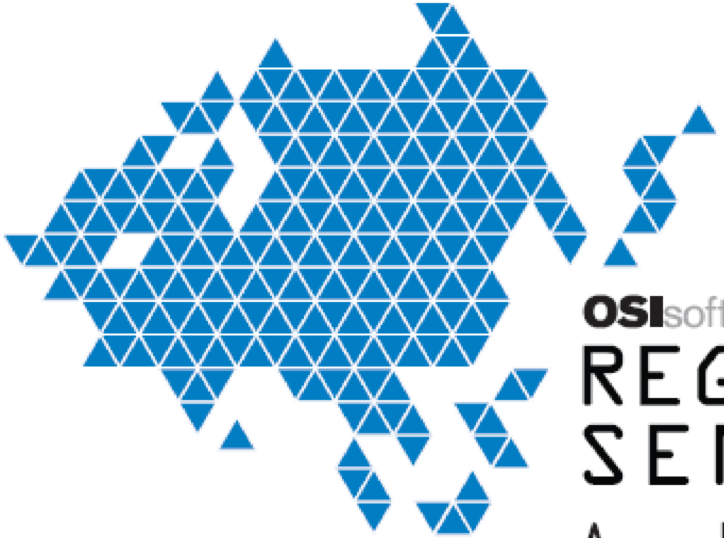


OSIsoft

REGIONAL SEMINAR 2011
APAC
THAILAND

JULY 26 - 29, 2011

THE WESTIN
GRANDE SUKHUMVIT HOTEL
BANGKOK

Gaining Insight from PI Data Using New Tools for Operational Intelligence

Kelly Sherrill, Business Development Upstream Oil & Gas

OSIsoft

© Copyright 2011 OSIsoft, LLC

Gaining Insight from PI Data Using New Tools for Operational Intelligence

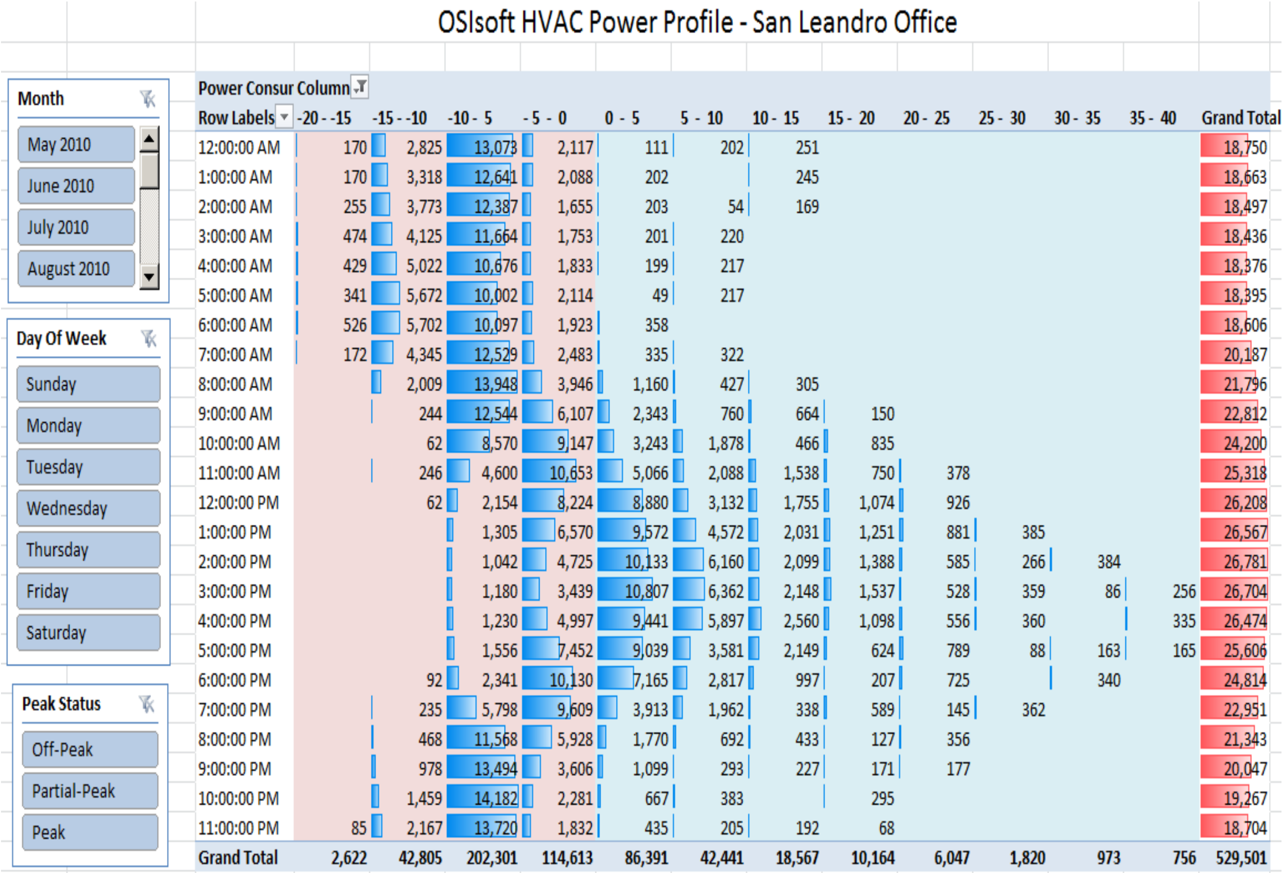
Kelly Sherrill,
Business Development Upstream Oil & Gas
OSIsoft

© Copyright 2011 OSIsoft, LLC

Agenda

- Business Intelligence (BI) Technologies
  - Multidimensional Data Analysis
  - Operational Intelligence
- Introduction to “Self-service BI”
  - PI AF
  - PI OLEDB Enterprise 2010
  - Microsoft PowerPivot for Excel 2010
  - Microsoft SharePoint 2010 Enterprise
- Example Walk Through
- Other Examples and Additional Information

Business Intelligence (BI) Technologies



OSIsoft HVAC Power Profile - San Leandro Office

Month

- May 2010
- June 2010
- July 2010
- August 2010

Day Of Week

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

Peak Status

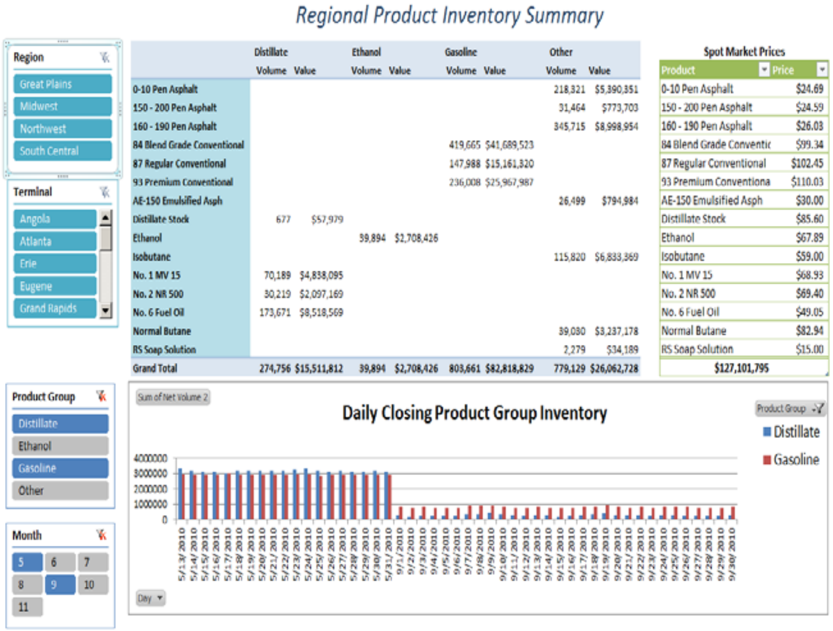
- Off-Peak
- Partial-Peak
- Peak

Power Consur Column

Row Labels	-20 - -15	-15 - -10	-10 - 5	- 5 - 0	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	Grand Total
12:00:00 AM	170	2,825	13,073	2,117	111	202	251						18,750
1:00:00 AM	170	3,318	12,641	2,088	202		245						18,663
2:00:00 AM	255	3,773	12,387	1,655	203	54	169						18,497
3:00:00 AM	474	4,125	11,664	1,753	201	220							18,436
4:00:00 AM	429	5,022	10,676	1,833	199	217							18,376
5:00:00 AM	341	5,672	10,002	2,114	49	217							18,395
6:00:00 AM	526	5,702	10,097	1,923	358								18,606
7:00:00 AM	172	4,345	12,529	2,483	335	322							20,187
8:00:00 AM		2,009	13,948	3,946	1,160	427	305						21,796
9:00:00 AM		244	12,544	6,107	2,343	760	664	150					22,812
10:00:00 AM		62	8,570	9,147	3,243	1,878	466	835					24,200
11:00:00 AM		246	4,600	10,653	5,066	2,088	1,538	750	378				25,318
12:00:00 PM		62	2,154	8,224	8,880	3,132	1,755	1,074	926				26,208
1:00:00 PM			1,305	6,570	9,572	4,572	2,031	1,251	881	385			26,567
2:00:00 PM			1,042	4,725	10,133	6,160	2,099	1,388	585	266	384		26,781
3:00:00 PM			1,180	3,439	10,807	6,362	2,148	1,537	528	359	86	256	26,704
4:00:00 PM			1,230	4,997	9,441	5,897	2,560	1,098	556	360		335	26,474
5:00:00 PM			1,556	7,452	9,039	3,581	2,149	624	789	88	163	165	25,606
6:00:00 PM		92	2,341	10,130	7,165	2,817	997	207	725		340		24,814
7:00:00 PM		235	5,798	9,609	3,913	1,962	338	589	145	362			22,951
8:00:00 PM		468	11,568	5,928	1,770	692	433	127	356				21,343
9:00:00 PM		978	13,494	3,606	1,099	293	227	171	177				20,047
10:00:00 PM		1,459	14,182	2,281	667	383		295					19,267
11:00:00 PM	85	2,167	13,720	1,832	435	205	192	68					18,704
Grand Total	2,622	42,805	202,301	114,613	86,391	42,441	18,567	10,164	6,047	1,820	973	756	529,501

Multidimensional Data Analysis

Quick, ad-hoc, aggregation of large amounts of interesting data (facts), based on user-selected criteria (dimensions), to identify opportunities for improvement.


Region
Great Plains
Midwest
Northwest
South Central
Terminal
Angola
Atlanta
Erie
Eugene
Grand Rapids
Product Group
Distillate
Ethanol
Gasoline
Other
Month
5
6
7
8
9
10
11
Sum of Net Volume 2
Product Group
Distillate
Gasoline
4000000
3000000
2000000
1000000
0
5/13/2010
5/14/2010
5/15/2010
5/16/2010
5/17/2010
5/18/2010
5/19/2010
5/20/2010
5/21/2010
5/22/2010
5/23/2010
5/24/2010
5/25/2010
5/26/2010
5/27/2010
5/28/2010
5/29/2010
5/30/2010
5/31/2010
9/1/2010
9/2/2010
9/3/2010
9/4/2010
9/5/2010
9/6/2010
9/7/2010
9/8/2010
9/9/2010
9/10/2010
9/11/2010
9/12/2010
9/13/2010
9/14/2010
9/15/2010
9/16/2010
9/17/2010
9/18/2010
9/19/2010
9/20/2010
9/21/2010
9/22/2010
9/23/2010
9/24/2010
9/25/2010
9/26/2010
9/27/2010
9/28/2010
9/29/2010
9/30/2010
Day

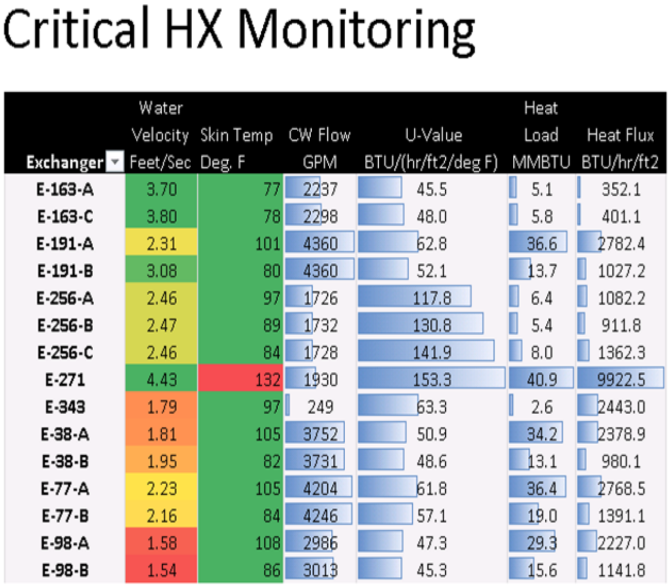
Regional Product Inventory Summary

	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							218,321	$5,390,351
150 - 200 Pen Asphalt							31,464	$773,703
160 - 190 Pen Asphalt							345,715	$8,998,954
84 Blend Grade Conventional					419,665	$41,689,523		
87 Regular Conventional					147,988	$15,161,320		
93 Premium Conventional					236,008	$25,967,987		
AE-150 Emulsified Asph							26,499	$794,984
Distillate Stock	677	$57,979						
Ethanol			39,894	$2,708,426				
Isobutane							115,820	$6,833,369
No. 1 MV 15	70,189	$4,838,095						
No. 2 NR 500	30,219	$2,097,169						
No. 6 Fuel Oil	173,671	$8,518,569						
Normal Butane							39,080	$3,237,178
RS Soap Solution							2,279	$34,189
Grand Total	274,756	$15,511,812	39,894	$2,708,426	803,661	$82,818,829	779,129	$26,062,728

Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
	$127,101,795

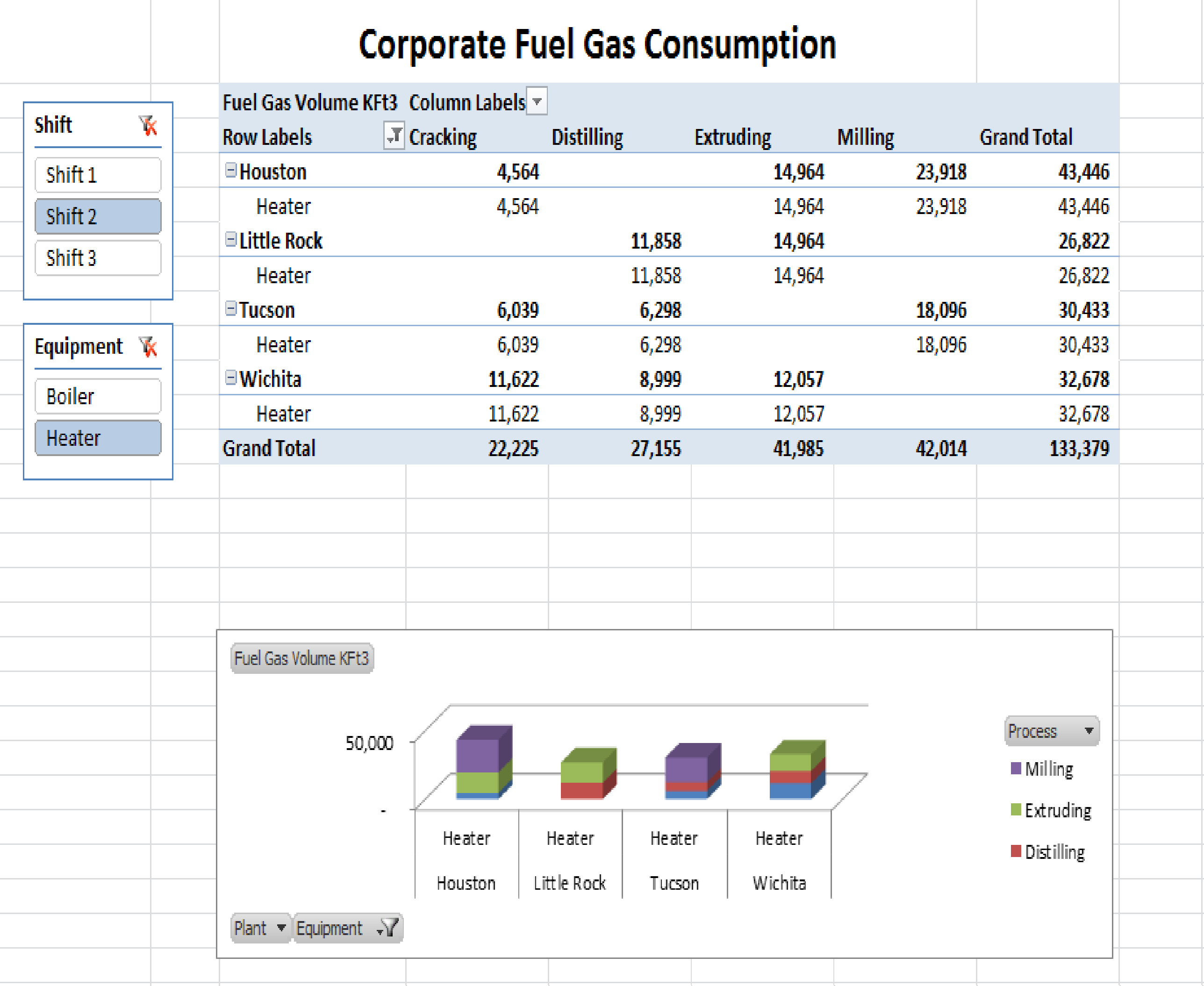
Daily Closing Product Group Inventory



Critical HX Monitoring

Exchanger	Water Velocity Feet/Sec	Skin Temp Deg. F	CW Flow GPM	U-Value BTU/(hr/ft2/deg F)	Heat Load MMBTU	Heat Flux BTU/hr/ft2
E-163-A	3.70	77	2237	45.5	5.1	352.1
E-163-C	3.80	78	2298	48.0	5.8	401.1
E-191-A	2.31	101	4360	62.8	36.6	2782.4
E-191-B	3.08	80	4360	52.1	13.7	1027.2
E-256-A	2.46	97	1726	117.8	6.4	1082.2
E-256-B	2.47	89	1732	130.8	5.4	911.8
E-256-C	2.46	84	1728	141.9	8.0	1362.3
E-271	4.43	132	1930	153.3	40.9	9922.5
E-343	1.79	97	249	63.3	2.6	2443.0
E-38-A	1.81	105	3752	50.9	34.2	2378.9
E-38-B	1.95	82	3731	48.6	13.1	980.1
E-77-A	2.23	105	4204	61.8	36.4	2768.5
E-77-B	2.16	84	4246	57.1	19.0	1391.1
E-98-A	1.58	108	2986	47.3	29.3	2227.0
E-98-B	1.54	86	3013	45.3	15.6	1141.8

