

# **Gaining Insight from PI System Data Using New Tools for Operational Intelligence**

Presented by

Curt Hertler  
Marketing Manager  
OSIsoft



# 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

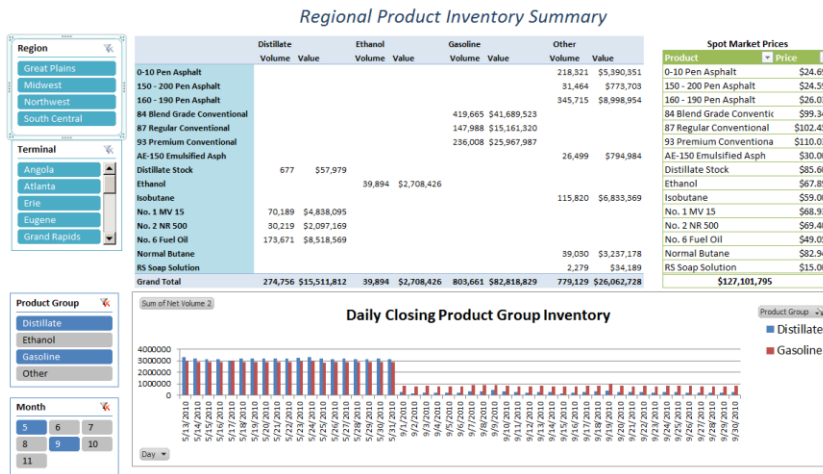
# Business Intelligence (BI) Technologies

OSIsoft HVAC Power Profile - San Leandro Office

		Power Consum Column													Grand Total
		-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	
<b>Month</b> May 2010 June 2010 July 2010 August 2010	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	
<b>Grand Total</b>		<b>2,622</b>	<b>42,805</b>	<b>202,301</b>	<b>114,613</b>	<b>86,391</b>	<b>42,441</b>	<b>18,567</b>	<b>10,164</b>	<b>6,047</b>	<b>1,820</b>	<b>973</b>	<b>756</b>	<b>529,501</b>	

# 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.



## Critical HX Monitoring

Exchanger	Water		CW Flow GPM	U-Value BTU/(hr/ft2/deg F)	Heat	
	Velocity Feet/Sec	Skin Temp Deg. F			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	36.1	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

## Equipment Benchmarking: Fuel Gas Efficiency and Maintenance

	Cracking Process		Distilling Process		Extruding Process		Milling Process	
	Fuel Ratio	No. W.O.	Fuel Ratio	No. W.O.	Fuel Ratio	No. W.O.	Fuel Ratio	No. W.O.
<b>Borne Engineering</b>								
BX-003	1,716		629	1	614	1		
BX-414	1,913						1,000	1
<b>Flame-On</b>								
FO-009	589	1	131				319	5
<b>Hot Spot</b>								
HS-345	511	1			797		2,322	2
HS-444			623		2,705	1		
<b>Inferno</b>								
I-27					1,446	4	1,226	1
I-56	401	3	741	2			6,129	8
<b>KPC, Limited</b>								
KPC-X36	2,539	1			180	3		
KPC-X87	1,841	1	658				877	1
<b>Swift Brothers</b>								
STM-305	3,853	4			631	1		
STM-900			286	2			2,621	5
<b>Grand Total</b>	<b>1,408</b>	<b>11</b>	<b>562</b>	<b>5</b>	<b>1,062</b>	<b>10</b>	<b>1,904</b>	<b>23</b>

