction as Benzene 91 can reduce the inventory level for 10,737,330 liters or 11.39% compare with all service station annual end day inventory quantities. Gasohol has the inventory reduction in the number of 29,895,320 liters or 22.18% compare with all service station annual end day inventory quantities.

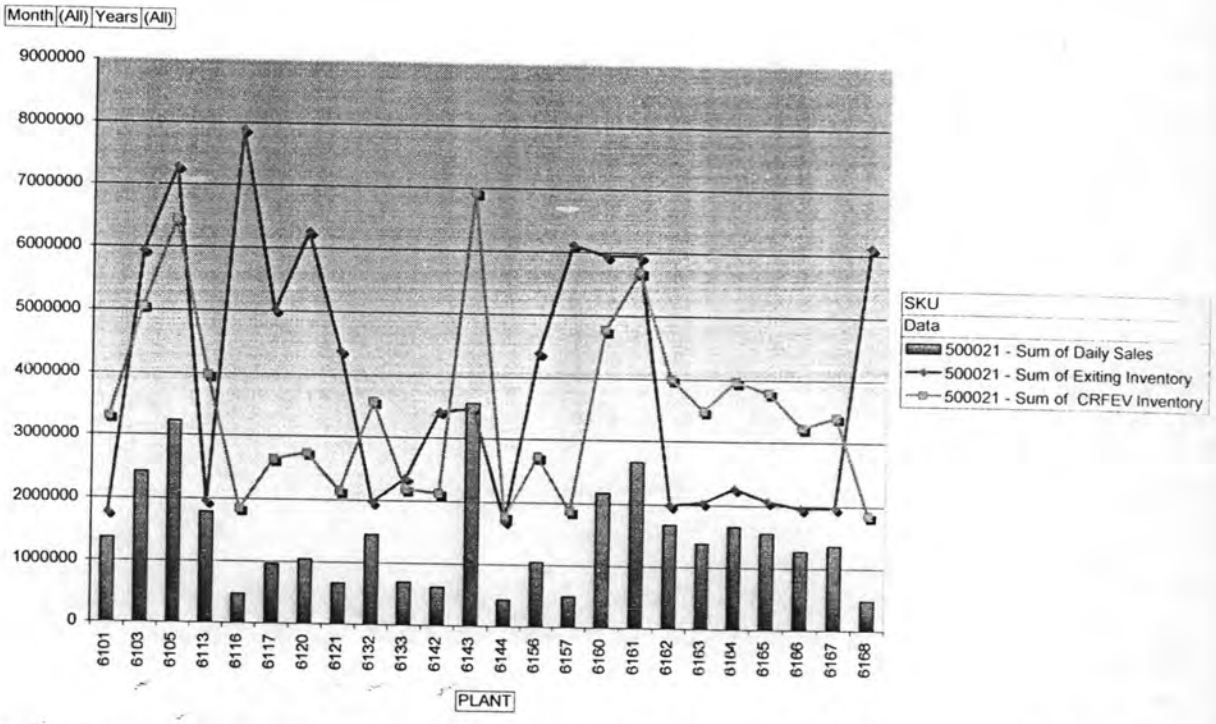

Figure 6.2 End day inventory comparison of existing system and Continuous review method SKU 500021

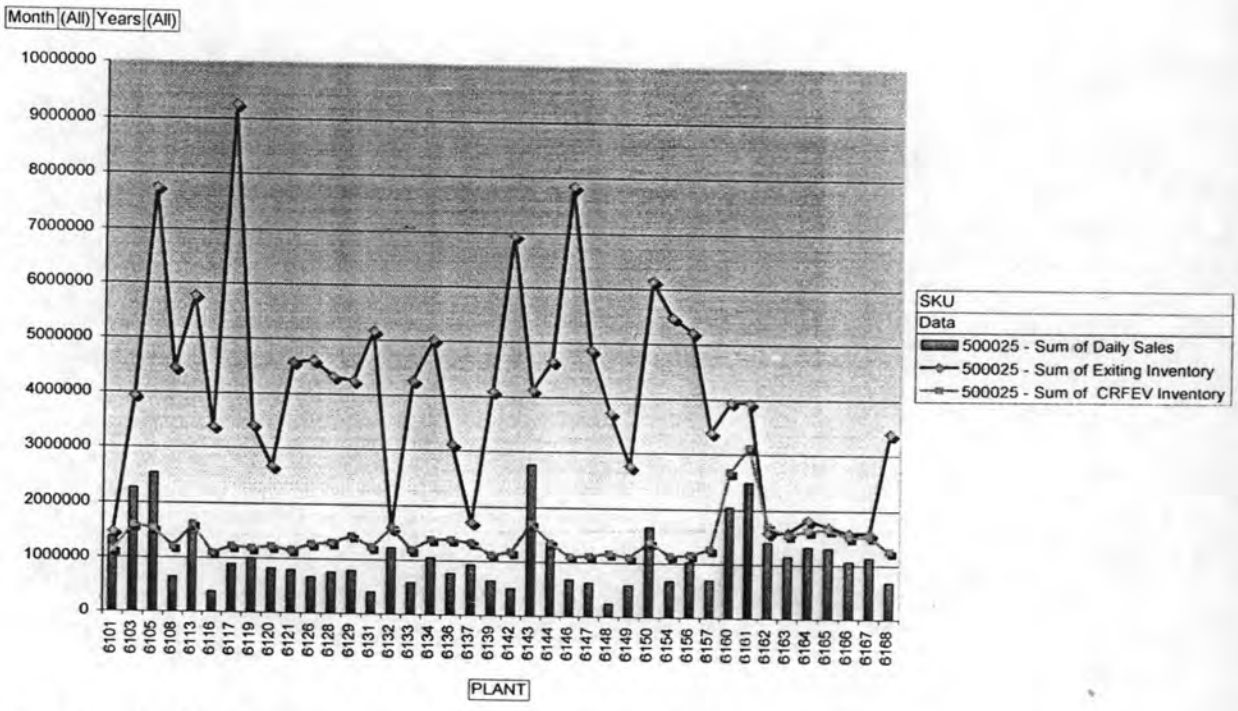

Figure 6.3 End day inventory comparison of existing system and Continuous review method SKU 500025