Operational Intelligence



Corporate Fuel Gas Consumption

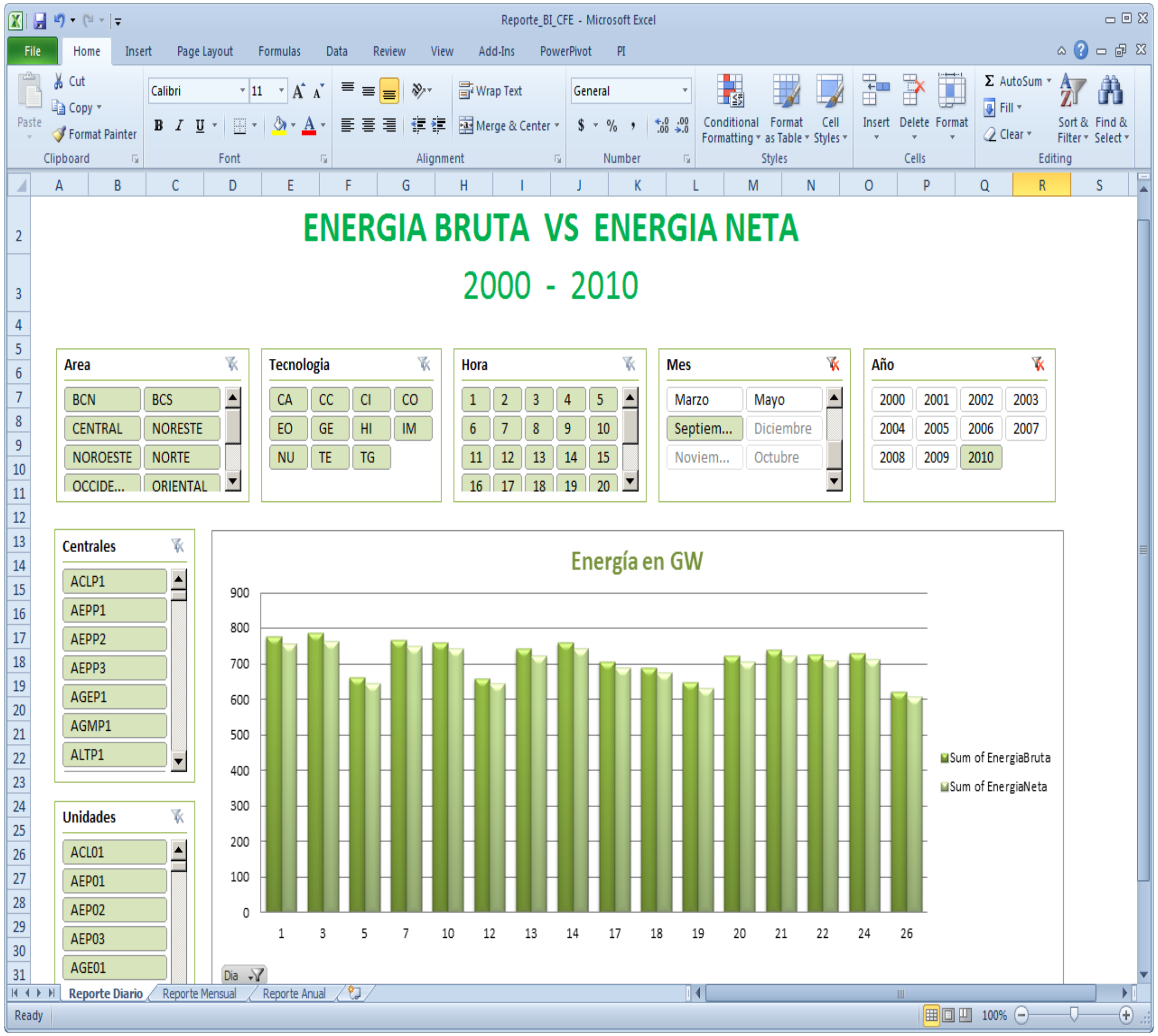
Shift
- Shift 1
- Shift 2
- Shift 3

Equipment
- Boiler
- Heater

Fuel Gas Volume KFt3	Column Labels				
Row Labels	**Cracking**	**Distilling**	**Extruding**	**Milling**	**Grand Total**
Houston	**4,564**		**14,964**	**23,918**	**43,446**
Heater	4,564		14,964	23,918	43,446
Little Rock		**11,858**	**14,964**		**26,822**
Heater		11,858	14,964		26,822
Tucson	**6,039**	**6,298**		**18,096**	**30,433**
Heater	6,039	6,298		18,096	30,433
Wichita	**11,622**	**8,999**	**12,057**		**32,678**
Heater	11,622	8,999	12,057		32,678
Grand Total	**22,225**	**27,155**	**41,985**	**42,014**	**133,379**

Fuel Gas Volume KFt3
50,000
-
Heater
Houston
Heater
Little Rock
Heater
Tucson
Heater
Wichita
Process
Milling
Extruding
Distilling
Plant
Equipment

Customer Example: CFE Mexico



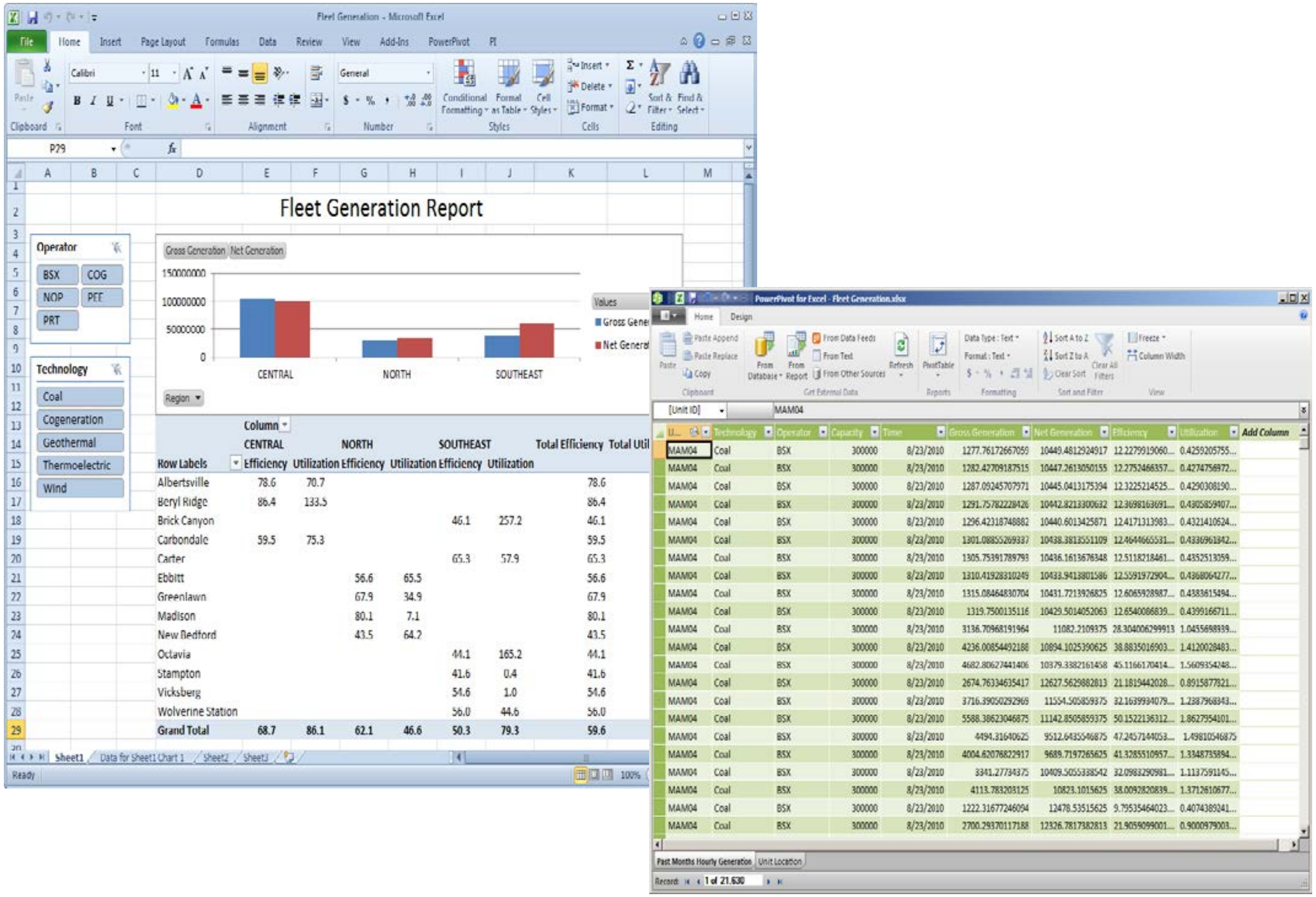
Reporte_BI_CFE - Microsoft Excel

ENERGIA BRUTA VS ENERGIA NETA

2000 - 2010

File
Home
Insert
Page Layout
Formulas
Data
Review
View
Add-Ins
PowerPivot
PI
Cut
Copy
Format Painter
Paste
Clipboard
Calibri
11
Font
Wrap Text
Merge & Center
Alignment
General
Number
Conditional Formatting
Format as Table
Cell Styles
Styles
Insert
Delete
Format
Cells
AutoSum
Fill
Clear
Sort & Filter
Find & Select
Editing
Area
BCN
BCS
CENTRAL
NORESTE
NOROESTE
NORTE
OCCIDE...
ORIENTAL
Tecnologia
CA
CC
CI
CO
EO
GE
HI
IM
NU
TE
TG
Hora
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Mes
Marzo
Mayo
Septiem...
Diciembre
Noviem...
Octubre
Año
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Centrales
ACLP1
AEPP1
AEPP2
AEPP3
AGEP1
AGMP1
ALTP1
Unidades
ACL01
AEP01
AEP02
AEP03
AGE01
Energía en GW
900
800
700
600
500
400
300
200
100
0
1
3
5
7
10
12
13
14
17
18
19
20
21
22
24
26
Sum of EnergiaBruta
Sum of EnergiaNeta
Dia
Reporte Diario
Reporte Mensual
Reporte Anual
Ready
100%

Introduction to “Self-Service” BI


Fleet Generation - Microsoft Excel
File
Home
Insert
Page Layout
Formulas
Data
Review
View
Add-Ins
PowerPivot
PI
Clipboard
Font
Alignment
Number
Styles
Cells
Editing
Operator
BSX
COG
NOP
PEE
PRT
Technology
Coal
Cogeneration
Geothermal
Thermoelectric
Wind
Gross Generation
Net Generation
150000000
100000000
50000000
0
CENTRAL
NORTH
SOUTHEAST
Values
Gross Gene
Net Generat
Region
Sheet1
Data for Sheet1 Chart 1
Sheet2
Sheet3
Ready
100%
PowerPivot for Excel - Fleet Generation.xlsx
Home
Design
Paste Append
Paste Replace
Copy
From Database
From Report
From Data Feeds
From Text
From Other Sources
Refresh
PivotTable
Data Type : Text
Format : Text
Sort A to Z
Sort Z to A
Clear Sort
Clear All Filters
Freeze
Column Width
Clipboard
Get External Data
Reports
Formatting
Sort and Filter
View
Past Months Hourly Generation
Unit Location

P29

Fleet Generation Report

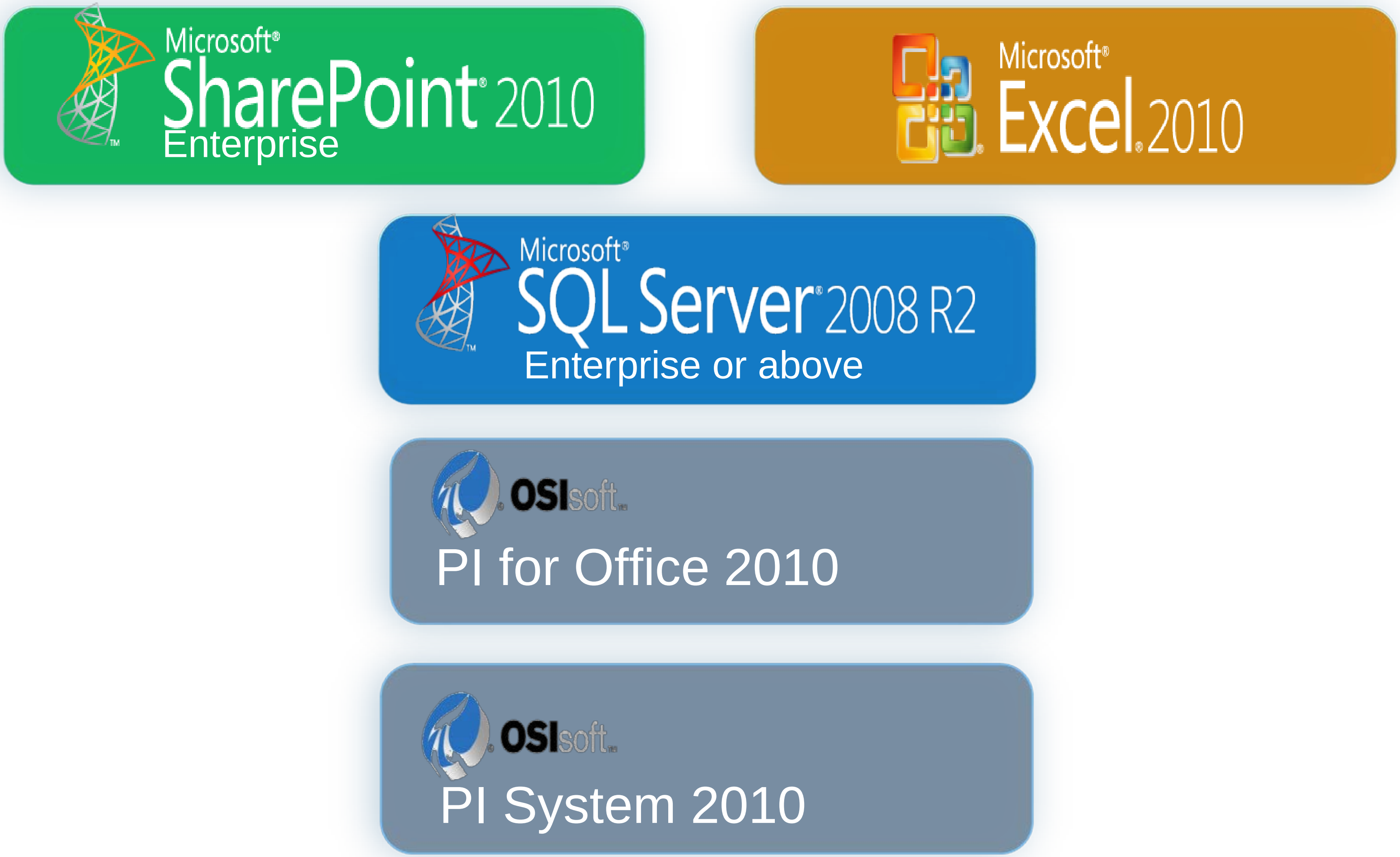
Row Labels	CENTRAL Efficiency	CENTRAL Utilization	NORTH Efficiency	NORTH Utilization	SOUTHEAST Efficiency	SOUTHEAST Utilization	Total Efficiency
Albertsville	78.6	70.7					78.6
Beryl Ridge	86.4	133.5					86.4
Brick Canyon					46.1	257.2	46.1
Carbondale	59.5	75.3					59.5
Carter					65.3	57.9	65.3
Ebbitt			56.6	65.5			56.6
Greenlawn			67.9	34.9			67.9
Madison			80.1	7.1			80.1
New Bedford			43.5	64.2			43.5
Octavia					44.1	165.2	44.1
Stampton					41.6	0.4	41.6
Vicksberg					54.6	1.0	54.6
Wolverine Station					56.0	44.6	56.0
Grand Total	**68.7**	**86.1**	**62.1**	**46.6**	**50.3**	**79.3**	**59.6**

[Unit ID] MAM04

U...	Technology	Operator	Capacity	Time	Gross Generation	Net Generation	Efficiency	Utilization	Add Column
MAM04	Coal	BSX	300000	8/23/2010	1277.76172667059	10449.4812924917	12.2279919060...	0.4259205755...	
MAM04	Coal	BSX	300000	8/23/2010	1282.42709187515	10447.2613050155	12.2752466357...	0.4274756972...	
MAM04	Coal	BSX	300000	8/23/2010	1287.09245707971	10445.0413175394	12.3225214525...	0.4290308190...	
MAM04	Coal	BSX	300000	8/23/2010	1291.75782228426	10442.8213300632	12.3698163691...	0.4305859407...	
MAM04	Coal	BSX	300000	8/23/2010	1296.42318748882	10440.6013425871	12.4171313983...	0.4321410624...	
MAM04	Coal	BSX	300000	8/23/2010	1301.08855269337	10438.3813551109	12.4644665531...	0.4336961842...	
MAM04	Coal	BSX	300000	8/23/2010	1305.75391789793	10436.1613676348	12.5118218461...	0.4352513059...	
MAM04	Coal	BSX	300000	8/23/2010	1310.41928310249	10433.9413801586	12.5591972904...	0.4368064277...	
MAM04	Coal	BSX	300000	8/23/2010	1315.08464830704	10431.7213926825	12.6065928987...	0.4383615494...	
MAM04	Coal	BSX	300000	8/23/2010	1319.7500135116	10429.5014052063	12.6540086839...	0.4399166711...	
MAM04	Coal	BSX	300000	8/23/2010	3136.70968191964	11082.2109375	28.304006299913	1.0455698939...	
MAM04	Coal	BSX	300000	8/23/2010	4236.00854492188	10894.1025390625	38.8835016903...	1.4120028483...	
MAM04	Coal	BSX	300000	8/23/2010	4682.80627441406	10379.3382161458	45.1166170414...	1.5609354248...	
MAM04	Coal	BSX	300000	8/23/2010	2674.76334635417	12627.5629882813	21.1819442028...	0.8915877821...	
MAM04	Coal	BSX	300000	8/23/2010	3716.39050292969	11554.505859375	32.1639934079...	1.2387968343...	
MAM04	Coal	BSX	300000	8/23/2010	5588.38623046875	11142.8505859375	50.1522136312...	1.8627954101...	
MAM04	Coal	BSX	300000	8/23/2010	4494.31640625	9512.6435546875	47.2457144053...	1.49810546875	
MAM04	Coal	BSX	300000	8/23/2010	4004.62076822917	9689.7197265625	41.3285510957...	1.3348735894...	
MAM04	Coal	BSX	300000	8/23/2010	3341.27734375	10409.5055338542	32.0983290981...	1.1137591145...	
MAM04	Coal	BSX	300000	8/23/2010	4113.783203125	10823.1015625	38.0092820839...	1.3712610677...	
MAM04	Coal	BSX	300000	8/23/2010	1222.31677246094	12478.53515625	9.79535464023...	0.4074389241...	
MAM04	Coal	BSX	300000	8/23/2010	2700.29370117188	12326.7817382813	21.9059099001...	0.9000979003...	