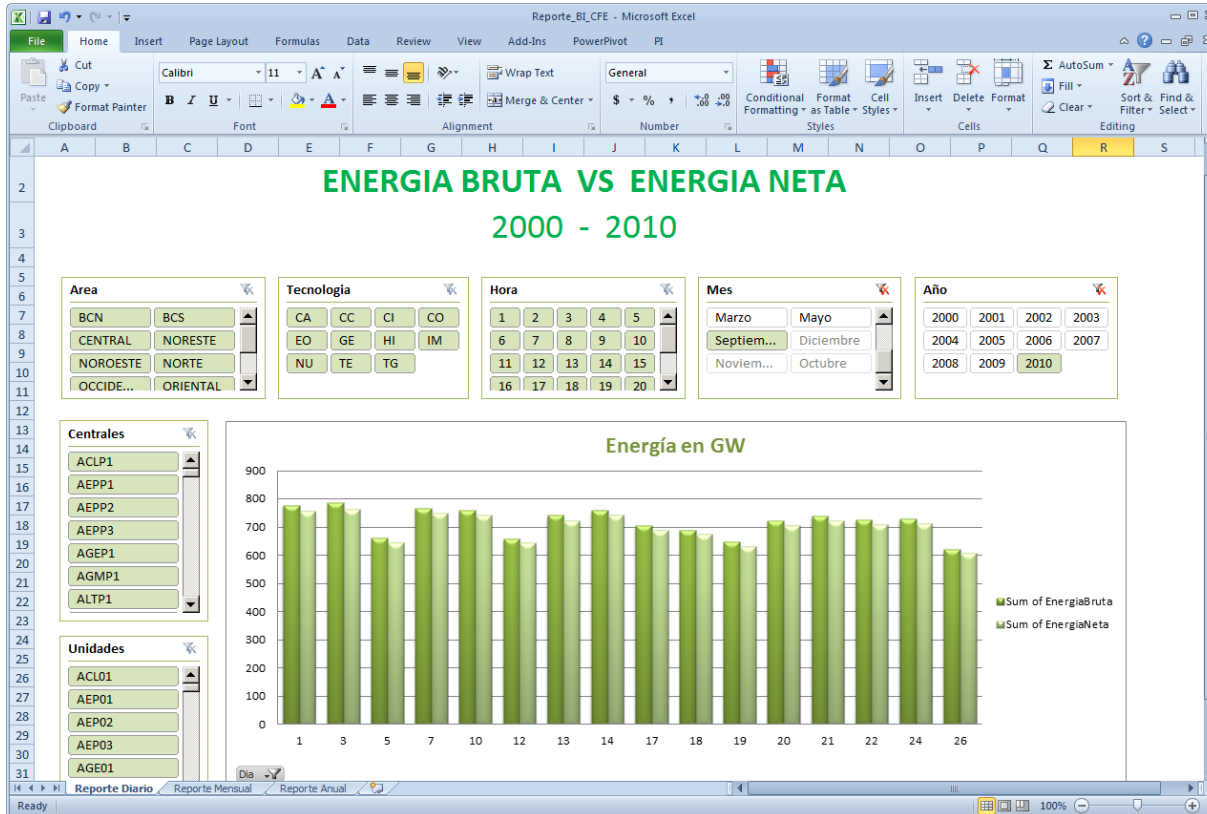
HOUSTON

LITTLE ROCK

TULSA

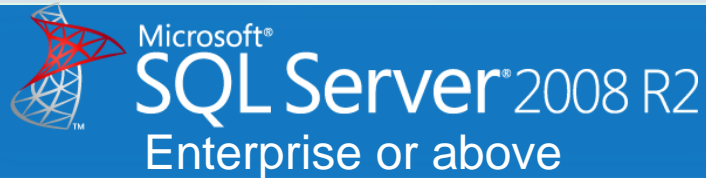
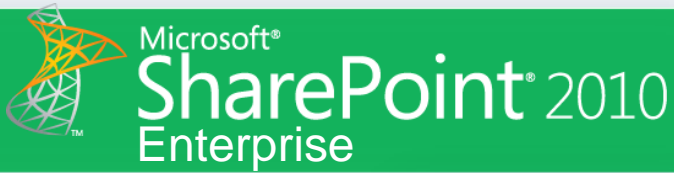
WILMINGTON