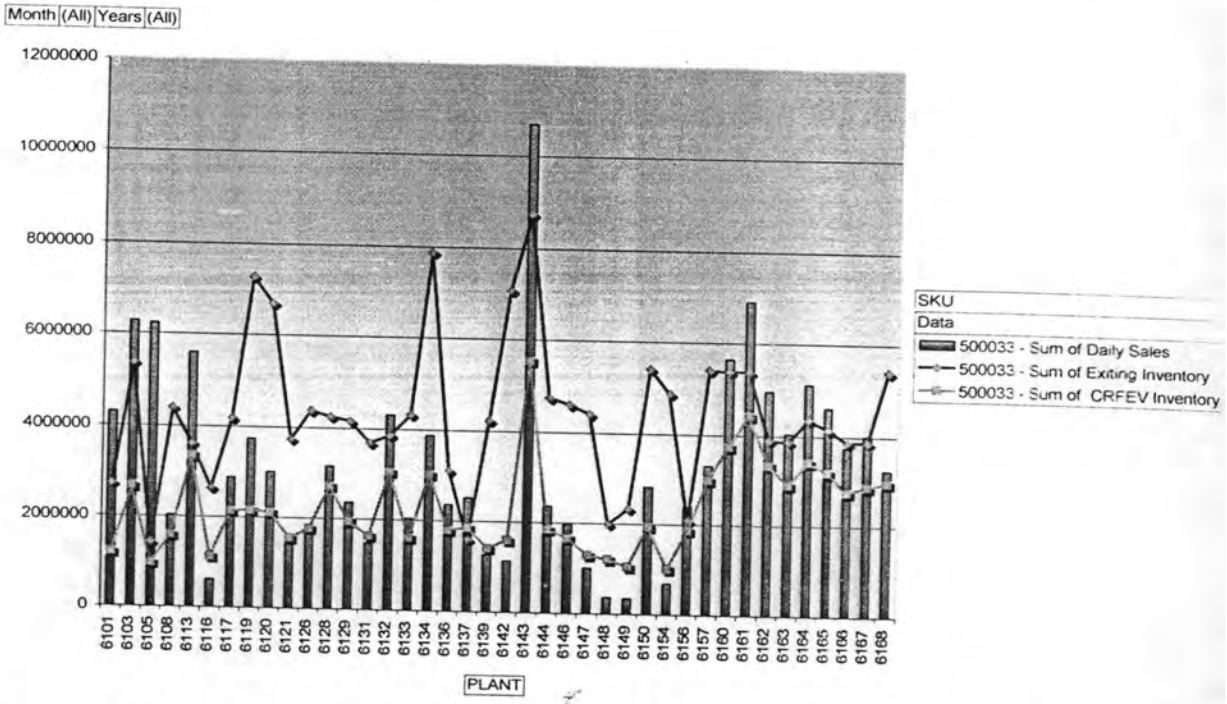

Figure 6.4 End day inventory comparison of existing system and Continuous review method SKU 500033

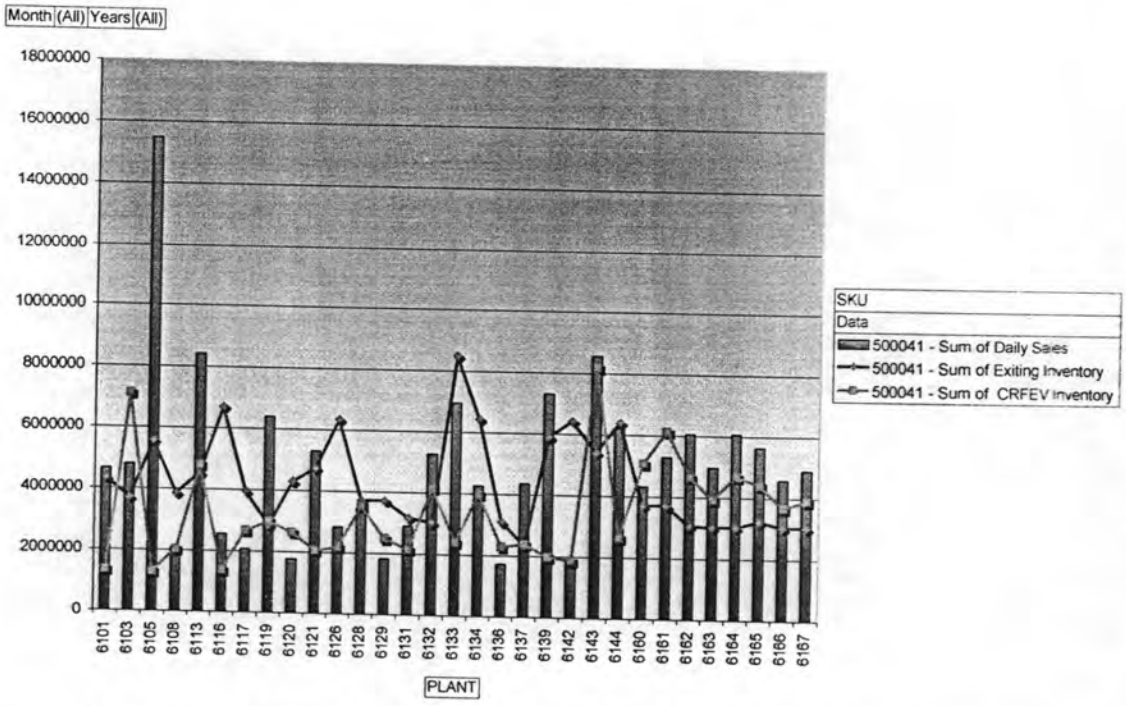

Figure 6.5 End day inventory comparison of existing system and Continuous review method SKU 500041

Figure 6.6 Numbers of plants which has inventory reduction for SKU 500021

	500021		
PLANT	Sum of Exiting Inventory	Sum of CRFEV Inventory	Inventory Reduction
Total end day inventory	94,288,080.00	83,550,750.00	(10,737,330.00)
Ratio of inventory reduction (liters)			(11.39)
Number of inventory reduction (plant)			13.00
Number of service station			24.00
Ratio of inventory reduction (plant)			54.17

	500025		
PLANT	Sum of Exiting Inventory	Sum of CRFEV Inventory	Inventory Reduction
Total end day inventory	161,248,320.00	56,520,570.00	(104,727,750.00)
Ratio of inventory reduction (liters)			(64.95)
Number of inventory reduction (plant)			38.00
Number of service station			40.00
Ratio of inventory reduction (plant)			95.00

Figure 6.7 Numbers of plants which has inventory reduction for SKU 500025

	500033		
PLANT	Sum of Exiting Inventory	Sum of CRFEV Inventory	Inventory Reduction
Total end day inventory	175,406,380.00	91,335,990.00	(84,070,390.00)
Ratio of inventory reduction (liters)			(47.93)
Number of inventory reduction (plant)			39.00
Number of service station			40.00
Ratio of inventory reduction (plant)			97.50

Figure 6.8 Numbers of plants which has inventory reduction for SKU 500033

	500041		
PLANT	Sum of Exiting Inventory	Sum of CRFEV Inventory	Inventory Reduction
Total end day inventory	134,804,130.00	104,908,810.00	(29,895,320.00)
Ratio of inventory reduction (liters)			(22.18)
Number of inventory reduction (plant)			17.00
Number of service station			31.00
Ratio of inventory reduction (plant)			54.84

Figure 6.9 Numbers of plants which has inventory reduction for SKU 500041

6.2 Minimum –Maximum Inventory approach

This approach adopts to generate the reorder level when the inventory level is lower than the specific minimum inventory which included the daily average sales and safety stock. The maximum inventory quantities are limited by stock target level which generates from average sales over time interval and lead time plus safety stock. Safety stock is equal to the specific 95% customer service level. The results of this inventory policy shown as figure 6.10 below