Record: 1 of 21,630

OSIsoft / Microsoft BI Stack



Microsoft SharePoint 2010
Enterprise

Microsoft Excel 2010

Microsoft SQL Server 2008 R2
Enterprise or above

OSIsoft
PI for Office 2010

OSIsoft
PI System 2010

Self-service BI Toolkit for PI

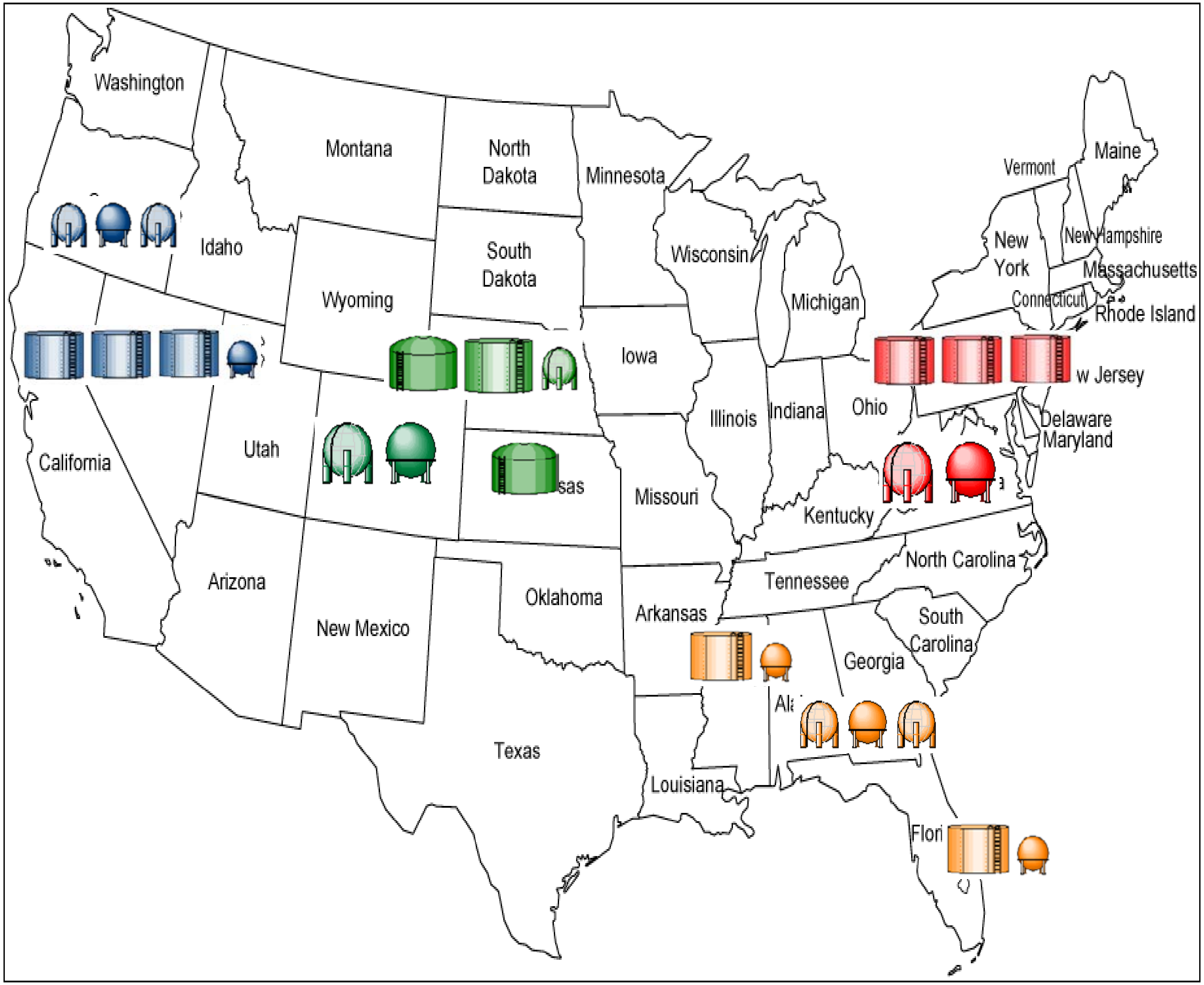
- Facts and Dimensions
  - PI AF (PI System 2010)

- Datasets for BI Data Extraction
  - PI OLEDB Enterprise 2010 (PI for Office 2010)

- Desktop Analysis and Cube Configuration
  - Microsoft PowerPivot for Excel 2010

- Enterprise Accountability
  - Microsoft PowerPivot for SharePoint 2010
  - Microsoft SharePoint 2010 Enterprise
  - Microsoft SQL Server 2008 R2 Enterprise or above

Example: Product Inventories


Washington
Montana
North Dakota
Minnesota
Idaho
South Dakota
Wisconsin
Wyoming
Michigan
Iowa
California
Utah
Illinois
Indiana
Ohio
Missouri
Kentucky
Arizona
New Mexico
Oklahoma
Arkansas
Tennessee
North Carolina
South Carolina
Georgia
Texas
Louisiana
Flori
Maine
Vermont
New Hampshire
New York
Massachusetts
Connecticut
Rhode Island
w Jersey
Delaware
Maryland

PI AF Associates Facts and Dimensions

Dimensions

Facts

AF Hierarchy

Facts

AF Attributes

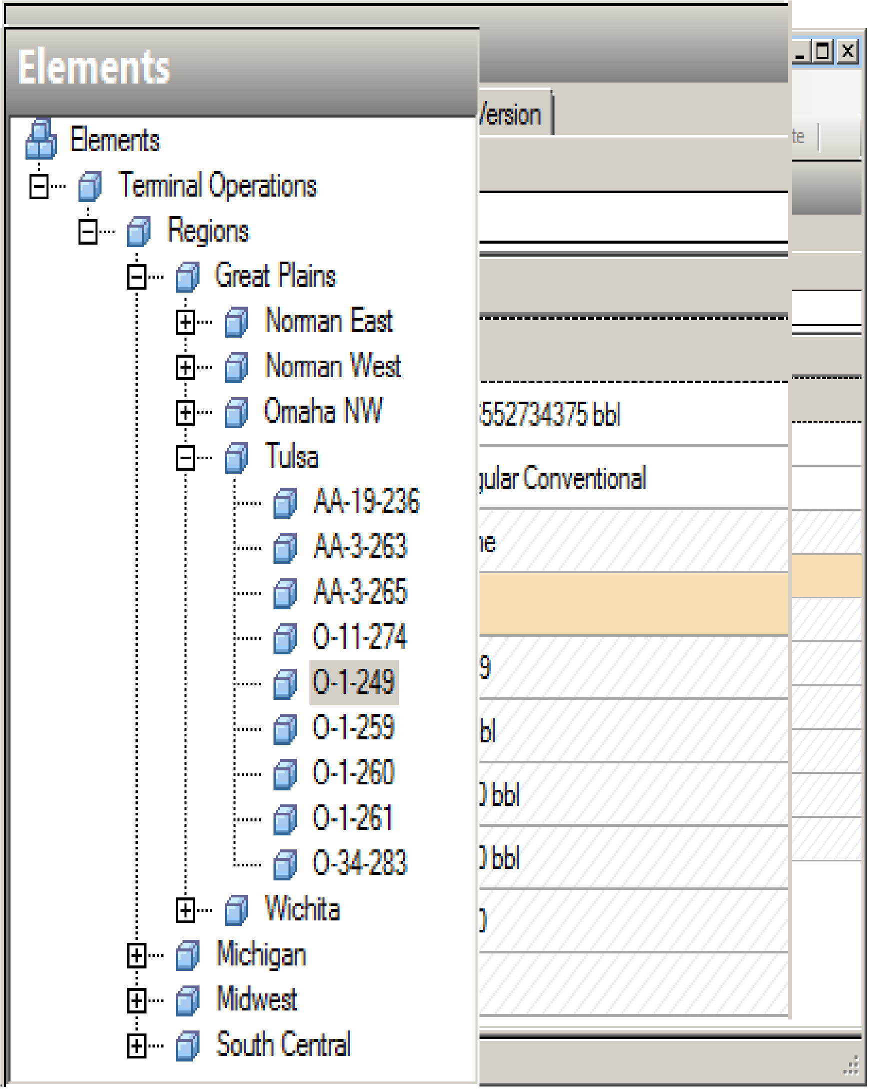
- Region
- Attributes
- Volume
- Terminal
  - Datapoint
- Product
- Tank
  - Formula
- Product
  - Other
- Group

Dimensions

Hierarchy

Templates

Categories



- Elements
  - Terminal Operations
    - Regions
      - Great Plains
        - Norman East
        - Norman West
        - Omaha NW
        - Tulsa
          - AA-19-236
          - AA-3-263
          - AA-3-265
          - O-11-274
          - O-1-249
          - O-1-259
          - O-1-260
          - O-1-261
          - O-34-283
        - Wichita
      - Michigan
      - Midwest
      - South Central

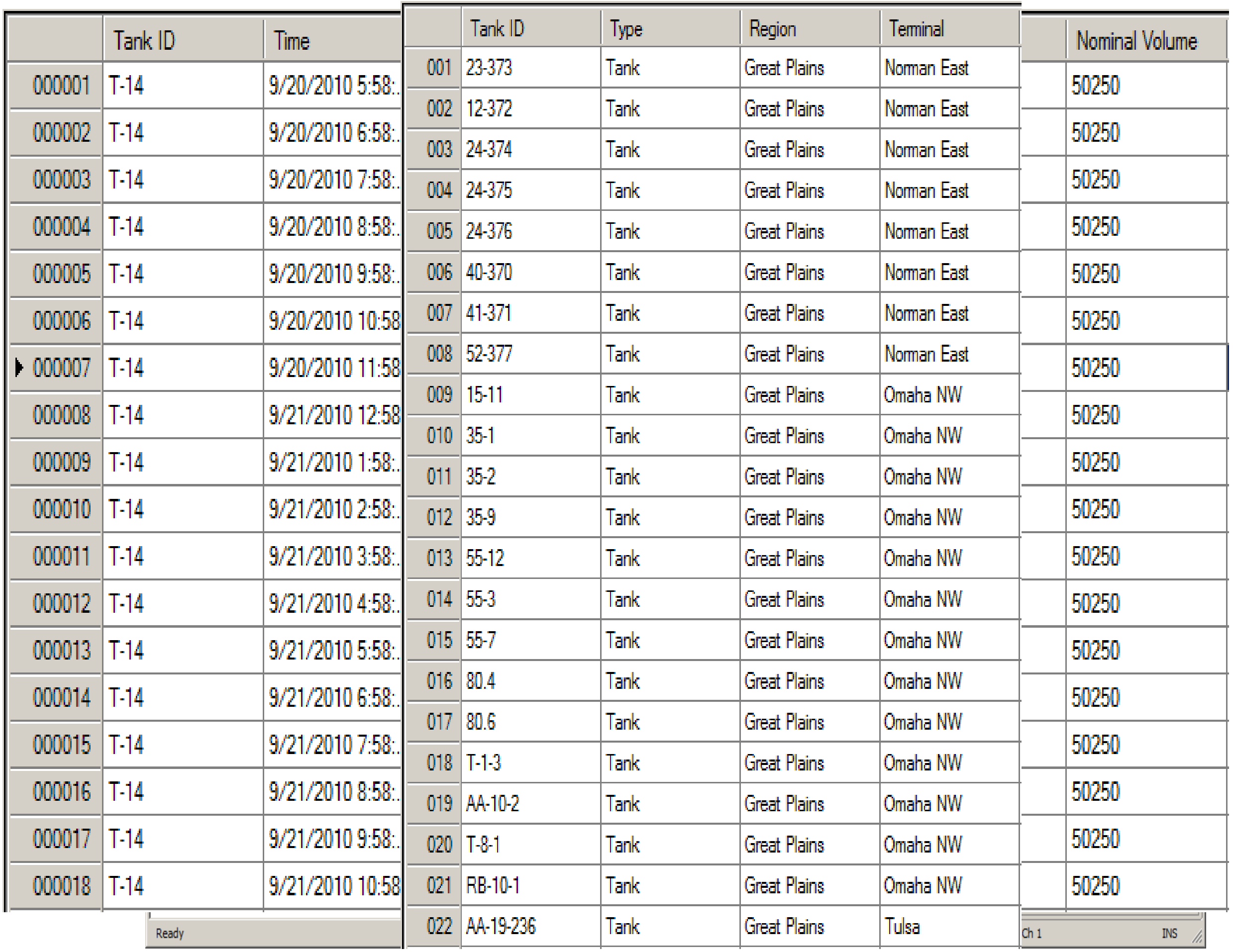
Elements
Version
552734375 bbl
gular Conventional
ne
9
bl
0 bbl
0 bbl
0

PI OLEDB Enterprise 2010

Dimensions – *AF Attributes*

Facts – *AF History*

PI-SQL Commander



	Tank ID	Time
000001	T-14	9/20/2010 5:58:.
000002	T-14	9/20/2010 6:58:.
000003	T-14	9/20/2010 7:58:.
000004	T-14	9/20/2010 8:58:.
000005	T-14	9/20/2010 9:58:.
000006	T-14	9/20/2010 10:58
▶ 000007	T-14	9/20/2010 11:58
000008	T-14	9/21/2010 12:58
000009	T-14	9/21/2010 1:58:.
000010	T-14	9/21/2010 2:58:.
000011	T-14	9/21/2010 3:58:.
000012	T-14	9/21/2010 4:58:.
000013	T-14	9/21/2010 5:58:.
000014	T-14	9/21/2010 6:58:.
000015	T-14	9/21/2010 7:58:.
000016	T-14	9/21/2010 8:58:.
000017	T-14	9/21/2010 9:58:.
000018	T-14	9/21/2010 10:58

Ready

	Tank ID	Type	Region	Terminal
001	23-373	Tank	Great Plains	Norman East
002	12-372	Tank	Great Plains	Norman East
003	24-374	Tank	Great Plains	Norman East
004	24-375	Tank	Great Plains	Norman East
005	24-376	Tank	Great Plains	Norman East
006	40-370	Tank	Great Plains	Norman East
007	41-371	Tank	Great Plains	Norman East
008	52-377	Tank	Great Plains	Norman East
009	15-11	Tank	Great Plains	Omaha NW
010	35-1	Tank	Great Plains	Omaha NW
011	35-2	Tank	Great Plains	Omaha NW
012	35-9	Tank	Great Plains	Omaha NW
013	55-12	Tank	Great Plains	Omaha NW
014	55-3	Tank	Great Plains	Omaha NW
015	55-7	Tank	Great Plains	Omaha NW
016	80.4	Tank	Great Plains	Omaha NW
017	80.6	Tank	Great Plains	Omaha NW
018	T-1-3	Tank	Great Plains	Omaha NW
019	AA-10-2	Tank	Great Plains	Omaha NW
020	T-8-1	Tank	Great Plains	Omaha NW
021	RB-10-1	Tank	Great Plains	Omaha NW
022	AA-19-236	Tank	Great Plains	Tulsa