# Customer Example: CFE Mexico





# OSIsoft / Microsoft BI Stack



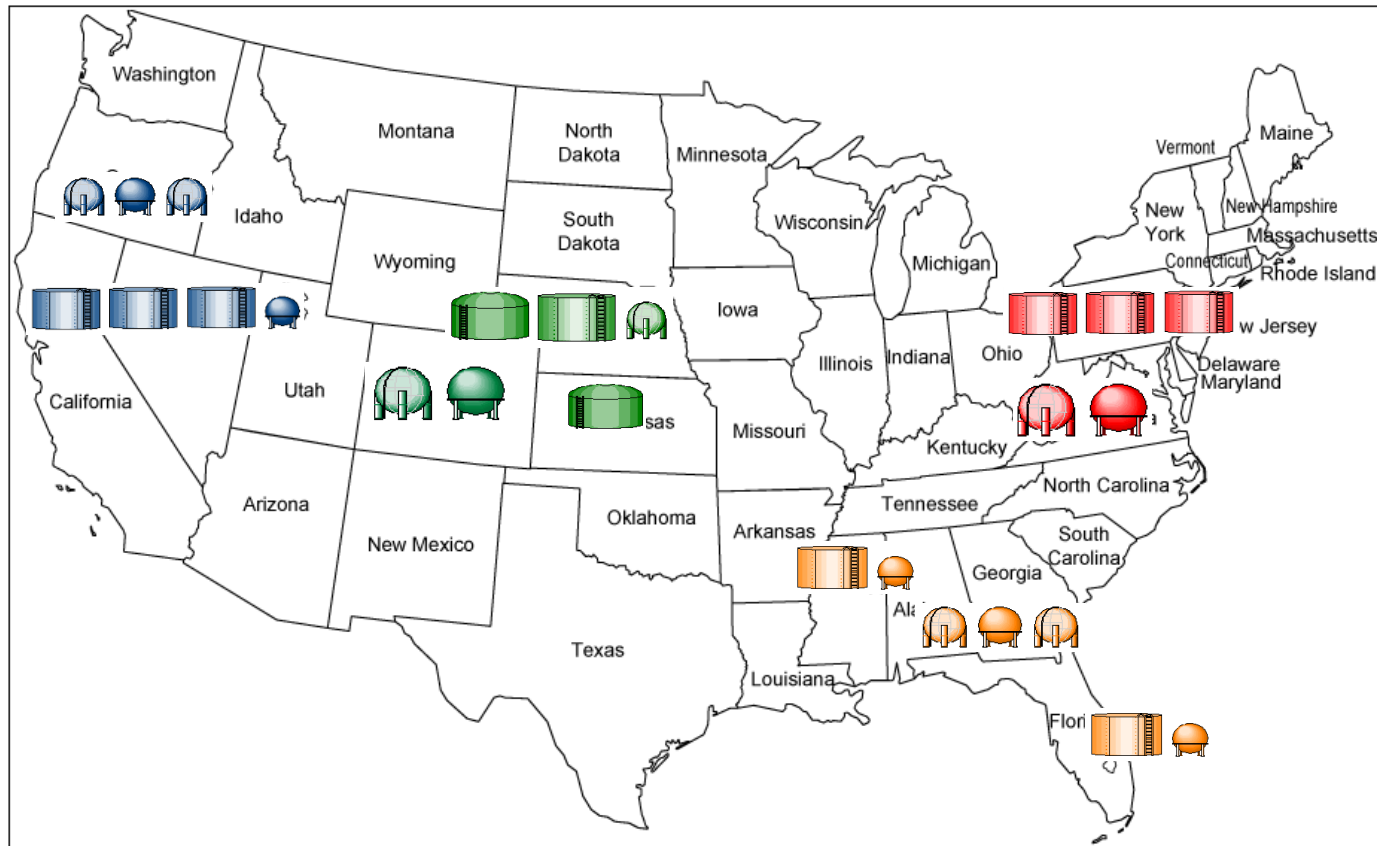




# Self-service BI Toolkit for the PI System

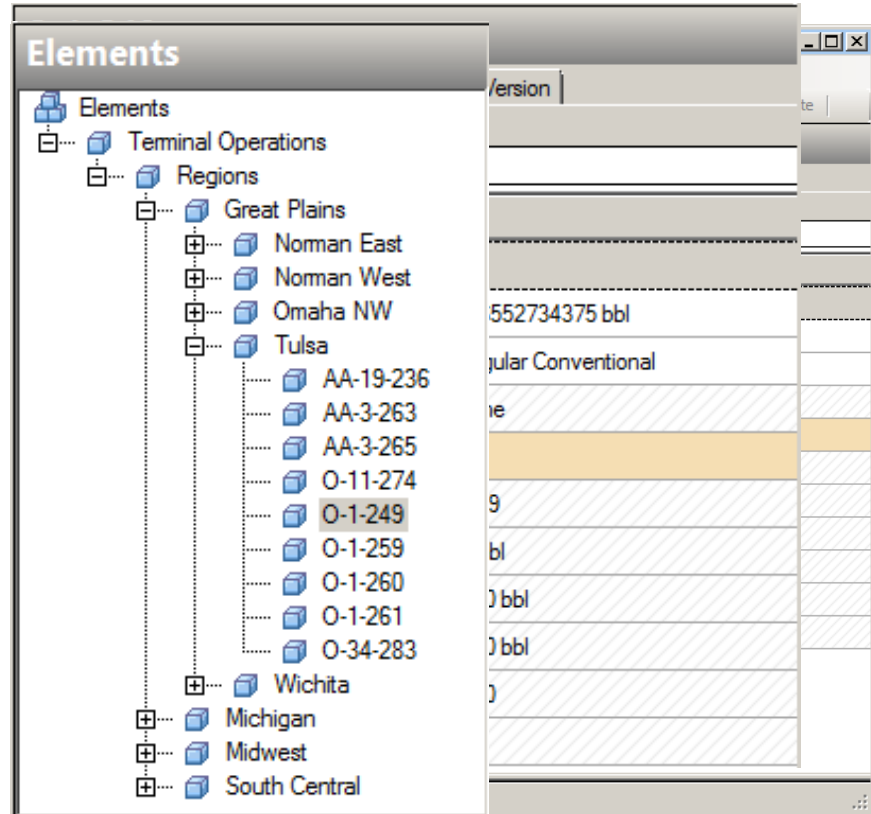
- Facts and Dimensions
  - PI AF (PI System 2010)
- Datasets for BI Data Extraction
  - PI OLEDB Enterprise 2010 (PI for Office 2010)
- Desktop Analysis and Cube Configuration
  - Microsoft PowerPivot for Excel 2010
- Enterprise Accountability
  - Microsoft PowerPivot for SharePoint 2010
  - Microsoft SharePoint 2010 Enterprise
  - Microsoft SQL Server 2008 R2 Enterprise or above

# Example: Product Inventories



# PI AF Associates Facts and Dimensions

Dimensions  
Facts  
Hierarchy  
Attributes  
Regions  
• Variable  
• Terminal Point  
• Product  
• Formula  
• Park  
• Product  
• Other  
Dimensions  
Hierarchy  
Templates  
Categories



# PI OLEDB Enterprise 2010

Back-SIGs – AF  
 All tanks

	Tank ID	Time		Tank ID	Type	Region	Terminal	Nominal Volume	
	000001	T-14	9/20/2010 5:58:..	001	23-373	Tank	Great Plains	Norman East	50250
	000002	T-14	9/20/2010 6:58:..	002	12-372	Tank	Great Plains	Norman East	50250
	000003	T-14	9/20/2010 7:58:..	003	24-374	Tank	Great Plains	Norman East	50250
	000004	T-14	9/20/2010 8:58:..	004	24-375	Tank	Great Plains	Norman East	50250
	000005	T-14	9/20/2010 9:58:..	005	40-376	Tank	Great Plains	Norman East	50250
	000006	T-14	9/20/2010 10:58:..	006	40-370	Tank	Great Plains	Norman East	50250
	000007	T-14	9/20/2010 11:58:..	007	41-371	Tank	Great Plains	Norman East	50250
	000008	T-14	9/21/2010 12:58:..	008	52-377	Tank	Great Plains	Norman East	50250
	000009	T-14	9/21/2010 1:58:..	009	15-11	Tank	Great Plains	Omaha NW	50250
	000010	T-14	9/21/2010 2:58:..	010	35-1	Tank	Great Plains	Omaha NW	50250
	000011	T-14	9/21/2010 3:58:..	011	35-2	Tank	Great Plains	Omaha NW	50250
	000012	T-14	9/21/2010 4:58:..	012	35-9	Tank	Great Plains	Omaha NW	50250
	000013	T-14	9/21/2010 5:58:..	013	55-12	Tank	Great Plains	Omaha NW	50250
	000014	T-14	9/21/2010 6:58:..	014	55-3	Tank	Great Plains	Omaha NW	50250
	000015	T-14	9/21/2010 7:58:..	015	55-7	Tank	Great Plains	Omaha NW	50250
	000016	T-14	9/21/2010 8:58:..	016	80.4	Tank	Great Plains	Omaha NW	50250
	000017	T-14	9/21/2010 9:58:..	017	80.6	Tank	Great Plains	Omaha NW	50250
	000018	T-14	9/21/2010 10:58:..	018	T-1-3	Tank	Great Plains	Omaha NW	50250
				019	AA-10-2	Tank	Great Plains	Omaha NW	50250
				020	T-8-1	Tank	Great Plains	Omaha NW	50250
				021	RB-10-1	Tank	Great Plains	Omaha NW	50250
				022	AA-19-236	Tank	Great Plains	Tulsa	50250