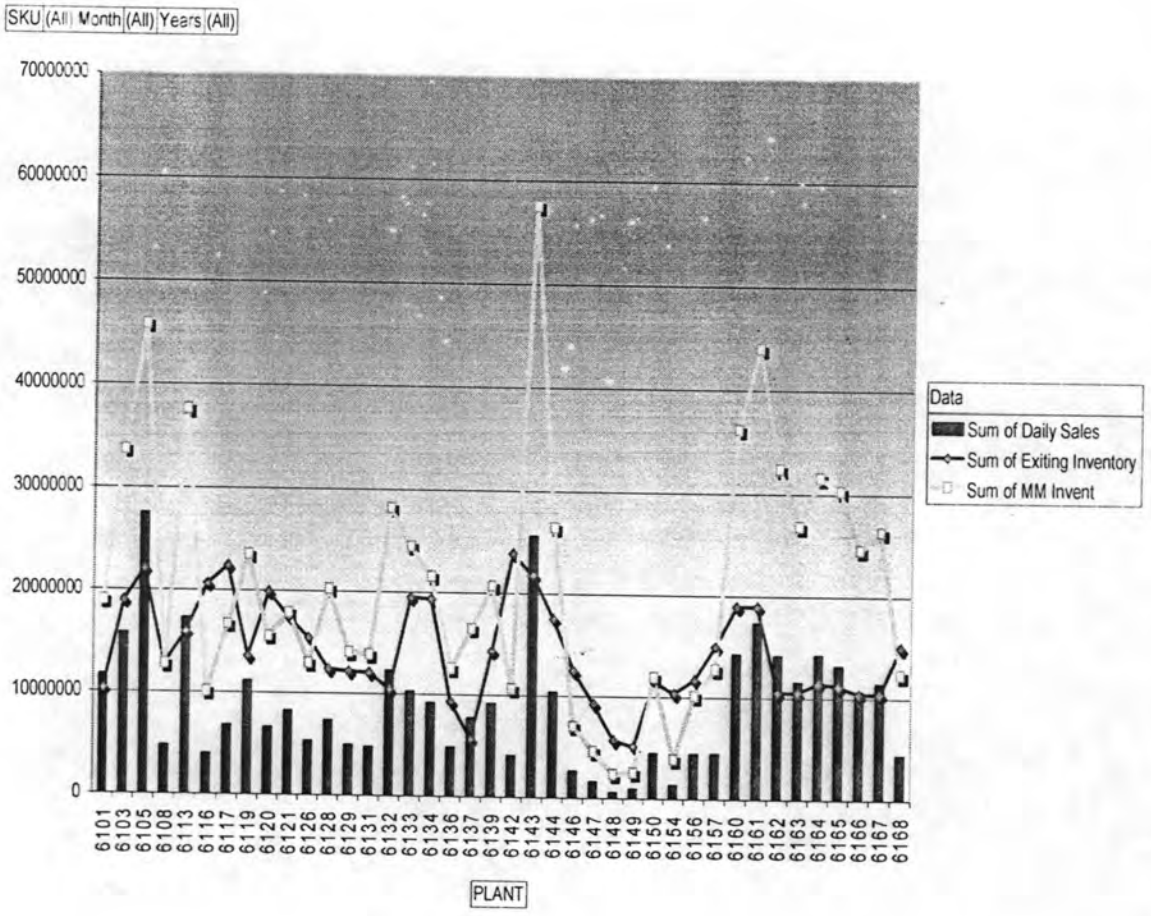

Figure 6.10 End day inventory comparison of existing system and Continuous review method

Figure 6.10 illustrated the comparison of existing inventory system and Minimum - Maximum inventory approach. The curve indicated the poor results of proposed inventory approach compare with the existing inventory policy. Further more, the figure iliustrated that the proposed policy has the highly number of inventory quantities and few numbers of service station that success in inventory reduction.

However when considered by product SKU, figured 6.11 – 6.14 indicated the inventory reduction of Benzene oil 91 (500021) and Benzene oil 95 (500025) when apply the Minimum - Maximum method. Nevertheless, the proposed inventory system indicated poor results for Diesel oil (500033) and Gasohol (500041). From the figure 6.15 – 6.18 indicated the ratio of success plant which can reduce the inventory quantities when apply the proposed system. Benzene oil 91 can reduced the inventory quantities for 25,438,450 liters with the ration 26.98 % compare with all service station annual end day inventory quantities. There are 13 service stations from 24 service stations that can acquire this successful. As same as Benzene 91, Diesel oil has the successful reduction of end day inventory for 32,220,850 liters with the ratio 19.98 % compare with all service stations annual end day inventory quantities. The numbers of success service station that can reduce the inventory level are 27 service stations from 40 service stations.

Nevertheless, this proposes inventory policy generate poor result for Diesel oil (500033) and Gasohol (50041) as the high number of end day inventory quantities and a few number of service stations which successful in inventory reduction. There are 139,117,580 liters of Diesel oil increasing from existing inventory method or by 79.31 % more and with only 7 of 40 service stations that can reduce the end day inventory. Gasohol has a highest number of end day inventory quantities which increase from 134,804,130 liters to 319,225,630 liters by 184,421,500 liters or 136 % more. In addition there are only 4 of 31 service stations that successful in end day inventory reduction.

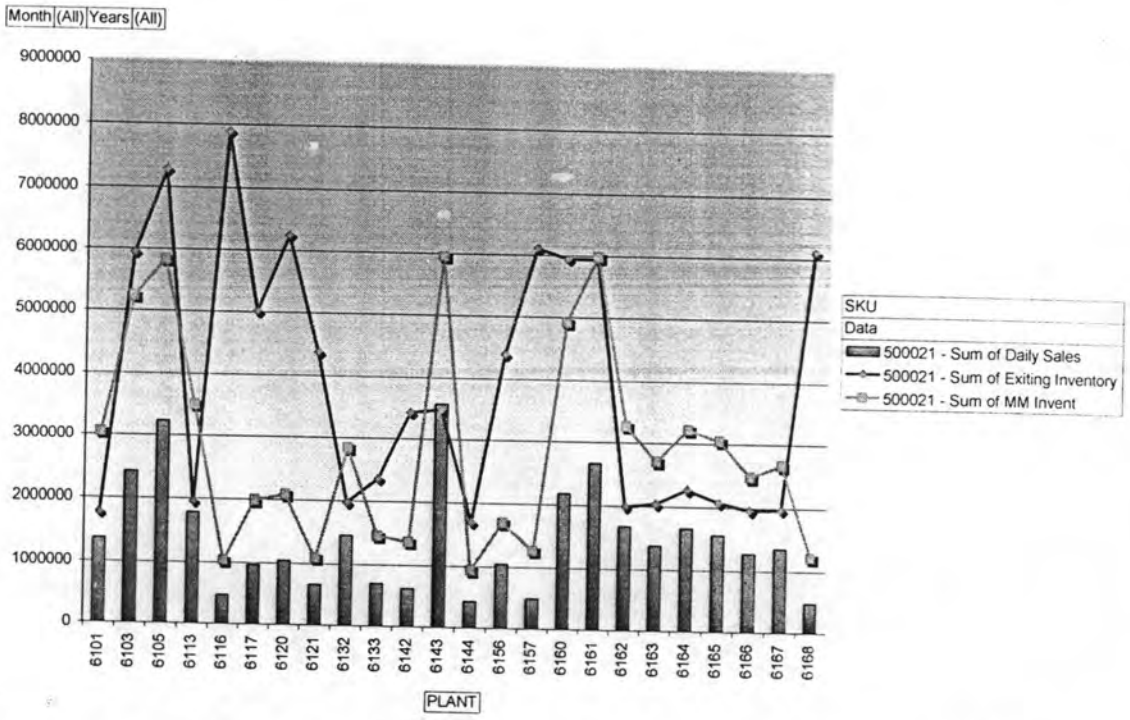

Figure 6.11 End day inventory comparisons of existing system and Min - Max method SKU 500021