Nominal Volume
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250
50250

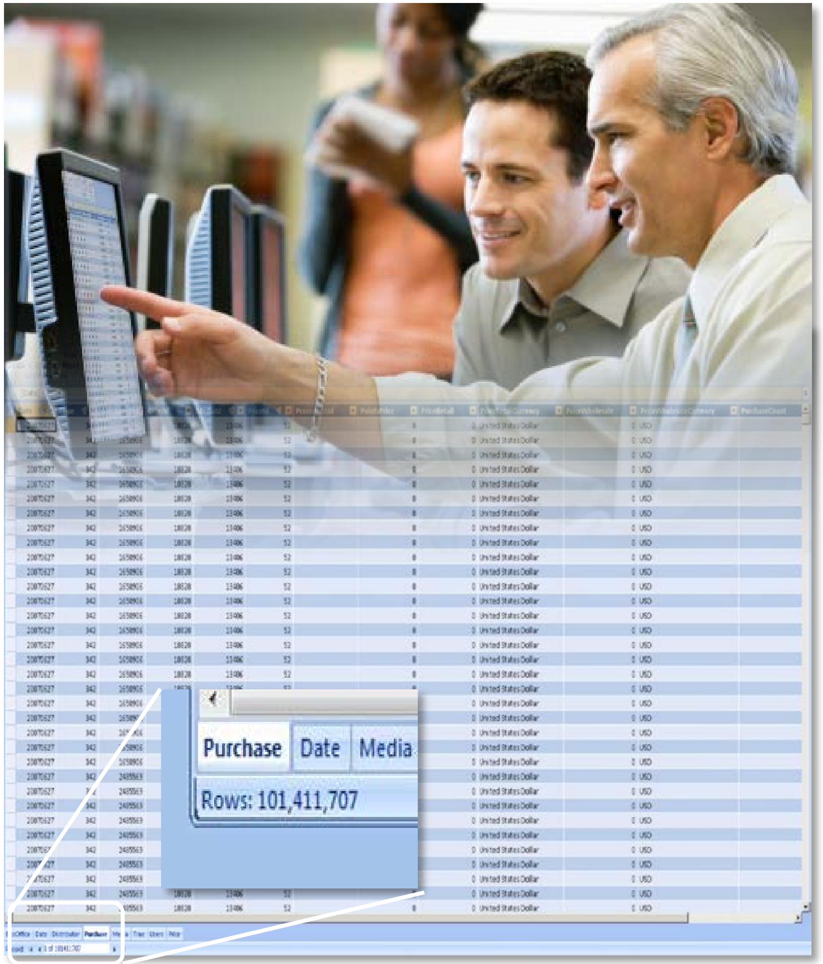
Ch 1 INS

Introducing PowerPivot for Excel 2010

Microsoft® Excel 2010

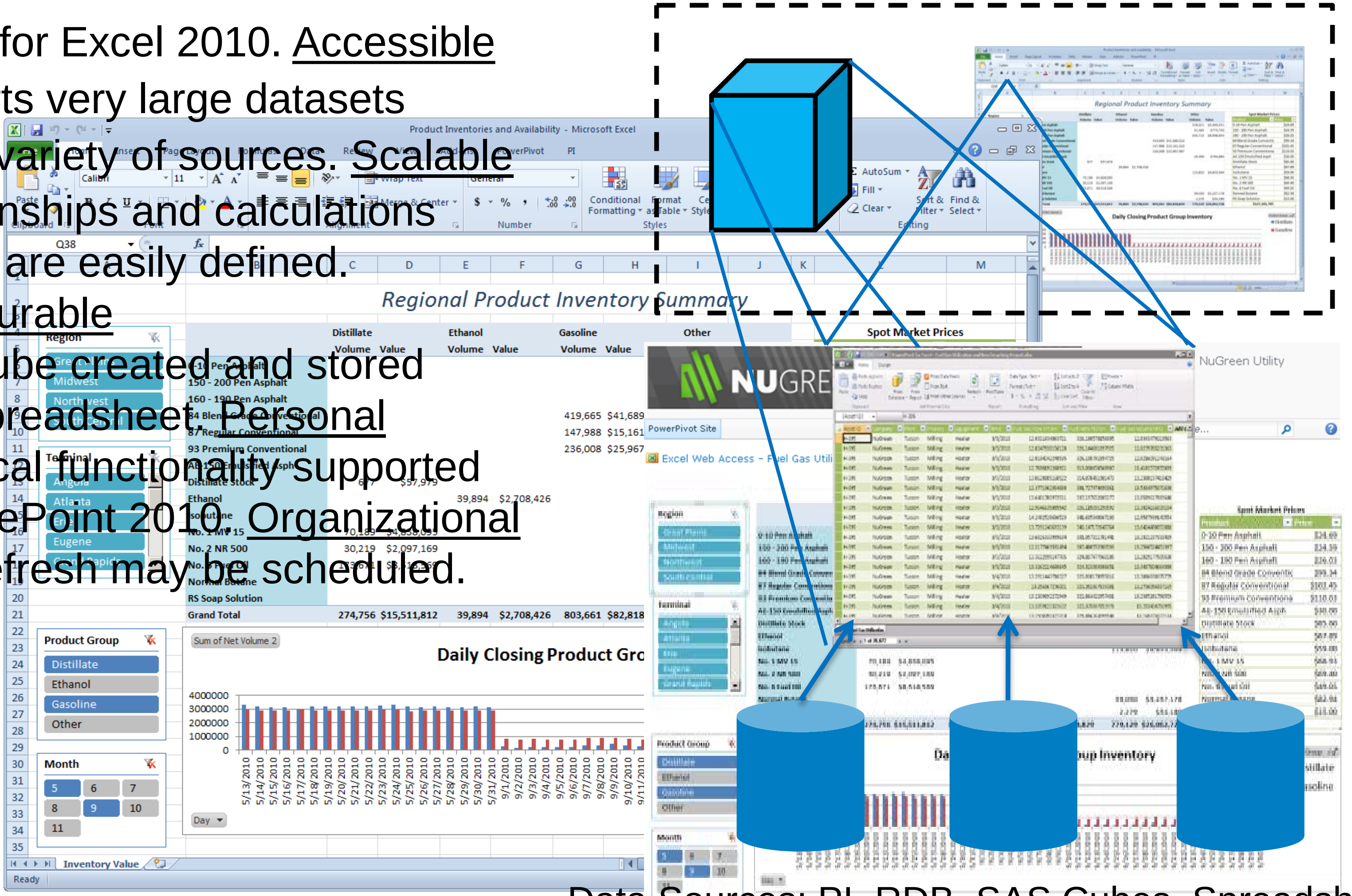
Empowering The End User

- Enable users to perform self-service analysis and intuitively build their own BI solutions
- Allow users to interactively explore and perform calculations on large data sets
- Integrate data from multiple sources
- Minimize dependence on IT support



Microsoft PowerPivot for Excel 2010

- Add-In for Excel 2010. Accessible
- Supports very large datasets from a variety of sources. Scalable
- Relationships and calculations (DAX[1]) are easily defined. Configurable
- Data cube created and stored with spreadsheet. Personal
- Analytical functionality supported in SharePoint 2010. Organizational
- Data refresh may be scheduled. Timely



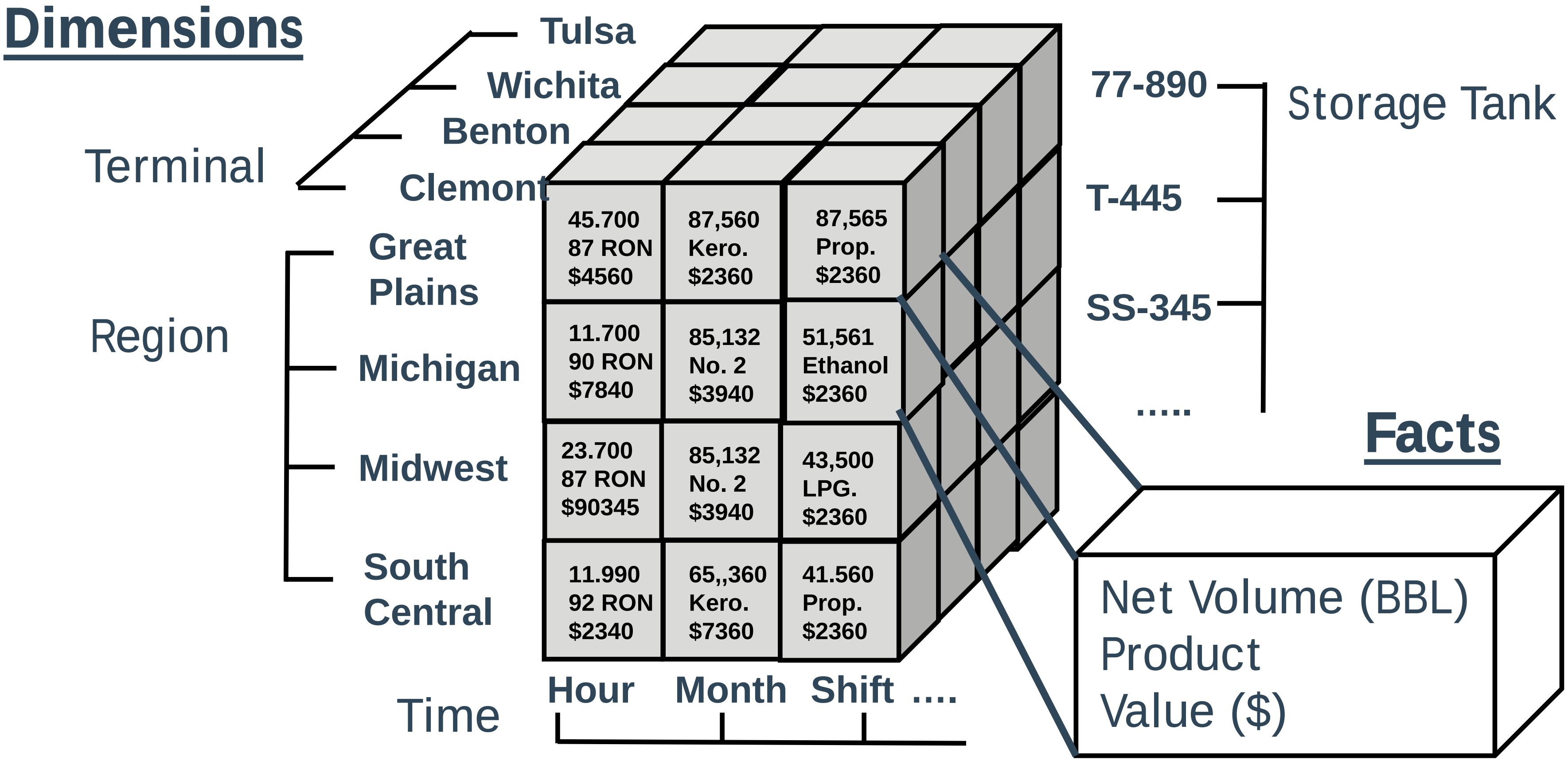
Product Inventories and Availability - Microsoft Excel
Regional Product Inventory Summary
Distillate
Ethanol
Gasoline
Other
Spot Market Prices
Product Group
Distillate
Ethanol
Gasoline
Other
Month
Daily Closing Product Gro
Inventory Value
NuGreen Utility
PowerPivot Site
Excel Web Access - Fuel Gas Utili

Data Sources: PI, RDB, SAS Cubes, Spreadsheet

---

1. Data Analysis Expression Language

Multidimensional Data “Cube”



Dimensions

Terminal
- Tulsa
- Wichita
- Benton
- Clemont

Region
- Great Plains
- Michigan
- Midwest
- South Central

Time
- Hour
- Month
- Shift
- ....

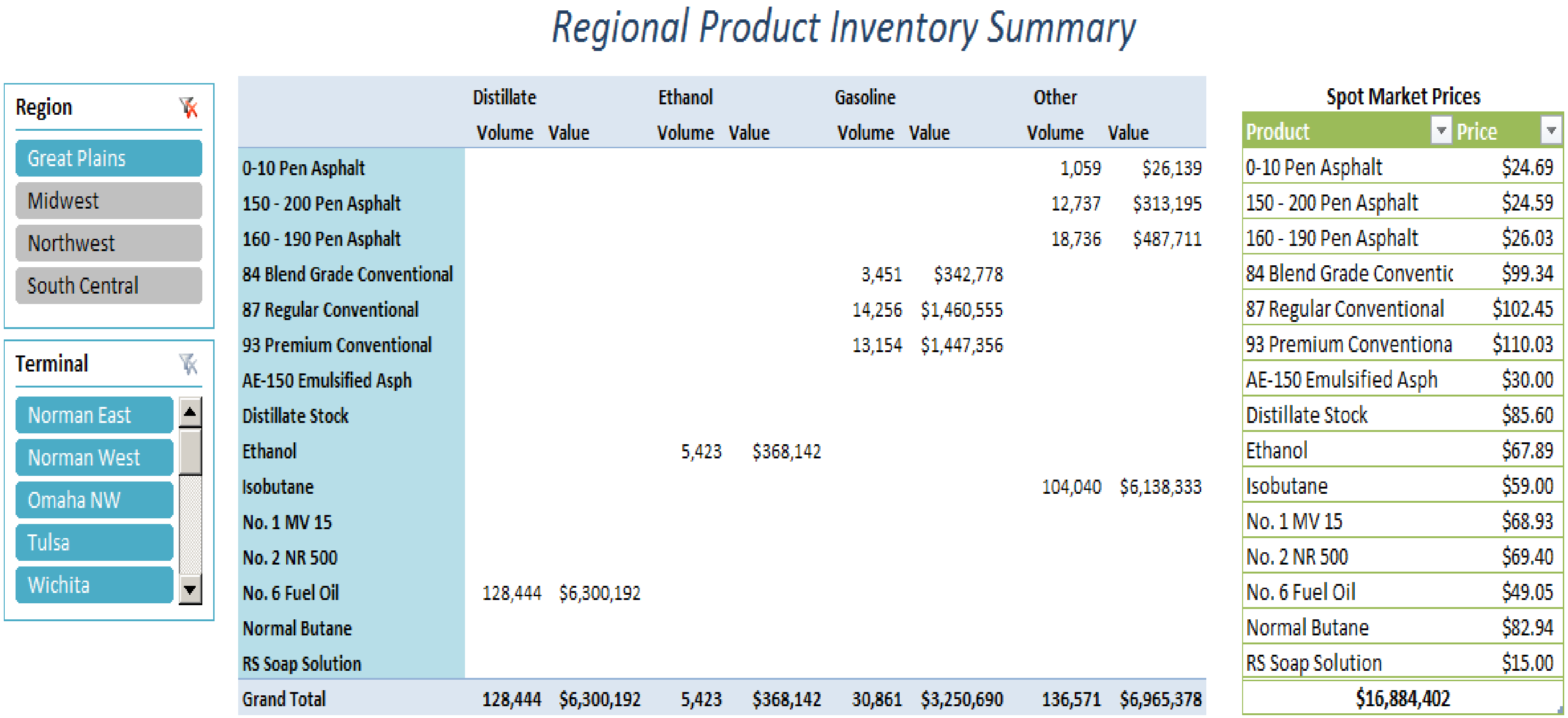
Storage Tank
- 77-890
- T-445
- SS-345
- .....

	Hour	Month	Shift
Great Plains	45.700 87 RON $4560	87,560 Kero. $2360	87,565 Prop. $2360
Michigan	11.700 90 RON $7840	85,132 No. 2 $3940	51,561 Ethanol $2360
Midwest	23.700 87 RON $90345	85,132 No. 2 $3940	43,500 LPG. $2360
South Central	11.990 92 RON $2340	65,,360 Kero. $7360	41.560 Prop. $2360

Facts

Net Volume (BBL)
Product
Value ($)

Example Walk Through


Region
Great Plains
Midwest
Northwest
South Central
Terminal
Norman East
Norman West
Omaha NW
Tulsa
Wichita

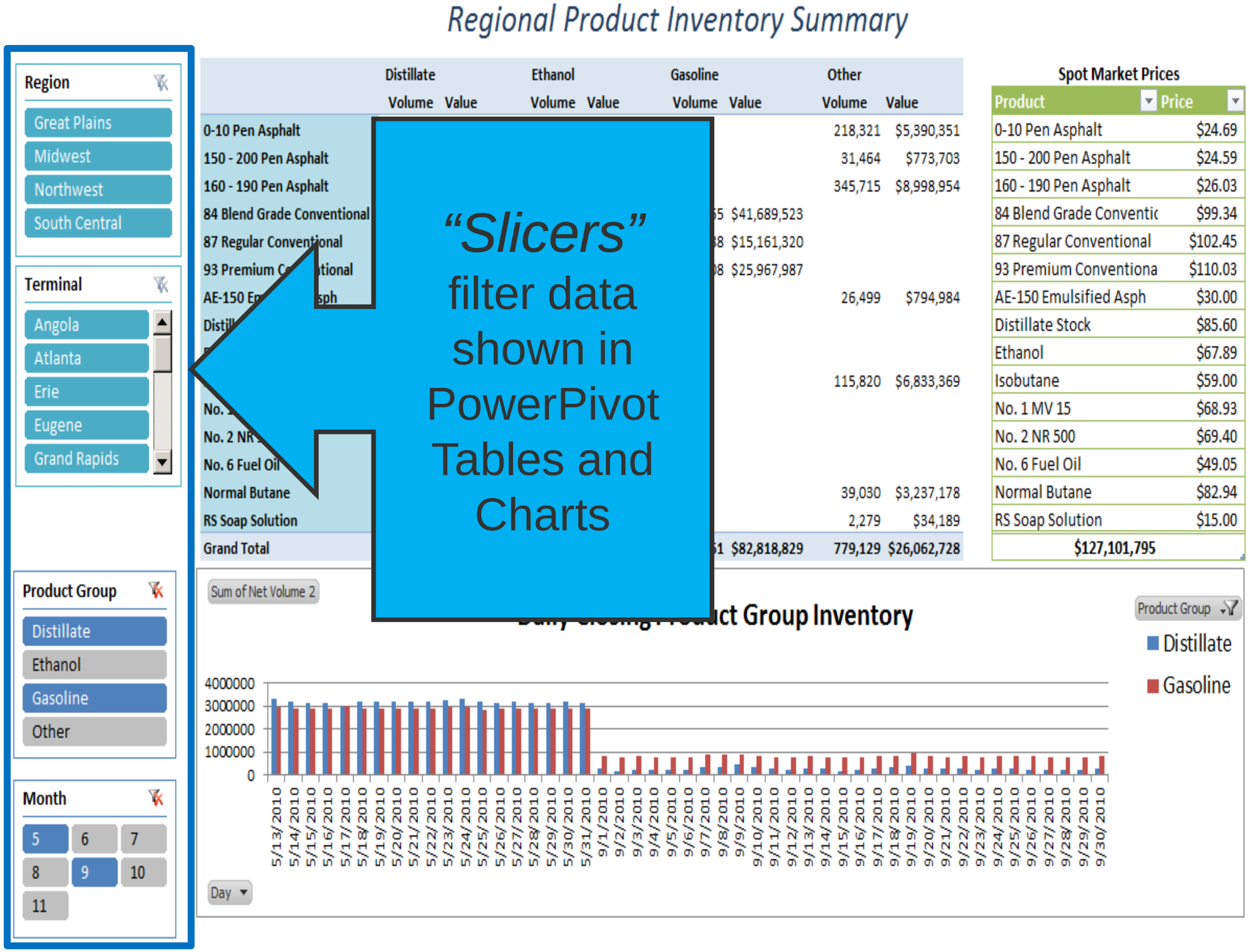
Regional Product Inventory Summary

	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							1,059	$26,139
150 - 200 Pen Asphalt							12,737	$313,195
160 - 190 Pen Asphalt							18,736	$487,711
84 Blend Grade Conventional					3,451	$342,778		
87 Regular Conventional					14,256	$1,460,555		
93 Premium Conventional					13,154	$1,447,356		
AE-150 Emulsified Asph								
Distillate Stock								
Ethanol			5,423	$368,142				
Isobutane							104,040	$6,138,333
No. 1 MV 15								
No. 2 NR 500								
No. 6 Fuel Oil	128,444	$6,300,192						
Normal Butane								
RS Soap Solution								
Grand Total	128,444	$6,300,192	5,423	$368,142	30,861	$3,250,690	136,571	$6,965,378

Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
	$16,884,402

Product Inventories and Valuation



Regional Product Inventory Summary

Region
Great Plains
Midwest
Northwest
South Central
Terminal
Angola
Atlanta
Erie
Eugene
Grand Rapids
Product Group
Distillate
Ethanol
Gasoline
Other
Month
5
6
7
8
9
10
11

	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							218,321	$5,390,351
150 - 200 Pen Asphalt							31,464	$773,703
160 - 190 Pen Asphalt							345,715	$8,998,954
84 Blend Grade Conventional						$41,689,523		
87 Regular Conventional						$15,161,320		
93 Premium C						$25,967,987		
AE-150 E							26,499	$794,984
Distill								
							115,820	$6,833,369
No.								
No. 2 NR								
No. 6 Fuel Oil								
Normal Butane							39,030	$3,237,178
RS Soap Solution							2,279	$34,189
Grand Total						$82,818,829	779,129	$26,062,728

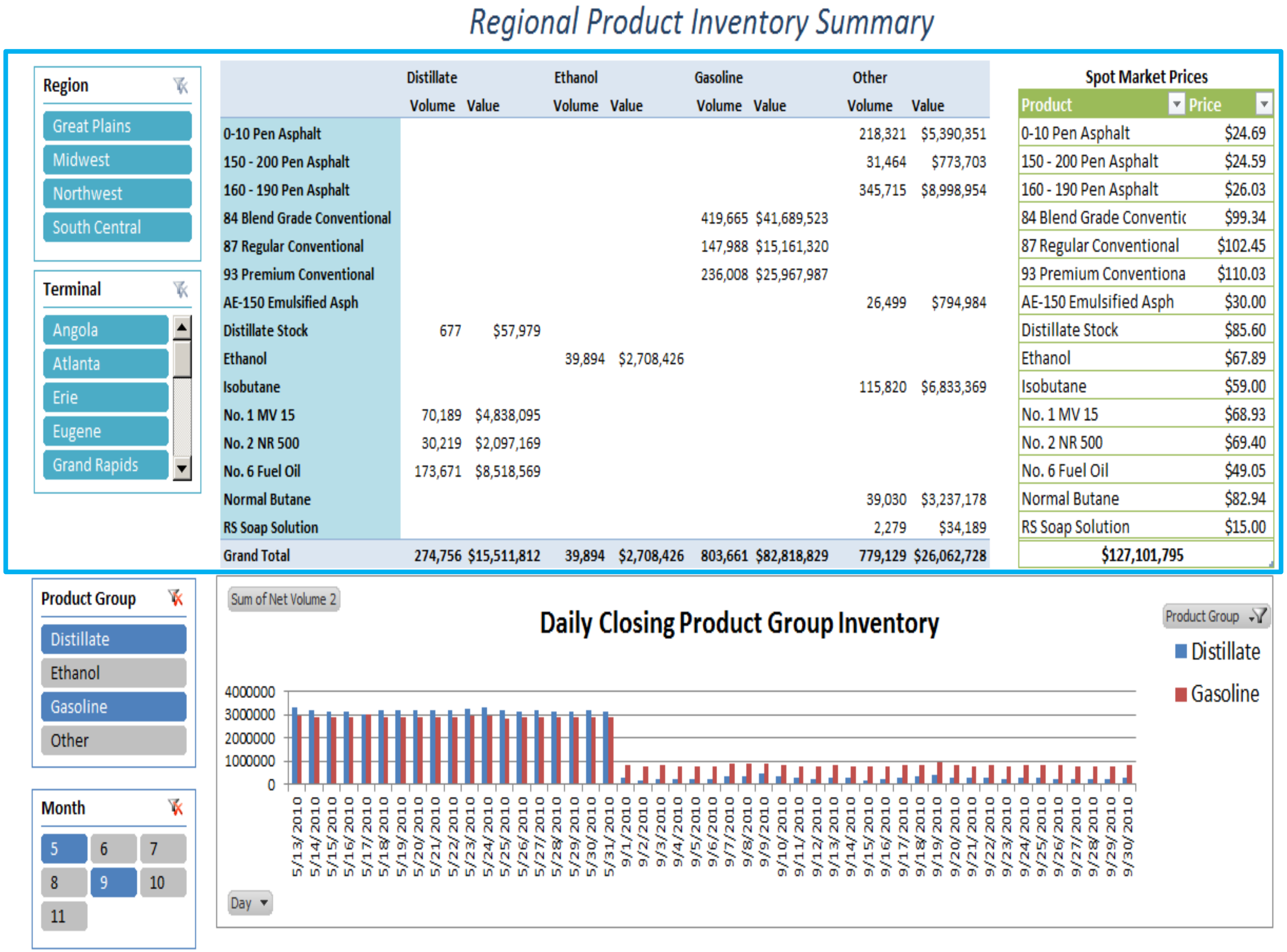
Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
	$127,101,795

Sum of Net Volume 2
ct Group Inventory
Product Group
Distillate
Gasoline
4000000
3000000
2000000
1000000
0
5/13/2010 … 5/31/2010
9/1/2010 … 9/30/2010
Day

“*Slicers*” filter data shown in PowerPivot Tables and Charts

Product Inventories and Valuation



Regional Product Inventory Summary

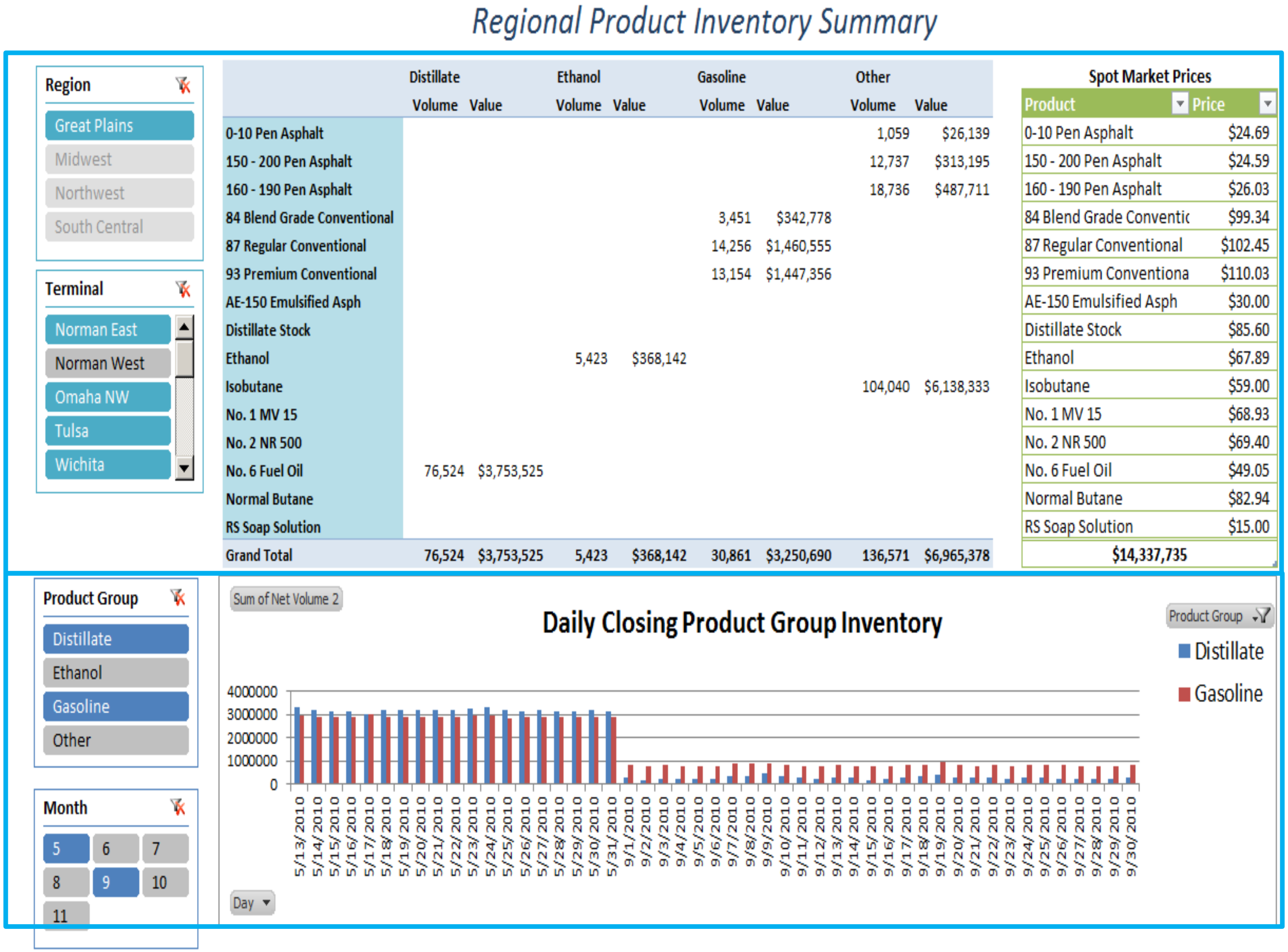
	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							218,321	$5,390,351
150 - 200 Pen Asphalt							31,464	$773,703
160 - 190 Pen Asphalt							345,715	$8,998,954
84 Blend Grade Conventional					419,665	$41,689,523		
87 Regular Conventional					147,988	$15,161,320		
93 Premium Conventional					236,008	$25,967,987		
AE-150 Emulsified Asph							26,499	$794,984
Distillate Stock	677	$57,979						
Ethanol			39,894	$2,708,426				
Isobutane							115,820	$6,833,369
No. 1 MV 15	70,189	$4,838,095						
No. 2 NR 500	30,219	$2,097,169						
No. 6 Fuel Oil	173,671	$8,518,569						
Normal Butane							39,030	$3,237,178
RS Soap Solution							2,279	$34,189
Grand Total	274,756	$15,511,812	39,894	$2,708,426	803,661	$82,818,829	779,129	$26,062,728

Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
	$127,101,795

Region
Great Plains
Midwest
Northwest
South Central
Terminal
Angola
Atlanta
Erie
Eugene
Grand Rapids
Product Group
Distillate
Ethanol
Gasoline
Other
Month
5
6
7
8
9
10
11
Sum of Net Volume 2
Daily Closing Product Group Inventory
Product Group
Distillate
Gasoline
4000000
3000000
2000000
1000000
0
5/13/2010
5/14/2010
5/15/2010
5/16/2010
5/17/2010
5/18/2010
5/19/2010
5/20/2010
5/21/2010
5/22/2010
5/23/2010
5/24/2010
5/25/2010
5/26/2010
5/27/2010
5/28/2010
5/29/2010
5/30/2010
5/31/2010
9/1/2010
9/2/2010
9/3/2010
9/4/2010
9/5/2010
9/6/2010
9/7/2010
9/8/2010
9/9/2010
9/10/2010
9/11/2010
9/12/2010
9/13/2010
9/14/2010
9/15/2010
9/16/2010
9/17/2010
9/18/2010
9/19/2010
9/20/2010
9/21/2010
9/22/2010
9/23/2010
9/24/2010
9/25/2010
9/26/2010
9/27/2010
9/28/2010
9/29/2010
9/30/2010
Day

Product Inventories and Valuation



Regional Product Inventory Summary

Region

- Great Plains
- Midwest
- Northwest
- South Central

Terminal

- Norman East
- Norman West
- Omaha NW
- Tulsa
- Wichita

	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							1,059	$26,139
150 - 200 Pen Asphalt							12,737	$313,195
160 - 190 Pen Asphalt							18,736	$487,711
84 Blend Grade Conventional					3,451	$342,778		
87 Regular Conventional					14,256	$1,460,555		
93 Premium Conventional					13,154	$1,447,356		
AE-150 Emulsified Asph								
Distillate Stock								
Ethanol			5,423	$368,142				
Isobutane							104,040	$6,138,333
No. 1 MV 15								
No. 2 NR 500								
No. 6 Fuel Oil	76,524	$3,753,525						
Normal Butane								
RS Soap Solution								
Grand Total	76,524	$3,753,525	5,423	$368,142	30,861	$3,250,690	136,571	$6,965,378

Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
	$14,337,735

Product Group

- Distillate
- Ethanol
- Gasoline
- Other

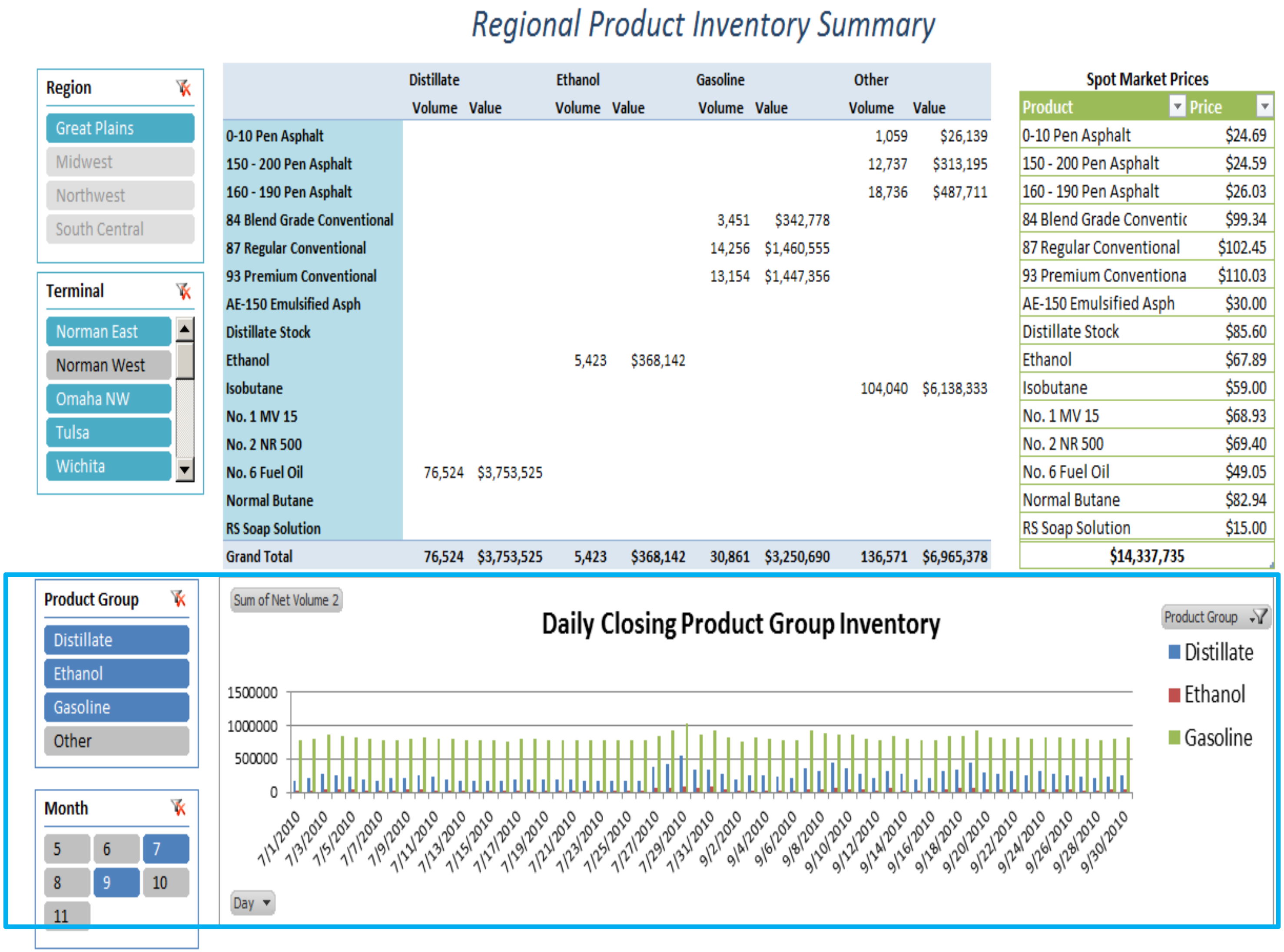
Month

5 6 7
8 9 10
11

Daily Closing Product Group Inventory

Sum of Net Volume 2
Product Group
🟦 Distillate
🟥 Gasoline
4000000
3000000
2000000
1000000
0
5/13/2010
5/14/2010
5/15/2010
5/16/2010
5/17/2010
5/18/2010
5/19/2010
5/20/2010
5/21/2010
5/22/2010
5/23/2010
5/24/2010
5/25/2010
5/26/2010
5/27/2010
5/28/2010
5/29/2010
5/30/2010
5/31/2010
9/1/2010
9/2/2010
9/3/2010
9/4/2010
9/5/2010
9/6/2010
9/7/2010
9/8/2010
9/9/2010
9/10/2010
9/11/2010
9/12/2010
9/13/2010
9/14/2010
9/15/2010
9/16/2010
9/17/2010
9/18/2010
9/19/2010
9/20/2010
9/21/2010
9/22/2010
9/23/2010
9/24/2010
9/25/2010
9/26/2010
9/27/2010
9/28/2010
9/29/2010
9/30/2010
Day