Ready

Ch 1

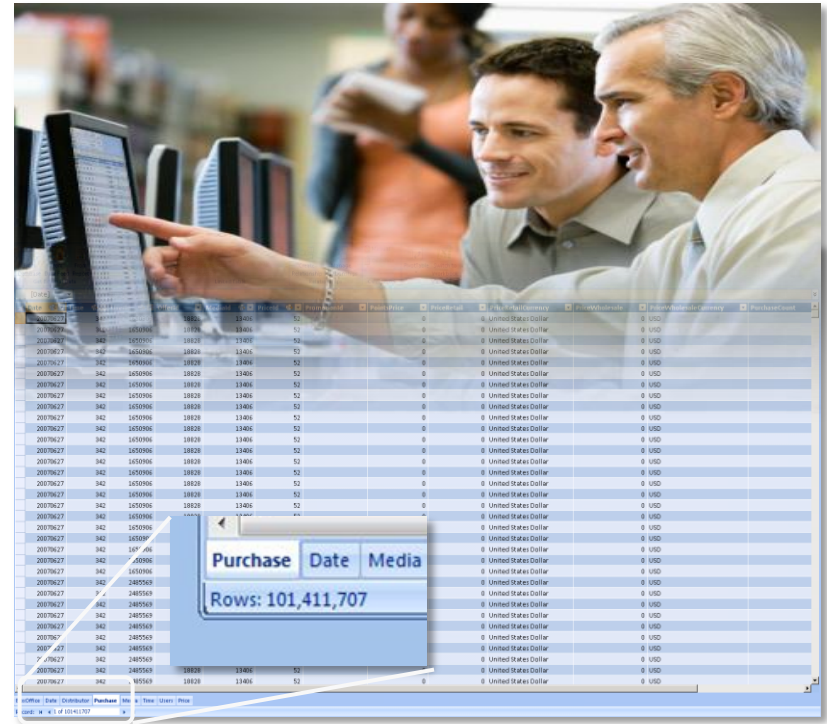
INS

# Introducing PowerPivot for Excel 2010

Microsoft®  
Excel 2010

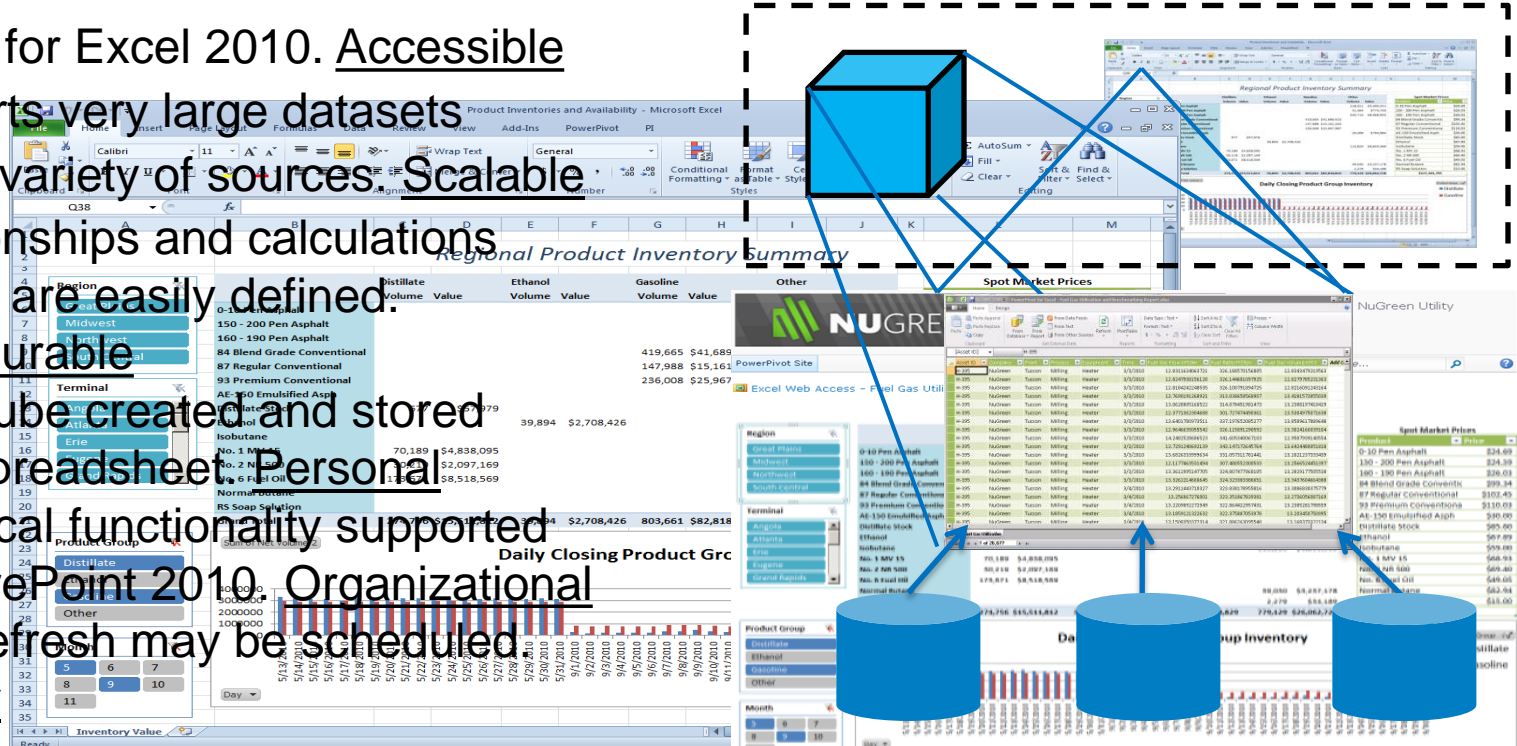
## Empowering The End User

- 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

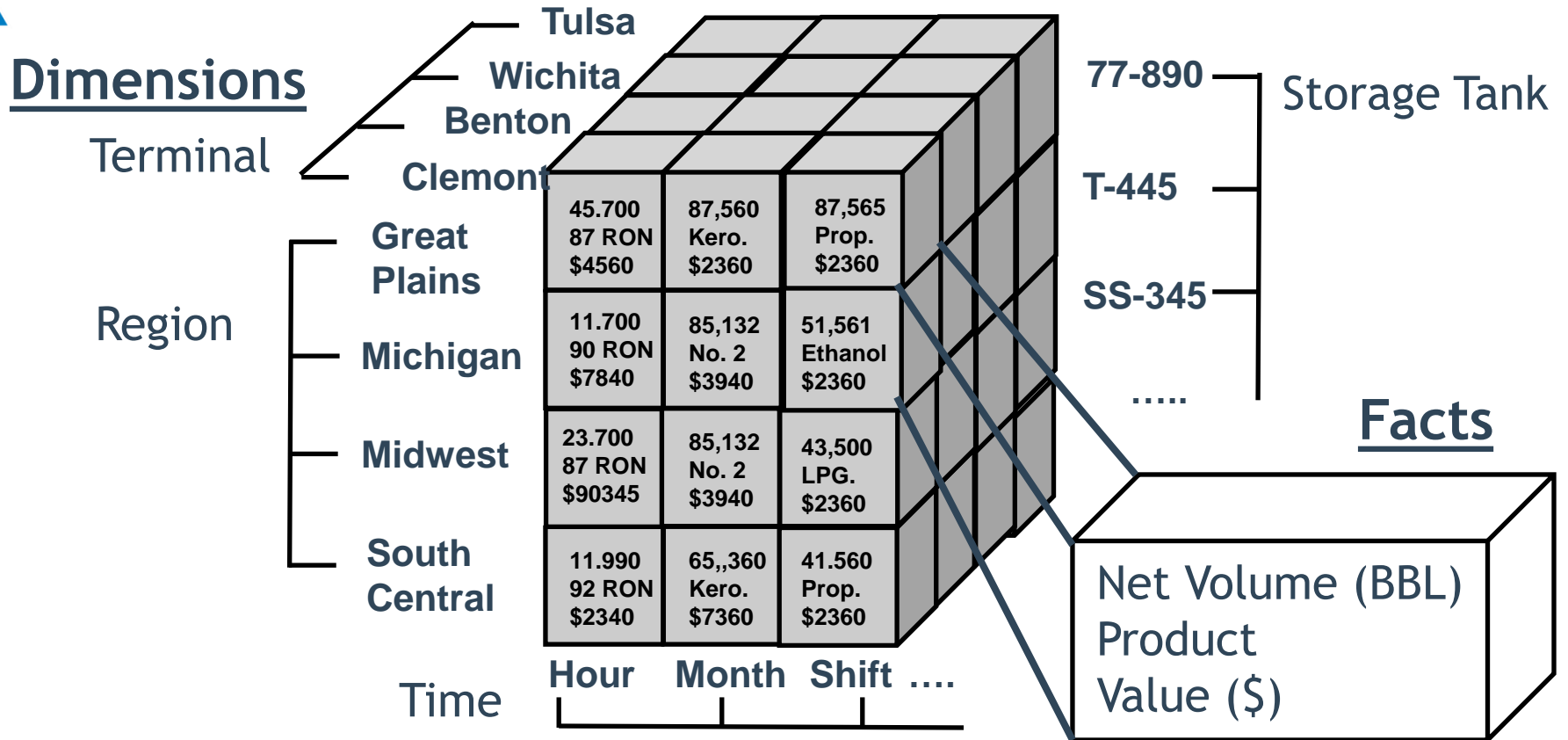
- Add-In for Excel 2010. Accessible
- Supports very large datasets from a variety of sources. Scalable
- Relationships and calculations (DAX<sup>1</sup>) are easily defined. Configurable
- Data cube created and stored with spreadsheet. Personal
- Analytical functionality supported in SharePoint 2010.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



Data Sources: PI, RDB, SAS Cubes, Spreadsheet


1. Data Analysis Expression Language

# Multidimensional Data "Cube"




# Example Walk Through

## 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	128,444	\$6,300,192						
Normal Butane								
RS Soap Solution								
<b>Grand Total</b>	<b>128,444</b>	<b>\$6,300,192</b>	<b>5,423</b>	<b>\$368,142</b>	<b>30,861</b>	<b>\$3,250,690</b>	<b>136,571</b>	<b>\$6,965,378</b>

**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
<b>\$16,884,402</b>	



# 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					5	\$41,689,523		
87 Regular Conventional					8	\$15,161,320		
93 Premium Conventional					8	\$25,967,987		
AE-150 Emulsified Asph							26,499	\$794,984
Distillate Stock							115,820	\$6,833,369
No. 1 MV 15								
No. 2 NR 500								
No. 6 Fuel Oil								
Normal Butane							39,030	\$3,237,178
RS Soap Solution							2,279	\$34,189
<b>Grand Total</b>					<b>1</b>	<b>\$82,818,829</b>	<b>779,129</b>	<b>\$26,062,728</b>

**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
<b>Total</b>	<b>\$127,101,795</b>

Sum of Net Volume 2

Product Group Inventory

Product Group: Distillate (blue), Gasoline (red)

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

# 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					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
<b>Grand Total</b>	<b>274,756</b>	<b>\$15,511,812</b>	<b>39,894</b>	<b>\$2,708,426</b>	<b>803,661</b>	<b>\$82,818,829</b>	<b>779,129</b>	<b>\$26,062,728</b>