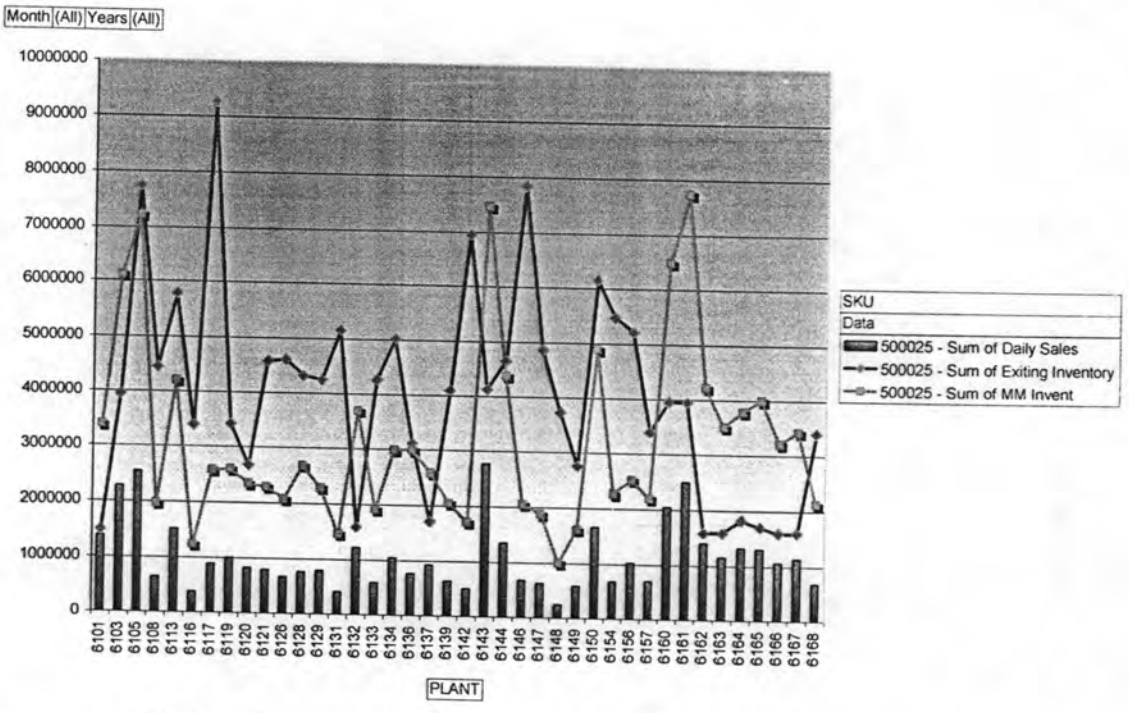

Figure 6.12 End day inventory comparisons of existing system and Min - Max method SKU 500025

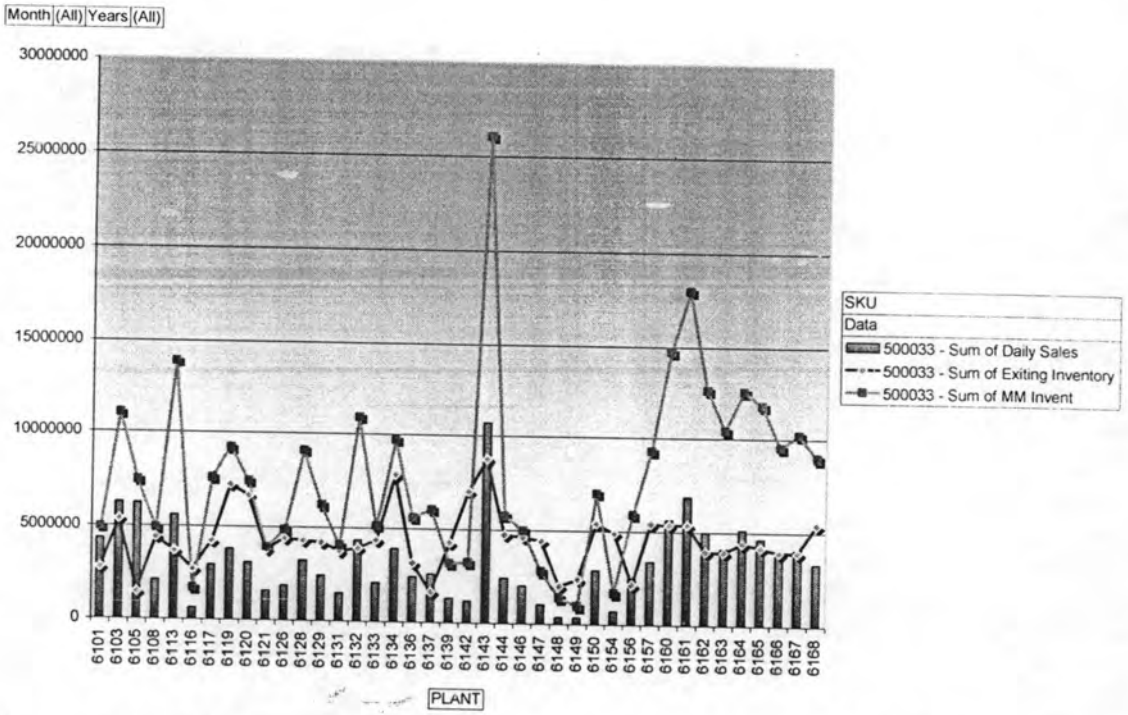

Figure 6.13 End day inventory comparisons of existing system and Min - Max method SKU 500033

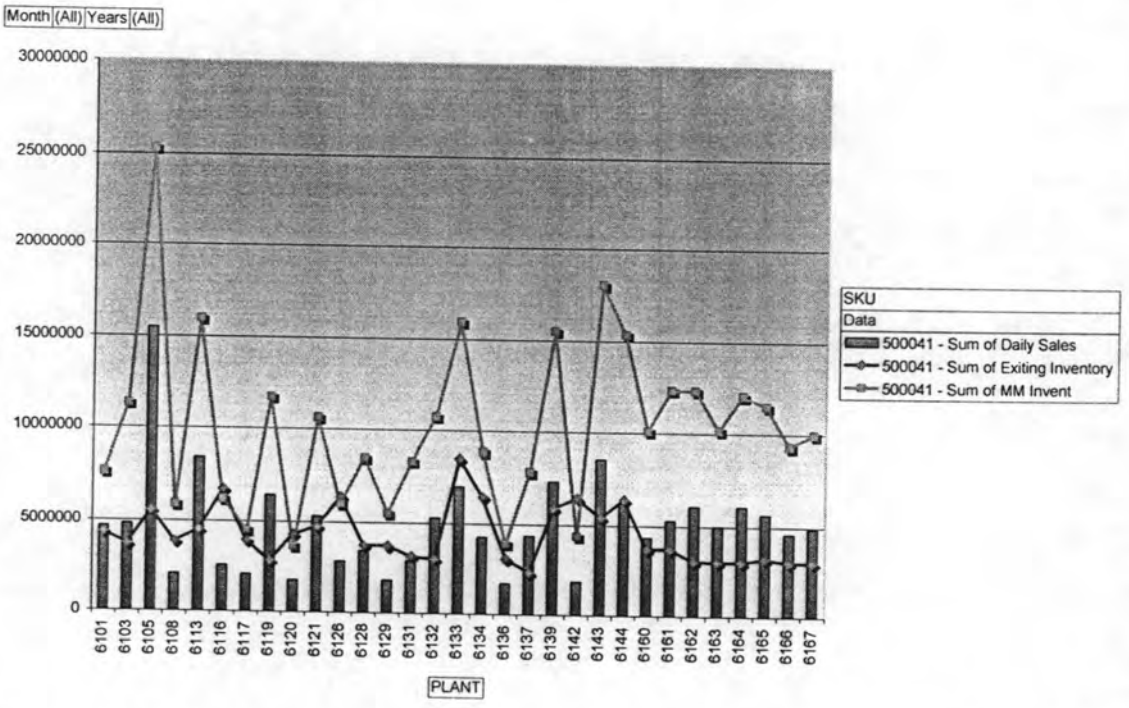

Figure 6.14 End day inventory comparisons of existing system and Min - Max method SKU 500041

	500021		
PLANT	Sum of Exiting Inventory	Sum of MM Inventory	Inventory Reduction
Total end day inventory	94,288,080.00	68,849,630.00	(25,438,450.00)
Ratio of inventory reduction (liters)			(26.98)
Number of inventory reduction (plant)			13.00
Number of service station			24.00
Ratio of inventory reduction (plant)			54.17

Figure 6.15 Numbers of plants which has inventory reduction for SKU 500021

	500025		
PLANT	Sum of Exiting Inventory	Sum of MM Inventory	Inventory Reduction
Total end day inventory	161,248,320.00	129,027,470.00	(32,220,850.00)
Ratio of inventory reduction (liters)			(19.98)
Number of inventory reduction (plant)			27.00
Number of service station			40.00
Ratio of inventory reduction (plant)			67.50