Product Inventories and Valuation



Regional Product Inventory Summary

Region
- Great Plains
- Midwest
- Northwest
- South Central

Terminal
- Norman East
- Norman West
- Omaha NW
- Tulsa
- Wichita

	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							1,059	$26,139
150 - 200 Pen Asphalt							12,737	$313,195
160 - 190 Pen Asphalt							18,736	$487,711
84 Blend Grade Conventional					3,451	$342,778		
87 Regular Conventional					14,256	$1,460,555		
93 Premium Conventional					13,154	$1,447,356		
AE-150 Emulsified Asph								
Distillate Stock								
Ethanol			5,423	$368,142				
Isobutane							104,040	$6,138,333
No. 1 MV 15								
No. 2 NR 500								
No. 6 Fuel Oil	76,524	$3,753,525						
Normal Butane								
RS Soap Solution								
Grand Total	76,524	$3,753,525	5,423	$368,142	30,861	$3,250,690	136,571	$6,965,378

Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
	$14,337,735

Product Group
- Distillate
- Ethanol
- Gasoline
- Other

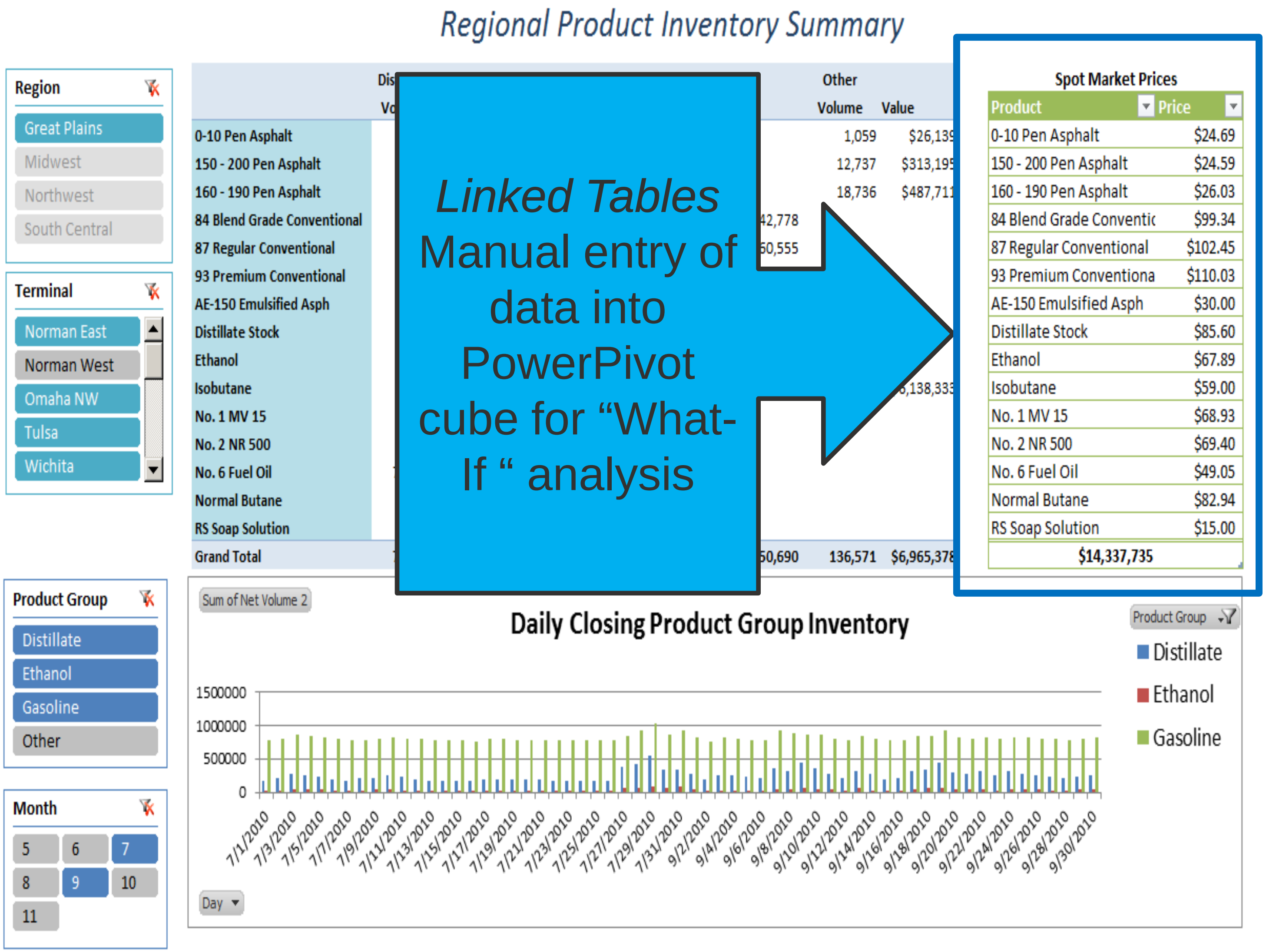
Month
- 5
- 6
- 7
- 8
- 9
- 10
- 11

Daily Closing Product Group Inventory

Sum of Net Volume 2
1500000
1000000
500000
0
7/1/2010
7/3/2010
7/5/2010
7/7/2010
7/9/2010
7/11/2010
7/13/2010
7/15/2010
7/17/2010
7/19/2010
7/21/2010
7/23/2010
7/25/2010
7/27/2010
7/29/2010
7/31/2010
9/2/2010
9/4/2010
9/6/2010
9/8/2010
9/10/2010
9/12/2010
9/14/2010
9/16/2010
9/18/2010
9/20/2010
9/22/2010
9/24/2010
9/26/2010
9/28/2010
9/30/2010
Day
Product Group
Distillate
Ethanol
Gasoline

Product Inventories and Valuation

Linked Tables
Manual entry of data into PowerPivot cube for "What-If " analysis



Regional Product Inventory Summary

	Dis		Other	
	Vo		Volume	Value
0-10 Pen Asphalt			1,059	$26,139
150 - 200 Pen Asphalt			12,737	$313,195
160 - 190 Pen Asphalt			18,736	$487,711
84 Blend Grade Conventional		42,778		
87 Regular Conventional		60,555		
93 Premium Conventional				
AE-150 Emulsified Asph				
Distillate Stock				
Ethanol				
Isobutane				6,138,333
No. 1 MV 15				
No. 2 NR 500				
No. 6 Fuel Oil				
Normal Butane				
RS Soap Solution				
Grand Total		50,690	136,571	$6,965,378

Spot Market Prices

Product	Price
0-10 Pen Asphalt	$24.69
150 - 200 Pen Asphalt	$24.59
160 - 190 Pen Asphalt	$26.03
84 Blend Grade Conventic	$99.34
87 Regular Conventional	$102.45
93 Premium Conventiona	$110.03
AE-150 Emulsified Asph	$30.00
Distillate Stock	$85.60
Ethanol	$67.89
Isobutane	$59.00
No. 1 MV 15	$68.93
No. 2 NR 500	$69.40
No. 6 Fuel Oil	$49.05
Normal Butane	$82.94
RS Soap Solution	$15.00
$14,337,735	

Daily Closing Product Group Inventory

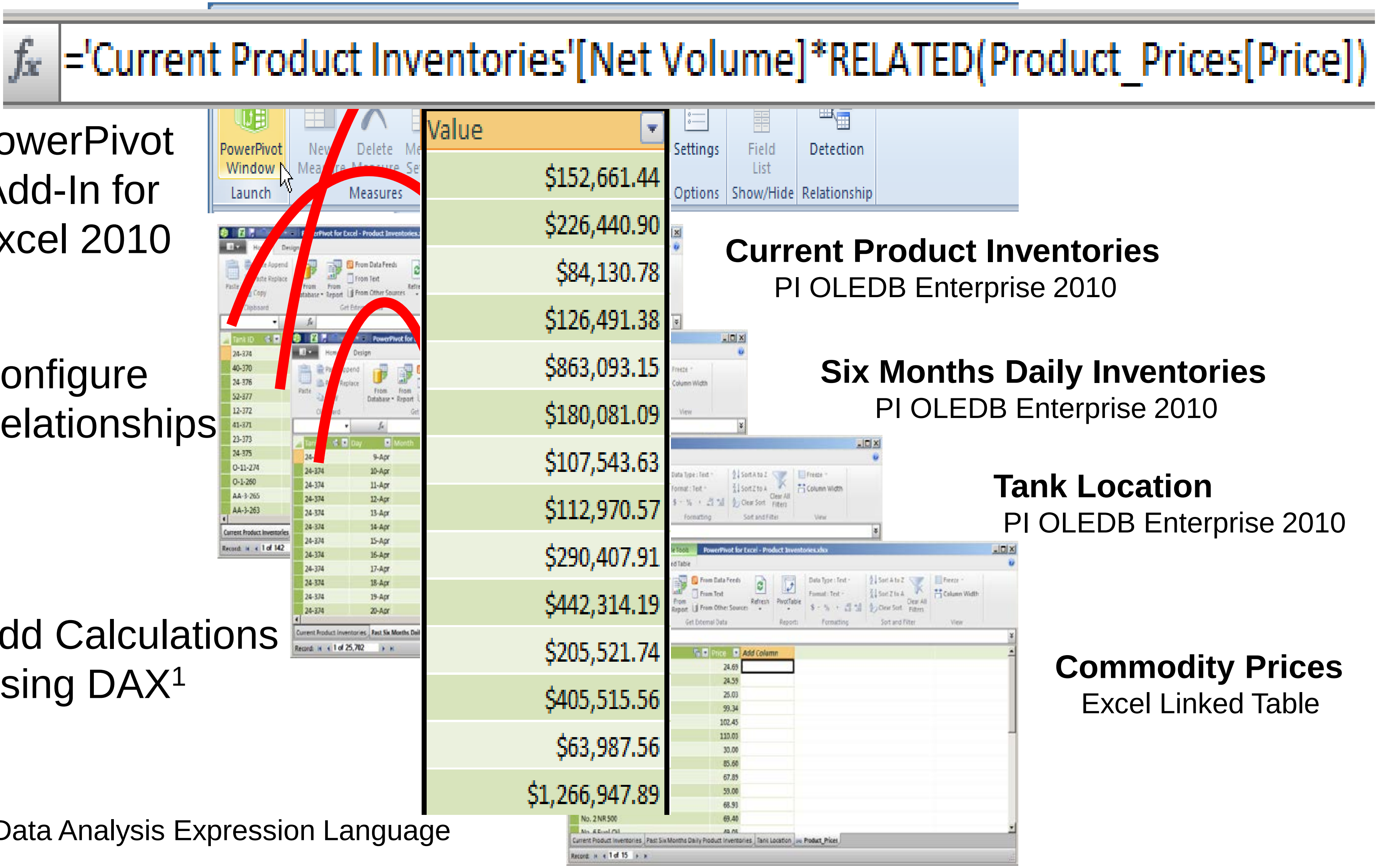
Region
Great Plains
Midwest
Northwest
South Central
Terminal
Norman East
Norman West
Omaha NW
Tulsa
Wichita
Product Group
Distillate
Ethanol
Gasoline
Other
Month
5
6
7
8
9
10
11
Sum of Net Volume 2
1500000
1000000
500000
0
7/1/2010
7/3/2010
7/5/2010
7/7/2010
7/9/2010
7/11/2010
7/13/2010
7/15/2010
7/17/2010
7/19/2010
7/21/2010
7/23/2010
7/25/2010
7/27/2010
7/29/2010
7/31/2010
9/2/2010
9/4/2010
9/6/2010
9/8/2010
9/10/2010
9/12/2010
9/14/2010
9/16/2010
9/18/2010
9/20/2010
9/22/2010
9/24/2010
9/26/2010
9/28/2010
9/30/2010
Day
Product Group
Distillate
Ethanol
Gasoline

Import Data into PowerPivot

PowerPivot Add-In for Excel 2010

Configure Relationships

Add Calculations Using DAX[1]



```
fx ='Current Product Inventories'[Net Volume]*RELATED(Product_Prices[Price])
```

Value
$152,661.44
$226,440.90
$84,130.78
$126,491.38
$863,093.15
$180,081.09
$107,543.63
$112,970.57
$290,407.91
$442,314.19
$205,521.74
$405,515.56
$63,987.56
$1,266,947.89

PowerPivot Window
Launch
New Measure
Delete Measure
Measures
Settings
Options
Field List
Show/Hide
Detection
Relationship
PowerPivot for Excel - Product Inventories.xlsx
From Data Feeds
From Text
From Other Sources
Get External Data
Refresh
PivotTable
Reports
Formatting
Sort and Filter
View
Price
Add Column
Current Product Inventories
Past Six Months Daily Product Inventories
Tank Location
Product_Prices

Current Product Inventories
PI OLEDB Enterprise 2010

Six Months Daily Inventories
PI OLEDB Enterprise 2010

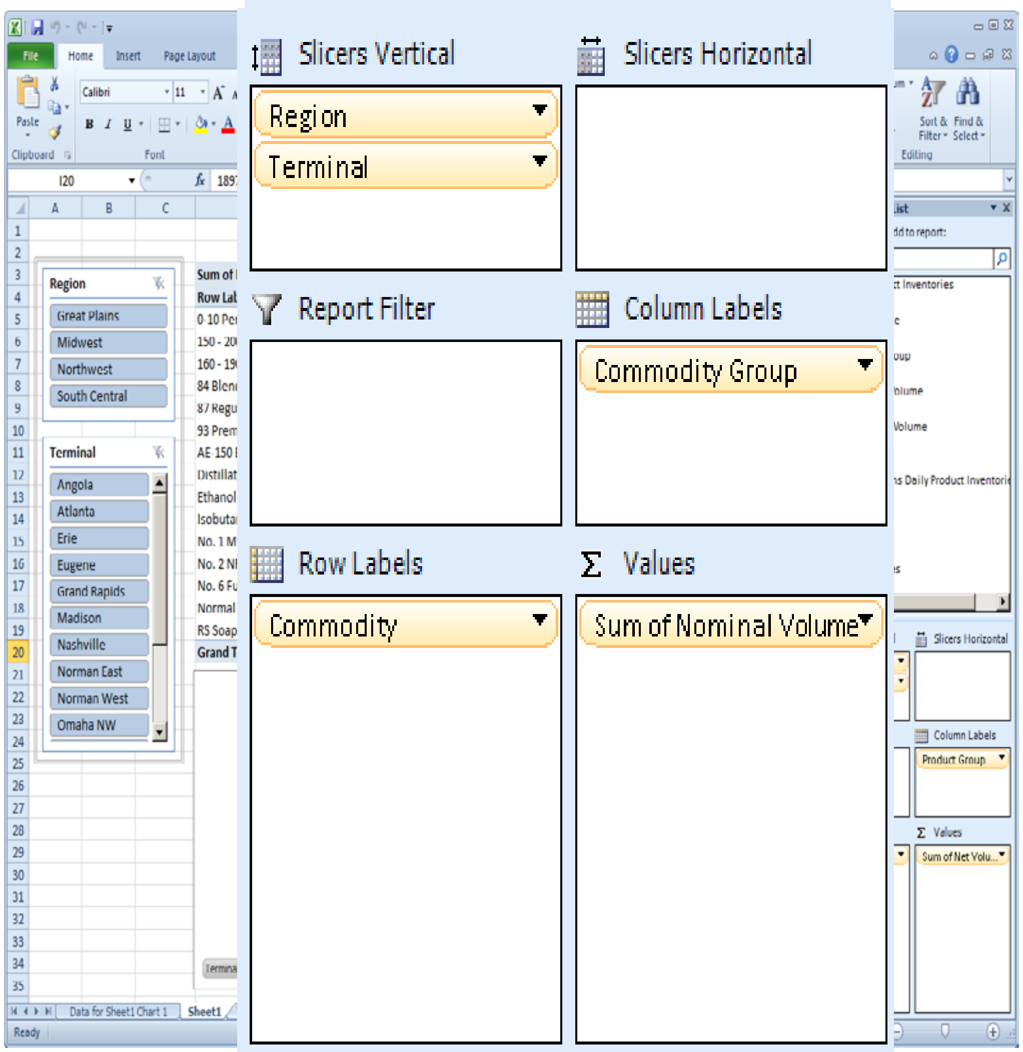
Tank Location
PI OLEDB Enterprise 2010

Commodity Prices
Excel Linked Table

---

1. Data Analysis Expression Language

Build PowerPivot Tables and Charts


File
Home
Insert
Page Layout
Paste
Clipboard
Calibri
11
Font
Sort & Filter
Find & Select
Editing
I20
Region
Great Plains
Midwest
Northwest
South Central
Terminal
Angola
Atlanta
Erie
Eugene
Grand Rapids
Madison
Nashville
Norman East
Norman West
Omaha NW
Data for Sheet1 Chart 1
Sheet1
Ready
Product Group
Sum of Net Volu...