**Spot Market Prices**

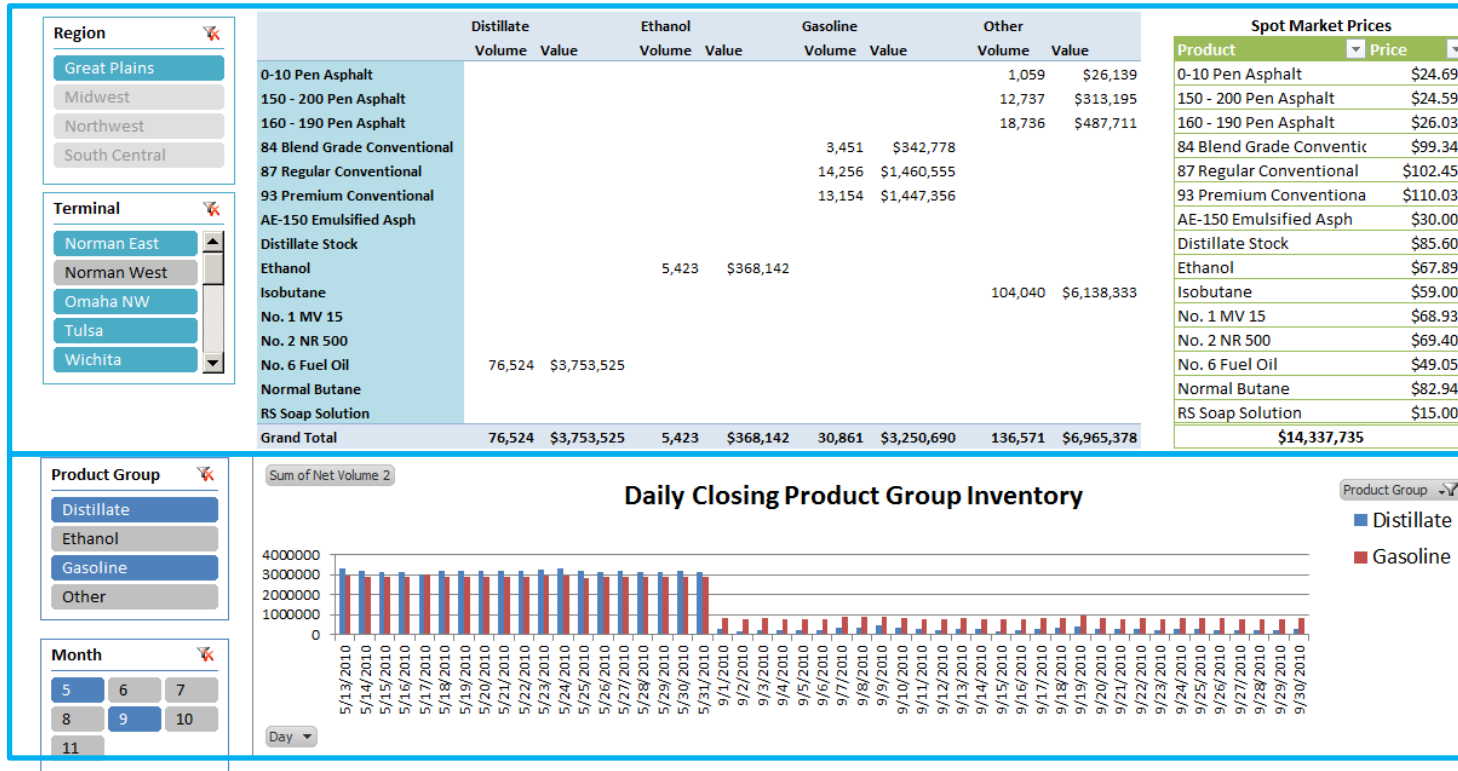
Product	Price
0-10 Pen Asphalt	\$24.69
150 - 200 Pen Asphalt	\$24.59
160 - 190 Pen Asphalt	\$26.03
84 Blend Grade Conventic	\$99.34
87 Regular Conventional	\$102.45
93 Premium Conventiona	\$110.03
AE-150 Emulsified Asph	\$30.00
Distillate Stock	\$85.60
Ethanol	\$67.89
Isobutane	\$59.00
No. 1 MV 15	\$68.93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

**Daily Closing Product Group Inventory**

The chart displays the daily closing inventory for two product groups: Distillate (blue bars) and Gasoline (red bars). The x-axis represents dates from 5/13/2010 to 9/30/2010. The y-axis represents the sum of net volume, ranging from 0 to 4,000,000. Distillate inventory remains relatively stable, fluctuating between approximately 2,800,000 and 3,200,000 units. Gasoline inventory is significantly lower, generally staying between 500,000 and 1,500,000 units, with some daily variations.

# Product Inventories and Valuation

## Regional Product Inventory Summary



# Product Inventories and Valuation

## Regional Product Inventory Summary

**Region**

Midwest

Northwest

South Central

**Terminal**

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								
<b>Grand Total</b>	<b>76,524</b>	<b>\$3,753,525</b>	<b>5,423</b>	<b>\$368,142</b>	<b>30,861</b>	<b>\$3,250,690</b>	<b>136,571</b>	<b>\$6,965,378</b>