Figure 6.16 Numbers of plants which has inventory reduction for SKU 500025

	500033		
PLANT	Sum of Exiting Inventory	Sum of MM Inventory	Inventory Reduction
Total end day inventory	175,406,380.00	314,523,960.00	139,117,580.00
Ratio of inventory reduction (liters)			79.31
Number of inventory reduction (plant)			7.00
Number of service station			40.00
Ratio of inventory reduction (plant)			17.50

Figure 6.17 Numbers of plants which has inventory reduction for SKU 500033

	500041		
PLANT	Sum of Exiting Inventory	Sum of MM Inventory	Inventory Reduction
Total end day inventory	134,804,130.00	319,225,630.00	184,421,500.00
Ratio of inventory reduction (liters)			136.81
Number of inventory reduction (plant)			4.00
Number of service station			31.00
Ratio of inventory reduction (plant)			12.90

Figure 6.18 Numbers of plants which has inventory reduction for SKU 500041

6.3 Minimum –Maximum Inventory with maximum forecast error approach

This approach adopts to generate the reorder level when the inventory level is lower than the specific minimum inventory which included the daily average sales and safety stock. However, safety stocks vary by maximum shortage quantities of forecast error in previous month. The maximum order quantities are limited by stock target level which generates from average sales over time interval and lead time plus safety stock. The results of proposed inventory policy illustrate as figure 6.19 below

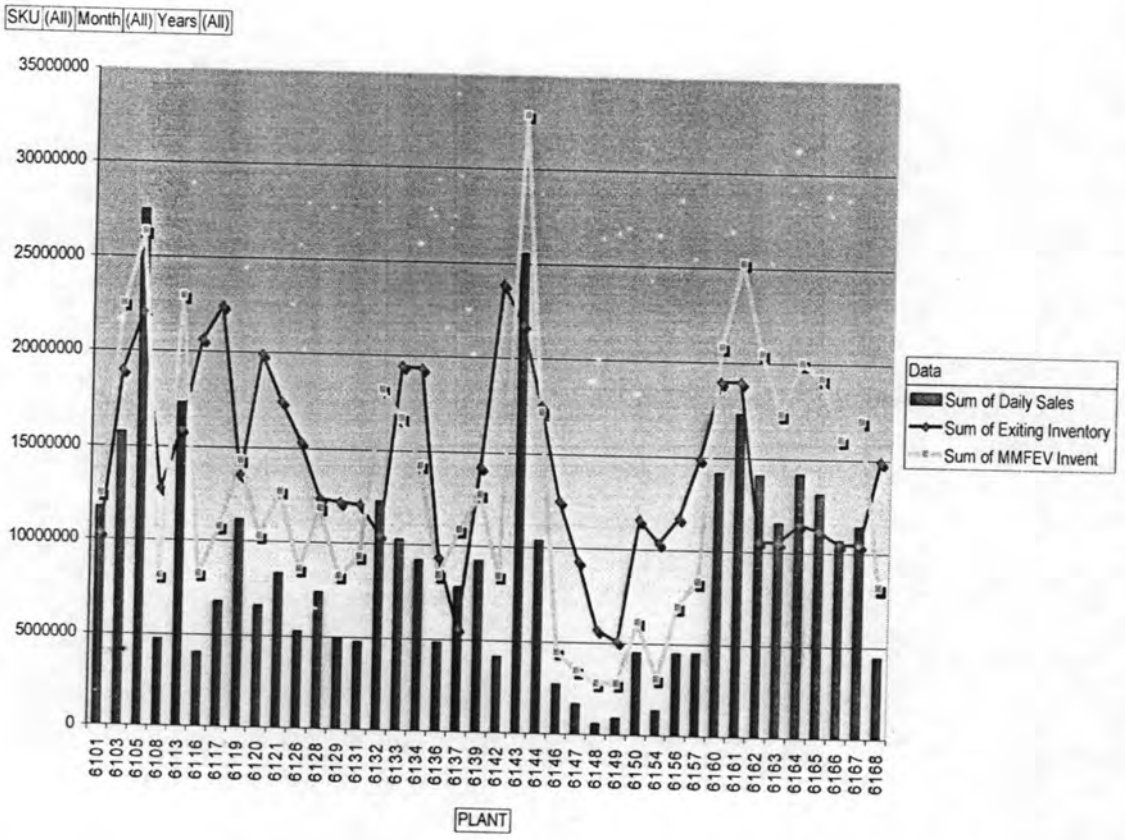

Figure 6.19 End day inventory comparison of existing system and Minimum –Maximum with maximum forecast error approach

Figure 6.19 illustrated the comparison of existing inventory system and Minimum - Maximum inventory with maximum forecast error approach. The curve indicated the potential from apply the proposed inventory approach compare with the

existing inventory policy. Further more, the figure illustrated that the proposed inventory policy have the lower number of inventory quantities and high numbers of service station that success in inventory reduction.

In the same way as Minimum – Maximum approach above, the proposed system Minimum –Maximum with maximum forecast error approach generate good results of inventory reduction for Benzene oil 91 (500021) and Benzene oil 95 (500025). There are 43.40 % or 40,924,990 liters of Benzene oil 91 end day inventory reductions. The numbers of success service stations that can reduce the inventory level are 14 service stations from total 24 service station or 58.33%. Meanwhile Benzene Oil 95 has the potential reduction of end day inventory level from 161,248,320 liters to 86,202,640 liters by 75,045,680 liters lower or 46.54%. There are 29 of 40 service stations which success in inventory reduction.

On the other hand, the propose inventory approach poor result for Diesel oil (500033) and Gasohol (500041) as the high number of end day inventory quantities. There are 628,490 liters increasing from 175,406,380 liters to 176,034,870 liters or 0.36% more. However, the number of success service stations quite average with 22 of 40 service stations or 55%.

Meanwhile, Gasohol has the highest number of end day inventory increasing 77,68,670 liters from 134,804,130 liters to 212,486,800 liters or 57.63%. Further more, there are very low numbers of service station that success in inventory reduction with 8 of 31 service stations or 25.81%.

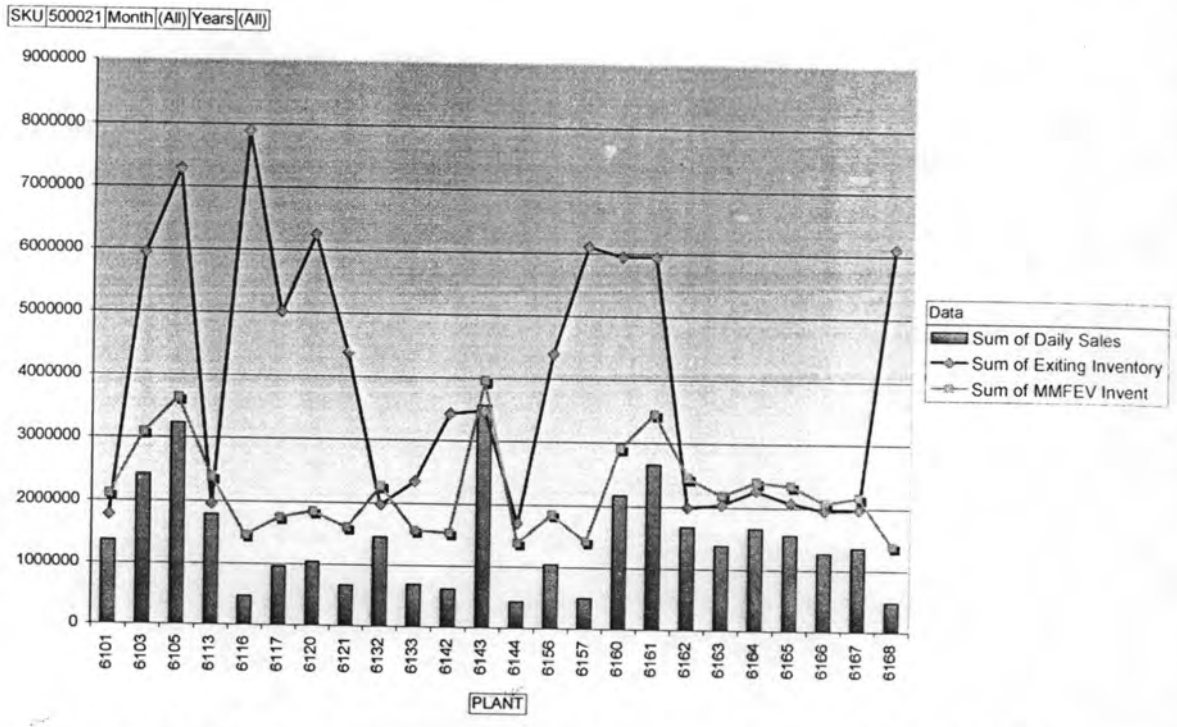

Figure 6.20 End day inventory comparisons of existing system and Min - Max with maximum forecast error approach SKU 500021