Slicers Vertical: Region, Terminal

Slicers Horizontal:

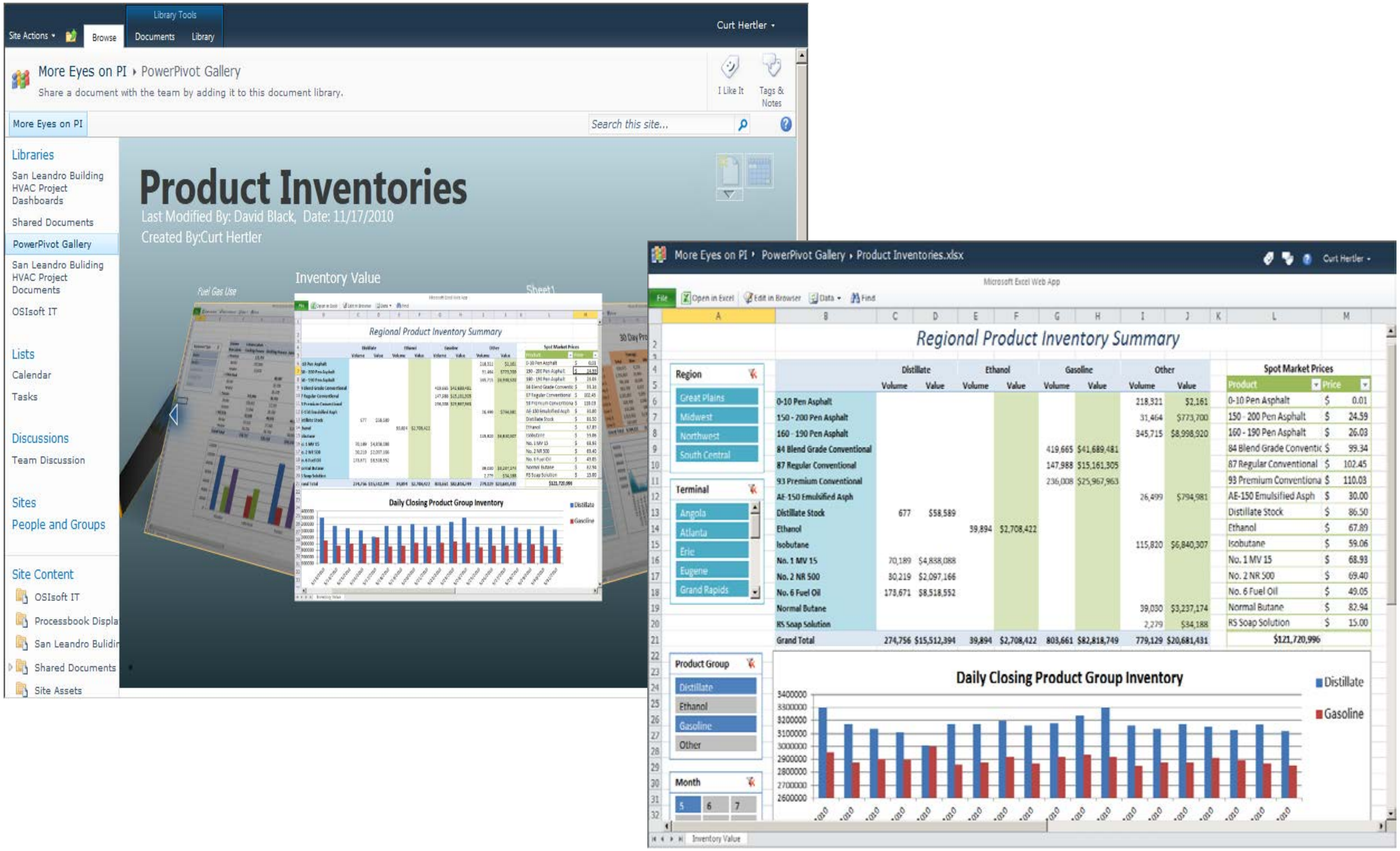
Report Filter:

Column Labels: Commodity Group

Row Labels: Commodity

Values: Sum of Nominal Volume

SharePoint 2010 Enterprise


Site Actions
Browse
Library Tools
Documents
Library
Curt Hertler
I Like It
Tags & Notes
More Eyes on PI
Search this site...
Libraries
San Leandro Building HVAC Project Dashboards
Shared Documents
PowerPivot Gallery
San Leandro Buliding HVAC Project Documents
OSIsoft IT
Lists
Calendar
Tasks
Discussions
Team Discussion
Sites
People and Groups
Site Content
OSIsoft IT
Processbook Displa
San Leandro Bulidir
Shared Documents
Site Assets
Inventory Value
Fuel Gas Use
Sheet1
30 Day Pro
File
Open in Excel
Edit in Browser
Data
Find
Microsoft Excel Web App
Region
Great Plains
Midwest
Northwest
South Central
Terminal
Angola
Atlanta
Erie
Eugene
Grand Rapids
Product Group
Distillate
Ethanol
Gasoline
Other
Month
5
6
7
3400000
3300000
3200000
3100000
3000000
2900000
2800000
2700000
2600000
Distillate
Gasoline
Inventory Value

More Eyes on PI ▸ PowerPivot Gallery

Share a document with the team by adding it to this document library.

Product Inventories

Last Modified By: David Black, Date: 11/17/2010

Created By:Curt Hertler

More Eyes on PI ▸ PowerPivot Gallery ▸ Product Inventories.xlsx

Regional Product Inventory Summary

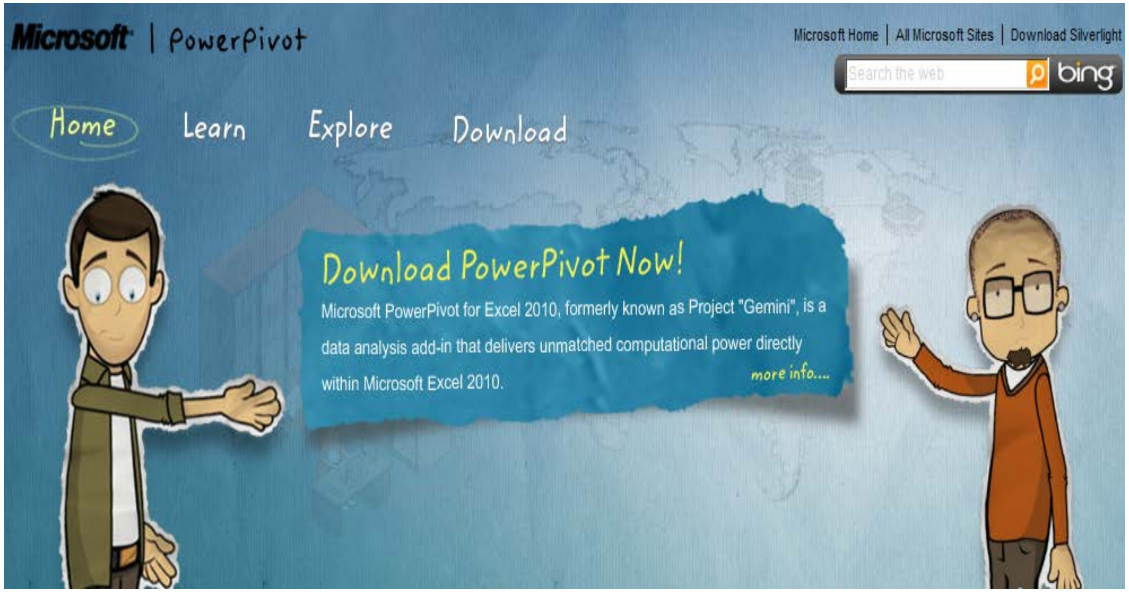
	Distillate		Ethanol		Gasoline		Other	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
0-10 Pen Asphalt							218,321	$2,161
150 - 200 Pen Asphalt							31,464	$773,700
160 - 190 Pen Asphalt							345,715	$8,998,920
84 Blend Grade Conventional					419,665	$41,689,481		
87 Regular Conventional					147,988	$15,161,305		
93 Premium Conventional					236,008	$25,967,963		
AE-150 Emulsified Asph							26,499	$794,981
Distillate Stock	677	$58,589						
Ethanol			39,894	$2,708,422				
Isobutane							115,820	$6,840,307
No. 1 MV 15	70,189	$4,838,088						
No. 2 NR 500	30,219	$2,097,166						
No. 6 Fuel Oil	173,671	$8,518,552						
Normal Butane							39,030	$3,237,174
RS Soap Solution							2,279	$34,188
Grand Total	274,756	$15,512,394	39,894	$2,708,422	803,661	$82,818,749	779,129	$20,681,431

Spot Market Prices

Product	Price	
0-10 Pen Asphalt	$	0.01
150 - 200 Pen Asphalt	$	24.59
160 - 190 Pen Asphalt	$	26.03
84 Blend Grade Conventic	$	99.34
87 Regular Conventional	$	102.45
93 Premium Conventiona	$	110.03
AE-150 Emulsified Asph	$	30.00
Distillate Stock	$	86.50
Ethanol	$	67.89
Isobutane	$	59.06
No. 1 MV 15	$	68.93
No. 2 NR 500	$	69.40
No. 6 Fuel Oil	$	49.05
Normal Butane	$	82.94
RS Soap Solution	$	15.00
	$121,720,996	

Daily Closing Product Group Inventory

Other Examples and Additional Information


Microsoft | PowerPivot
Microsoft Home | All Microsoft Sites | Download Silverlight
Search the web
bing
Home
Learn
Explore
Download

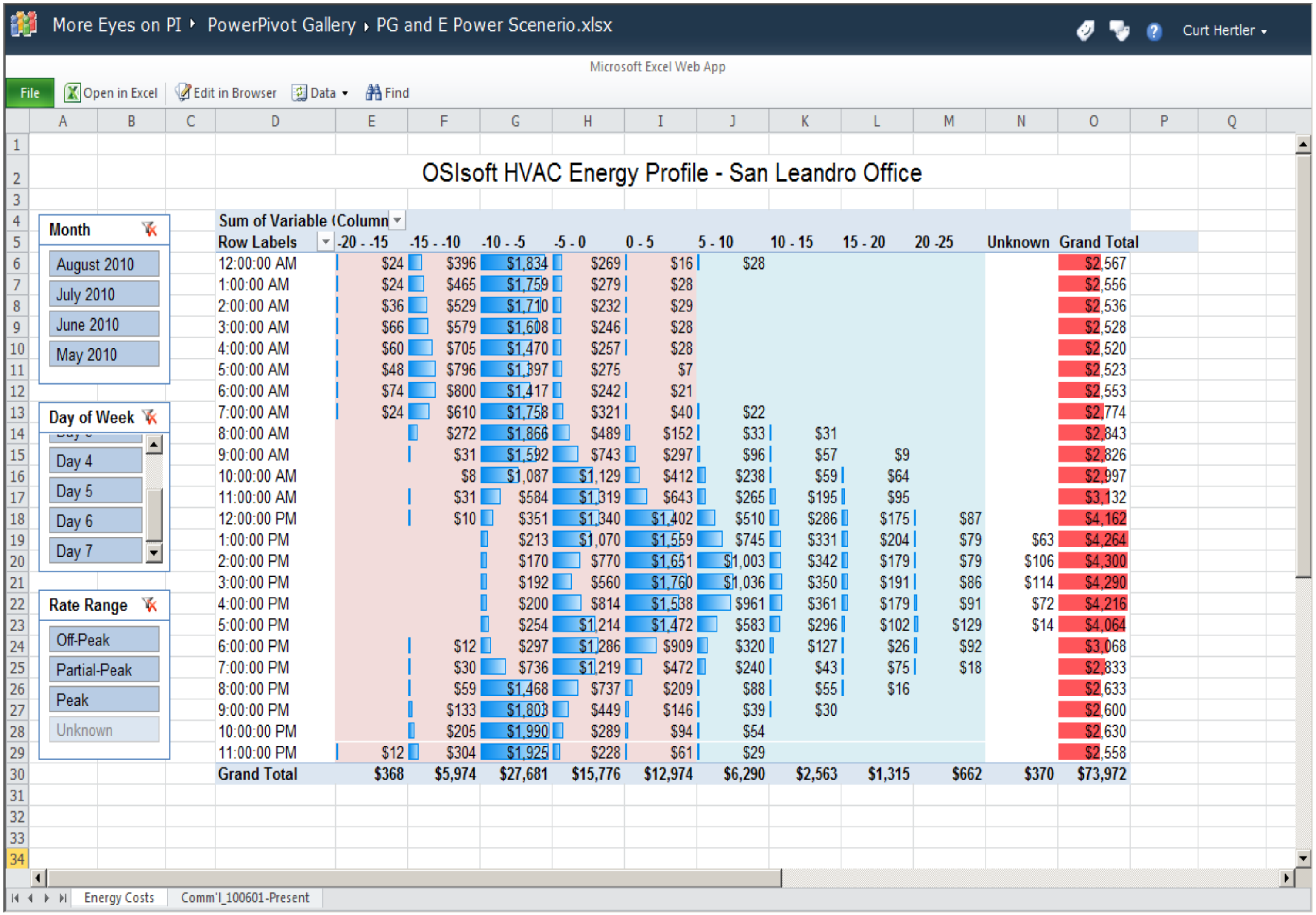
Download PowerPivot Now!

Microsoft PowerPivot for Excel 2010, formerly known as Project "Gemini", is a data analysis add-in that delivers unmatched computational power directly within Microsoft Excel 2010.

more info....

WWW.PowerPivot.com

Performance Profiling


More Eyes on PI ▸ PowerPivot Gallery ▸ PG and E Power Scenerio.xlsx
Curt Hertler
Microsoft Excel Web App
File
Open in Excel
Edit in Browser
Data
Find
Energy Costs
Comm'l_100601-Present

Month
- August 2010
- July 2010
- June 2010
- May 2010

Day of Week
- Day 4
- Day 5
- Day 6
- Day 7

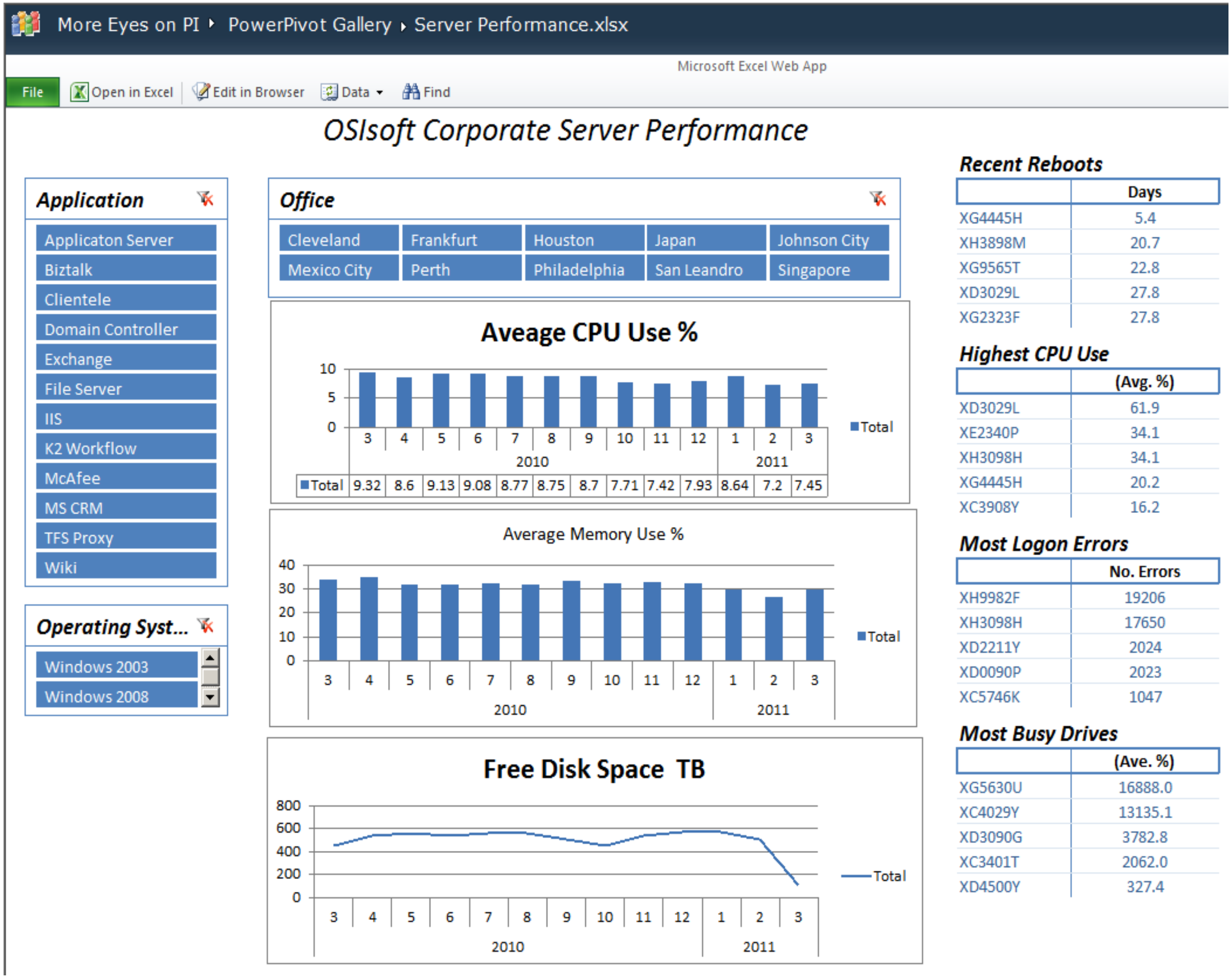
Rate Range
- Off-Peak
- Partial-Peak
- Peak
- Unknown