**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
<b>Total</b>	<b>\$14,337,735</b>

**Product Group**

Ethanol

Gasoline

Other

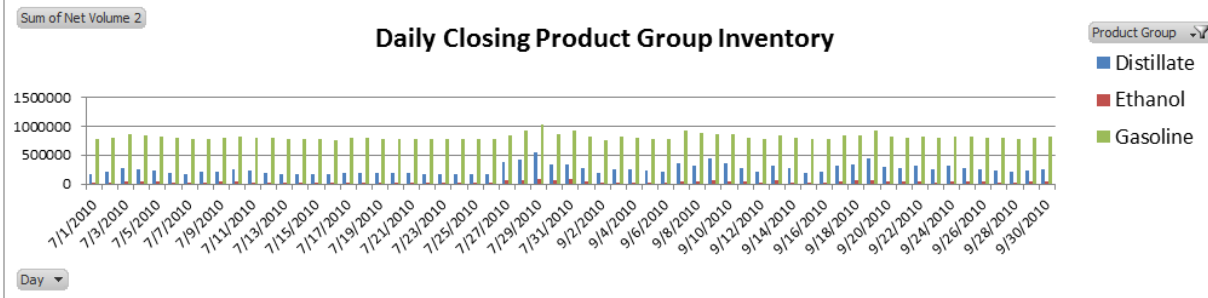
**Month**

8

9

10

11



# Product Inventories and Valuation

## Regional Product Inventory Summary

Region

- Great Plains
- Midwest
- Northwest
- South Central

Terminal

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

Product Group

- Distillate
- Ethanol
- Gasoline
- Other

Month

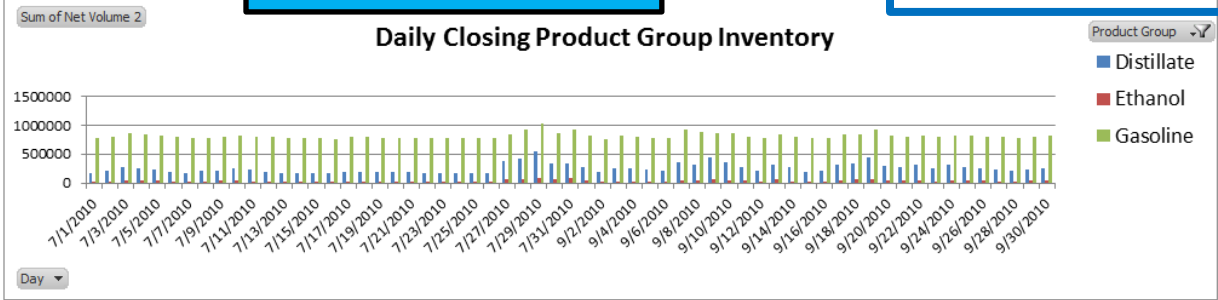
- 5
- 6
- 7
- 8
- 9
- 10
- 11

	Dis	Vo	Other	
			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				88,333
No. 1 MV 15				
No. 2 NR 500				
No. 6 Fuel Oil				
Normal Butane				
RS Soap Solution				
Grand Total			60,690	136,571 \$6,965,378

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

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
<b>\$14,337,735</b>	



# Import Data into PowerPivot

$f_x$  = 'Current Product Inventories'[Net Volume]\*RELATED(Product\_Prices[Price])

PowerPivot  
Add-In for  
Excel 2010

Configure  
Relationships

Add Calculations  
Using DAX<sup>1</sup>

1. Data Analysis Expression Language

The screenshot shows the PowerPivot for Excel 2010 interface. On the left, the 'PowerPivot Window' is open, displaying a table with columns 'Tank ID', 'Day', and 'Month'. Below it, another table is visible with columns 'Tank ID', 'Day', and 'Month'. On the right, a table with a 'Value' column is shown, containing numerical values. The DAX formula bar at the top displays the formula:  $f_x$  = 'Current Product Inventories'[Net Volume]\*RELATED(Product\_Prices[Price]). The interface includes various tabs like 'Settings', 'Field List', 'Detection', 'Options', 'Show/Hide', and 'Relationship'.

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

**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

# Build PowerPivot Tables and Charts

The screenshot displays the Microsoft Excel interface with a PivotTable and its associated task panes. The PivotTable is located in the center of the worksheet, with the following fields:

- Slicers Vertical:** Region, Terminal
- Report Filter:** (Empty)
- Column Labels:** Commodity Group
- Row Labels:** Commodity
- Values:** Sum of Nominal Volume

The PivotTable data is as follows:

Region	Terminal	Commodity Group	Commodity	Sum of Nominal Volume
Great Plains	0-10 Pe			150
Midwest	150- 20			160
Northwest	160- 19			84
South Central	84 Blen			87
	93 Pre			AE-150
	Distillat			Ethanol
	Isobuta			No. 1 M
	No. 2 N			No. 6 F
	Normal			RS Soap
	Grand T			

The task panes on the right side of the screen include:

- Slicers Vertical:** Region, Terminal
- Slicers Horizontal:** (Empty)
- Report Filter:** (Empty)
- Column Labels:** Commodity Group
- Row Labels:** Commodity
- Values:** Sum of Nominal Volume

The background shows the Excel ribbon with the PivotTable Tools (Analyze) tab selected, and the PivotTable Fields task pane on the right.

# SharePoint 2010 Enterprise

Site Actions | Library Tools | Documents | Library | Curt Hertler

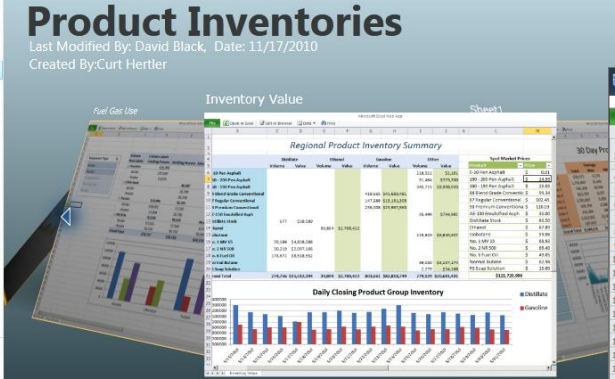
More Eyes on PI | PowerPivot Gallery  
Share a document with the team by adding it to this document library.

More Eyes on PI | Search this site...