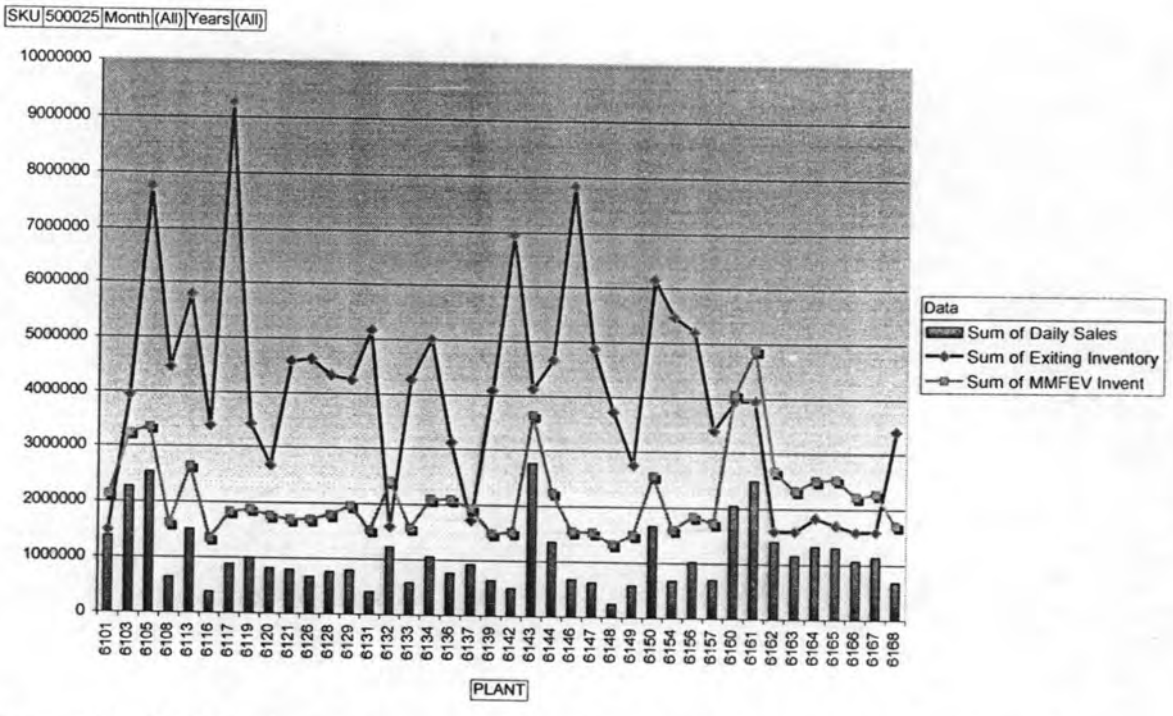

Figure 6.21 End day inventory comparisons of existing system and Min - Max with maximum forecast error approach SKU 500025

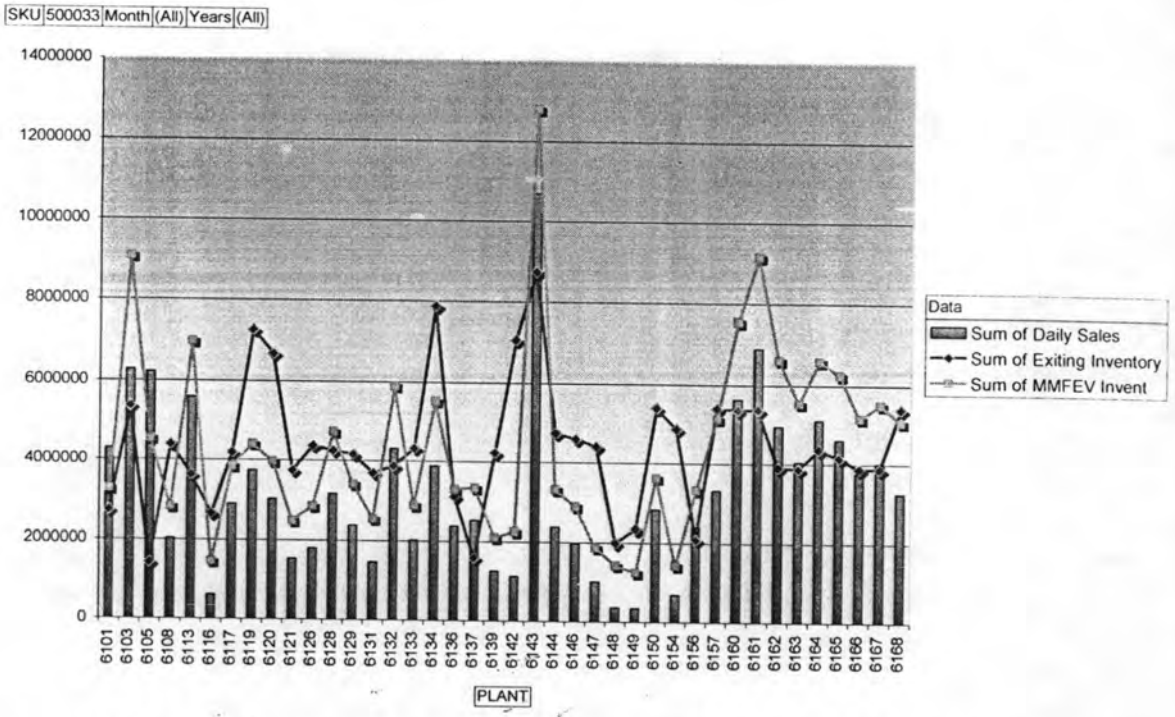

Figure 6.22 End day inventory comparisons of existing system and Min - Max with maximum forecast error approach SKU 500033