OSIsoft HVAC Energy Profile - San Leandro Office

Sum of Variable (Column

Row Labels	-20 - -15	-15 - -10	-10 - -5	-5 - 0	0 - 5	5 - 10	10 - 15	15 - 20	20 -25	Unknown	Grand Total
12:00:00 AM	$24	$396	$1,834	$269	$16	$28					$2,567
1:00:00 AM	$24	$465	$1,759	$279	$28						$2,556
2:00:00 AM	$36	$529	$1,710	$232	$29						$2,536
3:00:00 AM	$66	$579	$1,608	$246	$28						$2,528
4:00:00 AM	$60	$705	$1,470	$257	$28						$2,520
5:00:00 AM	$48	$796	$1,397	$275	$7						$2,523
6:00:00 AM	$74	$800	$1,417	$242	$21						$2,553
7:00:00 AM	$24	$610	$1,758	$321	$40	$22					$2,774
8:00:00 AM		$272	$1,866	$489	$152	$33	$31				$2,843
9:00:00 AM		$31	$1,592	$743	$297	$96	$57	$9			$2,826
10:00:00 AM		$8	$1,087	$1,129	$412	$238	$59	$64			$2,997
11:00:00 AM		$31	$584	$1,319	$643	$265	$195	$95			$3,132
12:00:00 PM		$10	$351	$1,340	$1,402	$510	$286	$175	$87		$4,162
1:00:00 PM			$213	$1,070	$1,559	$745	$331	$204	$79	$63	$4,264
2:00:00 PM			$170	$770	$1,651	$1,003	$342	$179	$79	$106	$4,300
3:00:00 PM			$192	$560	$1,760	$1,036	$350	$191	$86	$114	$4,290
4:00:00 PM			$200	$814	$1,538	$961	$361	$179	$91	$72	$4,216
5:00:00 PM			$254	$1,214	$1,472	$583	$296	$102	$129	$14	$4,064
6:00:00 PM		$12	$297	$1,286	$909	$320	$127	$26	$92		$3,068
7:00:00 PM		$30	$736	$1,219	$472	$240	$43	$75	$18		$2,833
8:00:00 PM		$59	$1,468	$737	$209	$88	$55	$16			$2,633
9:00:00 PM		$133	$1,803	$449	$146	$39	$30				$2,600
10:00:00 PM		$205	$1,990	$289	$94	$54					$2,630
11:00:00 PM	$12	$304	$1,925	$228	$61	$29					$2,558
Grand Total	**$368**	**$5,974**	**$27,681**	**$15,776**	**$12,974**	**$6,290**	**$2,563**	**$1,315**	**$662**	**$370**	**$73,972**

Historical Analytics


More Eyes on PI ▸ PowerPivot Gallery ▸ Server Performance.xlsx
Microsoft Excel Web App
File
Open in Excel
Edit in Browser
Data
Find
Application
Applicaton Server
Biztalk
Clientele
Domain Controller
Exchange
File Server
IIS
K2 Workflow
McAfee
MS CRM
TFS Proxy
Wiki
Operating Syst...
Windows 2003
Windows 2008
Office
Cleveland
Frankfurt
Houston
Japan
Johnson City
Mexico City
Perth
Philadelphia
San Leandro
Singapore
Aveage CPU Use %
10
5
0
Total
2010
2011
Average Memory Use %
40
30
20
10
0
Total
3
4
5
6
7
8
9
10
11
12
1
2
3
2010
2011
Free Disk Space TB
800
600
400
200
0
Total
3
4
5
6
7
8
9
10
11
12
1
2
3
2010
2011

OSIsoft Corporate Server Performance

Aveage CPU Use %

	2010										2011		
	3	4	5	6	7	8	9	10	11	12	1	2	3
■Total	9.32	8.6	9.13	9.08	8.77	8.75	8.7	7.71	7.42	7.93	8.64	7.2	7.45

Recent Reboots

	Days
XG4445H	5.4
XH3898M	20.7
XG9565T	22.8
XD3029L	27.8
XG2323F	27.8

Highest CPU Use

	(Avg. %)
XD3029L	61.9
XE2340P	34.1
XH3098H	34.1
XG4445H	20.2
XC3908Y	16.2

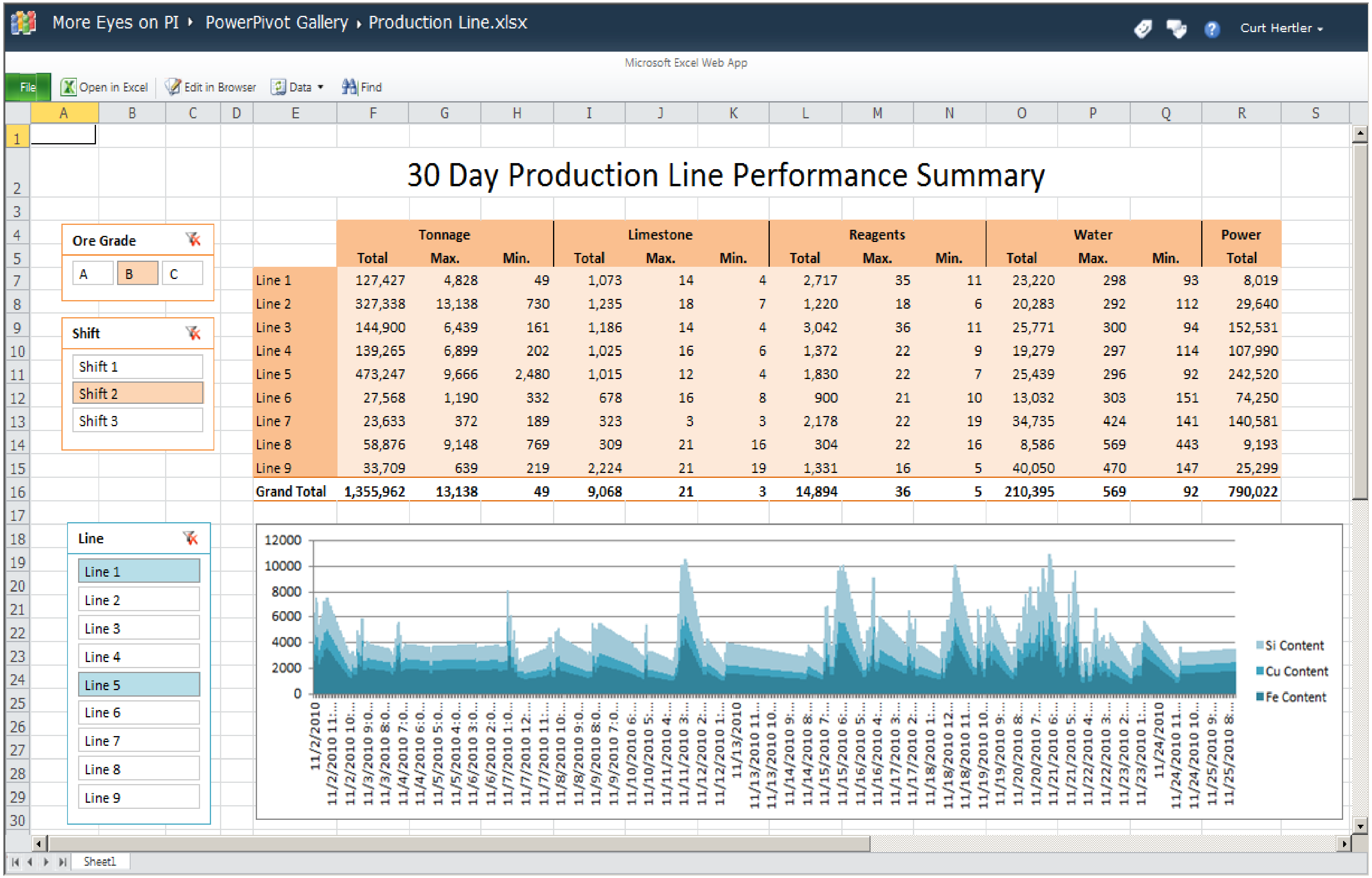
Most Logon Errors

	No. Errors
XH9982F	19206
XH3098H	17650
XD2211Y	2024
XD0090P	2023
XC5746K	1047

Most Busy Drives

	(Ave. %)
XG5630U	16888.0
XC4029Y	13135.1
XD3090G	3782.8
XC3401T	2062.0
XD4500Y	327.4

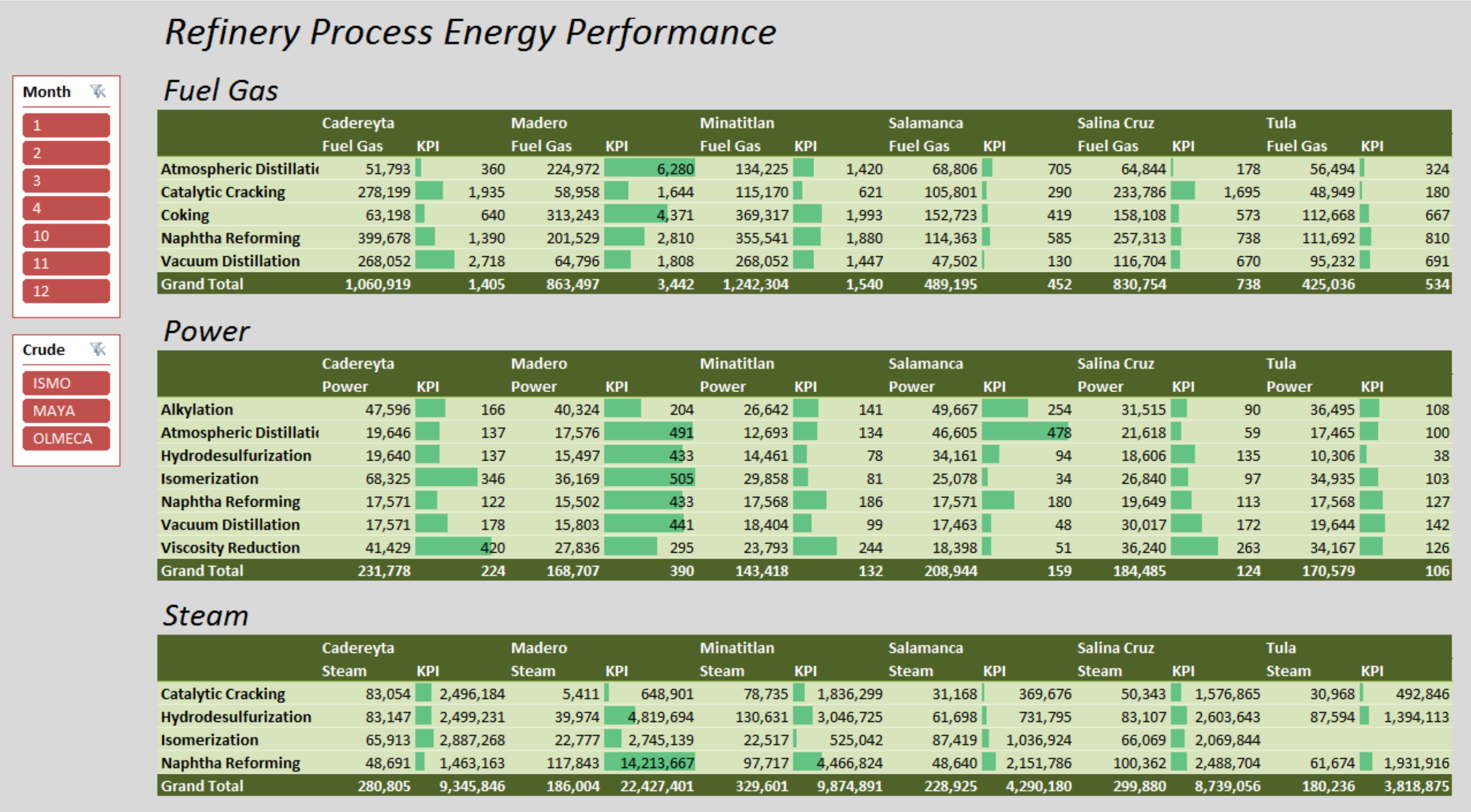
Feedstock Analysis


More Eyes on PI ▸ PowerPivot Gallery ▸ Production Line.xlsx
Curt Hertler
Microsoft Excel Web App
File
Open in Excel
Edit in Browser
Data
Find
Ore Grade
A
B
C
Shift
Shift 1
Shift 2
Shift 3
Line
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
Line 8
Line 9
12000
10000
8000
6000
4000
2000
0
11/2/2010
11/13/2010
11/24/2010
Si Content
Cu Content
Fe Content
Sheet1

30 Day Production Line Performance Summary

	Tonnage			Limestone			Reagents			Water			Power
	Total	Max.	Min.	Total	Max.	Min.	Total	Max.	Min.	Total	Max.	Min.	Total
Line 1	127,427	4,828	49	1,073	14	4	2,717	35	11	23,220	298	93	8,019
Line 2	327,338	13,138	730	1,235	18	7	1,220	18	6	20,283	292	112	29,640
Line 3	144,900	6,439	161	1,186	14	4	3,042	36	11	25,771	300	94	152,531
Line 4	139,265	6,899	202	1,025	16	6	1,372	22	9	19,279	297	114	107,990
Line 5	473,247	9,666	2,480	1,015	12	4	1,830	22	7	25,439	296	92	242,520
Line 6	27,568	1,190	332	678	16	8	900	21	10	13,032	303	151	74,250
Line 7	23,633	372	189	323	3	3	2,178	22	19	34,735	424	141	140,581
Line 8	58,876	9,148	769	309	21	16	304	22	16	8,586	569	443	9,193
Line 9	33,709	639	219	2,224	21	19	1,331	16	5	40,050	470	147	25,299
Grand Total	**1,355,962**	**13,138**	**49**	**9,068**	**21**	**3**	**14,894**	**36**	**5**	**210,395**	**569**	**92**	**790,022**

Energy Benchmarking



Refinery Process Energy Performance

Month

1
2
3
4
10
11
12

Crude

ISMO
MAYA
OLMECA

Fuel Gas

	Cadereyta		Madero		Minatitlan		Salamanca		Salina Cruz		Tula	
	Fuel Gas	KPI	Fuel Gas	KPI	Fuel Gas	KPI	Fuel Gas	KPI	Fuel Gas	KPI	Fuel Gas	KPI
Atmospheric Distillati	51,793	360	224,972	6,280	134,225	1,420	68,806	705	64,844	178	56,494	324
Catalytic Cracking	278,199	1,935	58,958	1,644	115,170	621	105,801	290	233,786	1,695	48,949	180
Coking	63,198	640	313,243	4,371	369,317	1,993	152,723	419	158,108	573	112,668	667
Naphtha Reforming	399,678	1,390	201,529	2,810	355,541	1,880	114,363	585	257,313	738	111,692	810
Vacuum Distillation	268,052	2,718	64,796	1,808	268,052	1,447	47,502	130	116,704	670	95,232	691
Grand Total	**1,060,919**	**1,405**	**863,497**	**3,442**	**1,242,304**	**1,540**	**489,195**	**452**	**830,754**	**738**	**425,036**	**534**

Power

	Cadereyta		Madero		Minatitlan		Salamanca		Salina Cruz		Tula	
	Power	KPI	Power	KPI	Power	KPI	Power	KPI	Power	KPI	Power	KPI
Alkylation	47,596	166	40,324	204	26,642	141	49,667	254	31,515	90	36,495	108
Atmospheric Distillati	19,646	137	17,576	491	12,693	134	46,605	478	21,618	59	17,465	100
Hydrodesulfurization	19,640	137	15,497	433	14,461	78	34,161	94	18,606	135	10,306	38
Isomerization	68,325	346	36,169	505	29,858	81	25,078	34	26,840	97	34,935	103
Naphtha Reforming	17,571	122	15,502	433	17,568	186	17,571	180	19,649	113	17,568	127
Vacuum Distillation	17,571	178	15,803	441	18,404	99	17,463	48	30,017	172	19,644	142
Viscosity Reduction	41,429	420	27,836	295	23,793	244	18,398	51	36,240	263	34,167	126
Grand Total	**231,778**	**224**	**168,707**	**390**	**143,418**	**132**	**208,944**	**159**	**184,485**	**124**	**170,579**	**106**

Steam

	Cadereyta		Madero		Minatitlan		Salamanca		Salina Cruz		Tula	
	Steam	KPI	Steam	KPI	Steam	KPI	Steam	KPI	Steam	KPI	Steam	KPI
Catalytic Cracking	83,054	2,496,184	5,411	648,901	78,735	1,836,299	31,168	369,676	50,343	1,576,865	30,968	492,846
Hydrodesulfurization	83,147	2,499,231	39,974	4,819,694	130,631	3,046,725	61,698	731,795	83,107	2,603,643	87,594	1,394,113
Isomerization	65,913	2,887,268	22,777	2,745,139	22,517	525,042	87,419	1,036,924	66,069	2,069,844		
Naphtha Reforming	48,691	1,463,163	117,843	14,213,667	97,717	4,466,824	48,640	2,151,786	100,362	2,488,704	61,674	1,931,916
Grand Total	**280,805**	**9,345,846**	**186,004**	**22,427,401**	**329,601**	**9,874,891**	**228,925**	**4,290,180**	**299,880**	**8,739,056**	**180,236**	**3,818,875**

Additional Resources

- OSIsoft Resources
  - Recorded vCampus Presentations
  - “Personal BI with PI DataLink and Office 2010”
  - “Building a BI Infrastructure Part 1: Warehousing, ETL, and Cube Building”
  - “Building a BI Infrastructure Part 2: Visualization, Analysis, and Personalization”
  - Prescriptive Architecture Guides

- Microsoft Resources
  - PowerPivot (www.PowerPivot.com)
  - CFE Case Study (www.microsoft.com/casestudies/Microsoft-Sharepoint-Server-2010/Comisi-n-Federal-de-Electricidad-CFE/Mexico-s-Electrical-Utility-Sees-Saving-Millions-of-Dollars-through-Collaborative-BI/4000007996)
  - Windows Azure DataMarket (datamarket.azure.com)

Thank you