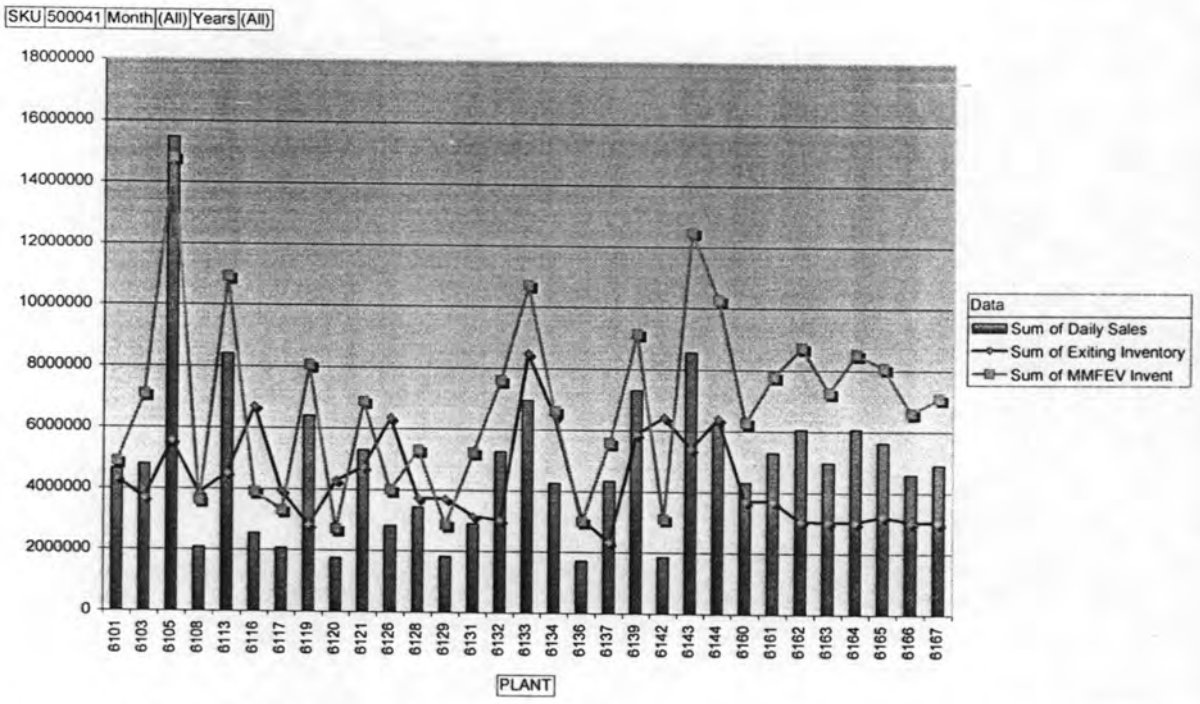

Figure 6.23 End day inventory comparisons of existing system and Min - Max with maximum forecast error approach SKU 500041

	500021		
PLANT	Sum of Exiting Inventory	Sum of MMFE Inventory	Inventory Reduction
Total end day inventory	94,288,080.00	53,363,090.00	(40,924,990.00)
Ratio of inventory reduction (liters)			(43.40)
Number of inventory reduction (plant)			14.00
Number of service station			24.00
Ratio of inventory reduction (plant)			58.33

Figure 6.24 Numbers of plants which has inventory reduction for SKU 500021

	500025		
PLANT	Sum of Exiting Inventory	Sum of MMFE Inventory	Inventory Reduction
Total end day inventory	161,248,320.00	86,202,640.00	(75,045,680.00)
Ratio of inventory reduction (liters)			(46.54)
Number of inventory reduction (plant)			29.00
Number of service station			40.00
Ratio of inventory reduction (plant)			72.50

Figure 6.25 Numbers of plants which has inventory reduction for SKU 500025

	500033		
PLANT	Sum of Exiting Inventory	Sum of MMFE Inventory	Inventory Reduction
Total end day inventory	175,406,380.00	176,034,870.00	628,490.00
Ratio of inventory reduction (liters)			0.36
Number of inventory reduction (plant)			22.00
Number of service station			40.00
Ratio of inventory reduction (plant)			55.00

Figure 6.26 Numbers of plants which has inventory reduction for SKU 500033

	500041		
PLANT	Sum of Exiting Inventory	Sum of MMFE Inventory	Inventory Reduction
Total end day inventory	134,804,130.00	212,486,800.00	77,682,670.00
Ratio of inventory reduction (liters)			57.63
Number of inventory reduction (plant)			8.00
Number of service station			31.00
Ratio of inventory reduction (plant)			25.81

Figure 6.27 Numbers of plants which has inventory reduction for SKU 500033

6.4 Perform cost and benefit analysis of the propose inventory model and the existing model

In order to perform the benefit comparison between the existing system and the proposed system under information sharing, two performance metrics have been taken into account are

6.4.1 End day inventory level which low quantities of inventory indicate a good performance of cost reduction.

6.4.2 Fill rate is the percentage of demand filled from available stock which include

- Fill rate unit ratio is the percentage of demand in liter unit filled from available inventory.
- Fill rate time ratio is the percentage of demand in time unit filled the customer demand from available inventory.

Description	Daily Sales	Exiting Inventory	CRFEV Inventory	MM Invent	MMFEV Invent
Grand total	360,946,770	565,746,910	336,316,120	831,626,690	528,087,400
Total Shortage (times)			303	195	73
Total Shortage (liters)			(1,411,680)	(490,150)	(460,590)
Ratio Shortage / Sales (times)			0.61	0.40	0.15
Ratio Shortage / Sales (liters)			0.39	0.14	0.13
Fill rate (times)			99.39	99.60	99.85
Fill rate (liters)			99.61	99.86	99.87

Figure 6.28 Performance metrics of inventory management

Figure 6.28 above illustrated the total inventory and total fill rate ratio of existing system and proposed system. The proposed inventory with information sharing has the good performance of end day inventory compare with the existing inventory method. Continuous review with maximum forecast error approach has the best performance and follow by Minimum – Maximum Inventory with maximum forecast error approach. However when consider about the frequency of shortage, Continuous review with maximum forecast error approach has the number of shortage four times higher than Minimum – Maximum Inventory with maximum forecast error approach with the ratio 0.61% and 0.15% respective. Fill rate time ratio and Fill rate quantities ratio of Continuous review with maximum forecast error approach are 99.39% and 99.61% respective. Meanwhile Minimum – Maximum Inventory with maximum forecast error approach has Fill rate time ratio and Fill rate quantities ratio at 99.85% and 99.87%. Further more, Minimum – Maximum Inventory approach generate worse performance of end day inventory level with the higher inventory level compare with the existing system. These results indicated that the safety stock policy which equal to the specific 95% customer service level generate poor results when compare with the maximum forecast error method. With specific 95% service level, the safety stock is varying by the value of standard deviation of each four sliding weeks multiply with (Z)1.64.The highest number of inventory level has been generated from the maximum stock target level which included average daily sales and safety stock over four sliding weeks which not response to end customer demand. However, the reduction in number of day which use to calculate the average daily sale from four sliding weeks to one or two sliding weeks can generate more accuracy of end customer demand as more recent of observed data generate more responsiveness to end customer demand which finally lead to overall inventory reduction.

6.5 Cluster Analysis

Hierarchical cluster analysis method operates to criteria forty service stations by their sales volumes and profit margin which generate from the ratio of end day inventory and sales volume. This study classify service stations to four clusters included Cluster 1 – Cluster 4 as illustrated in figure 6.31- 6.33. Further more, figure 6.38 shows the number of membership in each cluster. Cluster 1 include 19 service

stations, Cluster 2 has 3 service stations meanwhile Cluster 3 has 2 service stations and Cluster 4 has 16 service stations. Nevertheless sequence of cluster number has no correlation to the potential level of cluster. From figure 6.34 – 6.37 show the comparison of each cluster potential. With taken in to account of sales volumes, Cluster 3 has the highest sales volume which follow by Cluster 2, Cluster 1 and Cluster 4 respectively. Meanwhile, when taken in to account of profit margin, the highest potential generated by Cluster 3 which follow by Cluster 2, Cluster 1 and Cluster 4 respectively.

Figure 6.29 Cluster analysis case summaries

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
40	100.0	0	.0	40	100.0

a. Average Linkage (Between Groups)

Figure 6.30 Average linkages between groups

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	28	31	240870400.008	0	0	6
2	32	36	249008400.360	0	0	8
3	5	33	542424100.032	0	0	30
4	4	14	661004100.001	0	0	9
5	17	20	1126944900.033	0	0	33
6	28	30	1159803200.003	1	0	7
7	28	40	5303747600.005	6	0	19
8	32	34	6101096200.180	2	0	27
9	4	18	6860581650.019	4	0	14
10	16	23	9504300100.004	0	0	18
11	6	21	11610062500.001	0	0	22
12	1	35	21465180100.241	0	0	15
13	7	9	24554890000.001	0	0	28
14	4	13	37413581100.005	9	0	19
15	1	39	54754690250.116	12	0	20
16	25	29	74736624400.003	0	0	24
17	26	27	100324227600.005	0	0	24
18	16	38	122337861050.213	10	0	29
19	4	28	143887730900.012	14	7	22
20	1	8	185234634300.066	15	0	26
21	12	19	195894760000.609	0	0	23
22	4	6	393655380525.046	19	11	25
23	10	12	576746880400.423	0	21	28
24	25	26	581772793100.002	16	17	31
25	4	11	679014923460.010	22	0	35
26	1	15	703069591475.112	20	0	29
27	32	37	1066235473700.090	8	0	34
28	7	10	1359392021967.080	13	23	33
29	1	16	1544188930506.819	26	18	34
30	2	5	2443901801050.037	0	3	37
31	24	25	2465978971750.005	0	24	35
32	3	22	3619201856400.007	0	0	39
33	7	17	3733757942490.169	28	5	36
34	1	32	8026297683662.710	29	27	36
35	4	24	10572552899127.310	25	31	38
36	1	7	20474666122620.570	34	33	37
37	1	2	45471539193766.800	36	30	38
38	1	4	72387897665141.300	37	35	39
39	1	3	361352345240734.8	38	32	0

Figure 6.31 Cluster membership

Cluster Membership

Case	4 Clusters	3 Clusters	2 Clusters
1	1	1	1
2	2	1	1
3	3	2	2
4	4	3	1
5	2	1	1
6	4	3	1
7	1	1	1
8	1	1	1
9	1	1	1
10	1	1	1
11	4	3	1
12	1	1	1
13	4	3	1
14	4	3	1
15	1	1	1
16	1	1	1
17	1	1	1
18	4	3	1
19	1	1	1
20	1	1	1
21	4	3	1
22	3	2	2
23	1	1	1
24	4	3	1
25	4	3	1
26	4	3	1
27	4	3	1
28	4	3	1
29	4	3	1
30	4	3	1
31	4	3	1
32	1	1	1
33	2	1	1
34	1	1	1
35	1	1	1
36	1	1	1
37	1	1	1
38	1	1	1
39	1	1	1
40	4	3	1

Figure 6.32 Cluster analyses with two subgroups

Average Linkage (Between Groups)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	38	95.0	95.0	95.0
	2	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

Figure 6.33 Cluster analyses with three subgroups

Average Linkage (Between Groups)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	55.0	55.0	55.0
	2	2	5.0	5.0	60.0
	3	16	40.0	40.0	100.0
	Total	40	100.0	100.0	

Figure 6.34Cluster analyses with four subgroups

Average Linkage (Between Groups)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	47.5	47.5	47.5
	2	3	7.5	7.5	55.0
	3	2	5.0	5.0	60.0
	4	16	40.0	40.0	100.0
	Total	40	100.0	100.0	

Figure 6.35 Descriptive statistic tic of Cluster 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Sales	19	6618700.00	14170590.00	10522340.5263	2450509.91860
Profit_Mar	19	.3000	1.3800	.833158	.3643572
Valid N (listwise)	19				

Figure 6.36 Descriptive statistic tic of Cluster 2

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Sales	3	15744310.00	17319210.00	16786480.0000	902620.81612
Profit_Mar	3	.8300	1.0900	.943333	.1331666
Valid N (listwise)	3				

Figure 6.37 Descriptive statistic tic of Cluster 3

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Sales	2	25569320.00	27471740.00	26520530.0000	1345214.08267
Profit_Mar	2	1.1700	1.2500	1.210000	.0565685
Valid N (listwise)	2				

Figure 6.38 Descriptive statistic tic of Cluster 4

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Sales	16	607240.00	5289710.00	3604862.5000	1593481.54088
Profit_Mar	16	.1100	.5200	.286250	.1209339
Valid N (listwise)	16				

Figure 6.39 below illustrated member of each service station subgroup.

Figure 6.39 Summary of each cluster member.

Plant	Cluster	Plant	Cluster	Plant	Cluster	Plant	Cluster
6101	1	6103	2	6105	3	6108	4
6117	1	6113	2	6143	3	6116	4
6119	1	6161	2	**Total Plant**	**2**	6126	4
6120	1	**Total Plant**	**3**			6129	4
6121	1					6131	4
6128	1					6136	4
6132	1					6142	4
6133	1					6146	4
6134	1					6147	4
6137	1					6148	4
6139	1					6149	4
6144	1					6150	4
6160	1					6154	4
6162	1					6156	4
6163	1					6157	4
6164	1					6168	4
6165	1					**Total Plant**	**16**
6166	1						
6167	1						
Total Plant	**19**						

Figure 6.40 Comparison of each cluster potential

Cluster	Factor	N	Min	Max	Mean	Std. Deviation
3	Profit Margin	2	1.17	1.25	**1.210000**	0.056568542
2	Profit Margin	3	0.83	1.09	0.943333	0.133166562
1	Profit Margin	19	0.3	1.38	0.833158	0.3643572
4	Profit Margin	16	0.11	0.52	0.286250	0.120933866
3	Sales Volumes	2	25,569,320	27,471,740	**26,520,530**	1345214.083
2	Sales Volumes	3	15,744,310	17,319,210	16,786,480	902620.8161
1	Sales Volumes	19	6,618,700	14,170,590	15,124,959	1679566.846
4	Sales Volumes	16	607,240	5,289,710	3,604,863	1593481.541

The figure 6.40 above show the potential of each cluster by cluster 3, cluster 2, cluster 1 and cluster 4 respective. However when consider the correlation between the distance from central depot to each service station and potential of each service station, it founded that number of distance do not relate to the potential of service station. From figure 6.41, the numbers of distance in each cluster are varied from short distance to far distance. However as in cluster 4 with plant number6116, it shown that shortest distance does not generate the high number of potential for service station. In addition, the same number of distance from each service station to central depot generate the different of potential level such as with the same 10 kilometers distance of plant number 6113, 6121 and 6146 , the potential level of each service station are different as these service stations belong to cluster 2, cluster 3 and cluster 4 respective.

In the next chapter, all work done in Chapter I through Chapter VI will be concluded and suggestion would be addressed as well.

Figure 6.41 Distance of each service station

Plant	Cluster	Distance	Plant Area	Plant	Cluster	Distance	Plant Area
6105	3	30	Airport 2	6108	4	25	Ladprakao
6143	3	20	Vibavadee	6116	4	2	Sanphavut
6103	2	18	Vibavadee	6117	4	16	Ladprao
6113	2	10	Pattanakarn	6120	4	25	Chatujak
6160	2	31	Airport 1	6126	4	10	Rongmuang
6161	2	10	Rama 4	6129	4	12	Bantadthong
6162	2	30	Phaholyotin 30	6131	4	31	Nongkham
6164	2	27	Ngamwongwarn	6136	4	10	Rama 1
6165	2	10	South NaNa	6142	4	16	Soi Aree
6101	1	13	Sanampao	6146	4	10	Saintlouis
6119	1	20	Dowkanong	6147	4	16	Samsennai
6121	1	10	Prakanong	6148	4	25	Ladyao
6128	1	10	Thungmahamek	6149	4	52	Phaholyotin
6132	1	15	Ladprao	6150	4	50	Prachachurn
6133	1	25	Bangborn	6154	4	10	Rama 3
6134	1	4	Prakanong	6156	4	17	Sukhapibal 3
6137	1	17	Bangkoknoi	6157	4	30	Songprapa
6139	1	50	Nimitmai	6168	4	20	Pracharath
6144	1	20	Prachachurn				
6163	1	20	Pracharath				
6166	1	8	Ramkamhang				
6167	1	25	Ladyao				