**Product Inventories**  
Last Modified by: David Black, Date: 11/17/2010  
Created By: Curt Hertler

Libraries  
San Leandro Building HVAC Project Dashboards  
Shared Documents  
PowerPivot Gallery  
San Leandro Building HVAC Project Documents  
OSIssoft IT

Lists  
Calendar  
Tasks  
Discussions  
Team Discussion  
Sites  
People and Groups  
Site Content  
OSIssoft IT  
Processbook Display  
San Leandro Building  
Shared Documents  
Site Assets



More Eyes on PI | PowerPivot Gallery | Product Inventories.xlsx | Curt Hertler

Microsoft Excel Web App

**Regional Product Inventory Summary**

Region	Distillate		Ethanol		Gasoline		Other		Spot Market Prices	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Product	Price
Great Plains	0.10 Pen Asphalt	218,321	\$2,183						0-10 Pen Asphalt	\$ 0.01
Midwest	150 - 200 Pen Asphalt	31,464	\$773,700						150 - 200 Pen Asphalt	\$ 24.59
Northwest	160 - 190 Pen Asphalt	845,715	\$8,998,920						160 - 190 Pen Asphalt	\$ 26.03
South Central	84 Blend Grade Conventioal				419,665	\$41,689,481			84 Blend Grade Conventioal	\$ 99.34
Grand Rapids	87 Regular Conventioal				147,988	\$15,161,305			87 Regular Conventioal	\$ 102.45
	93 Premium Conventioal				236,008	\$25,967,963			93 Premium Conventioal	\$ 110.03
	AE-150 Emulsified Ash						26,499	\$794,981	AE-150 Emulsified Ash	\$ 30.00
	Distillate Stock	677	\$58,589						Distillate Stock	\$ 86.50
	Ethanol			99,894	\$2,708,422				Ethanol	\$ 67.89
	Isobutane						115,820	\$6,840,307	Isobutane	\$ 59.06
	No. 1 MV 15	70,189	\$4,838,088						No. 1 MV 15	\$ 68.93
	No. 2 NR 500	30,219	\$2,097,166						No. 2 NR 500	\$ 69.40
	No. 6 Fuel Oil	173,671	\$8,518,552						No. 6 Fuel Oil	\$ 49.05
	Normal Butane						39,030	\$3,237,174	Normal Butane	\$ 82.54
	RS Soap Solution						2,279	\$94,188	RS Soap Solution	\$ 15.00
	<b>Grand Total</b>	<b>274,756</b>	<b>\$15,512,394</b>	<b>99,894</b>	<b>\$2,708,422</b>	<b>803,661</b>	<b>\$82,818,749</b>	<b>779,129</b>	<b>\$20,681,431</b>	<b>\$121,720,996</b>

**Daily Closing Product Group Inventory**

Legend: Distillate (Blue), Gasoline (Red)

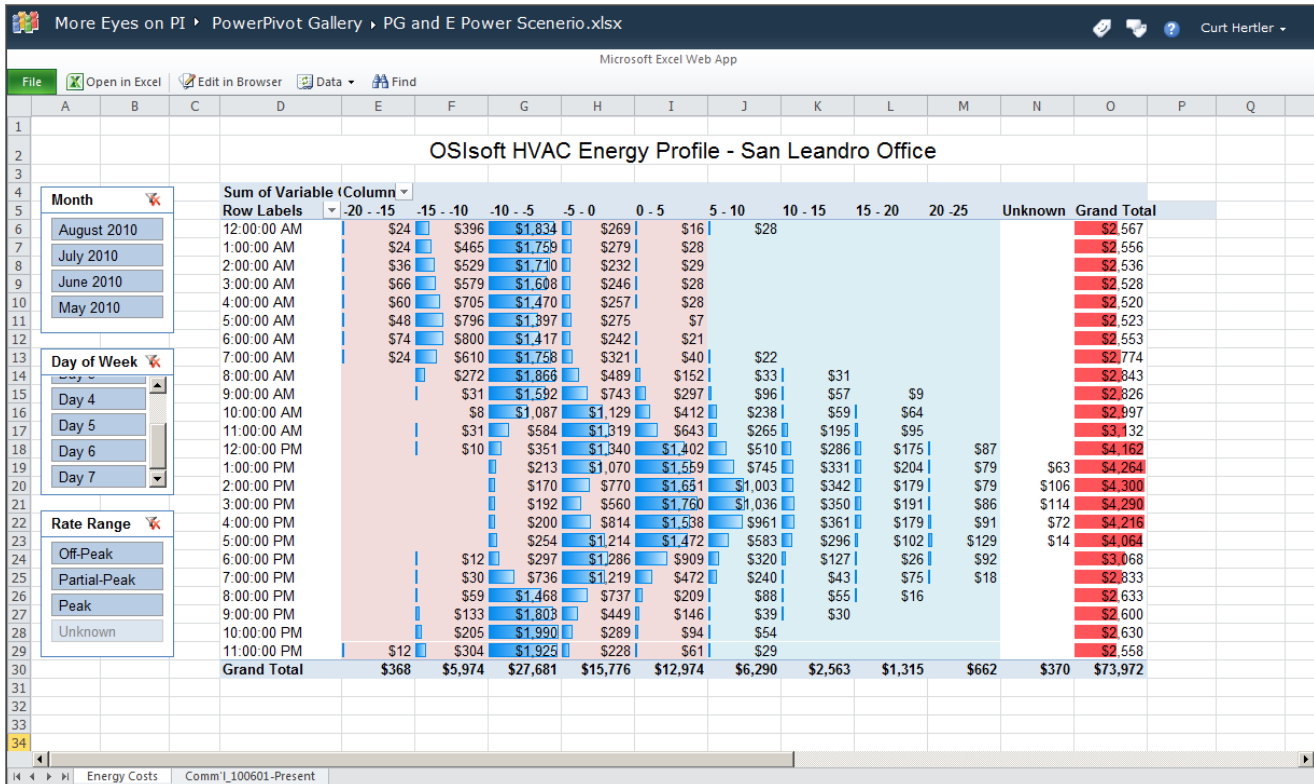


# Other Examples and Additional Information

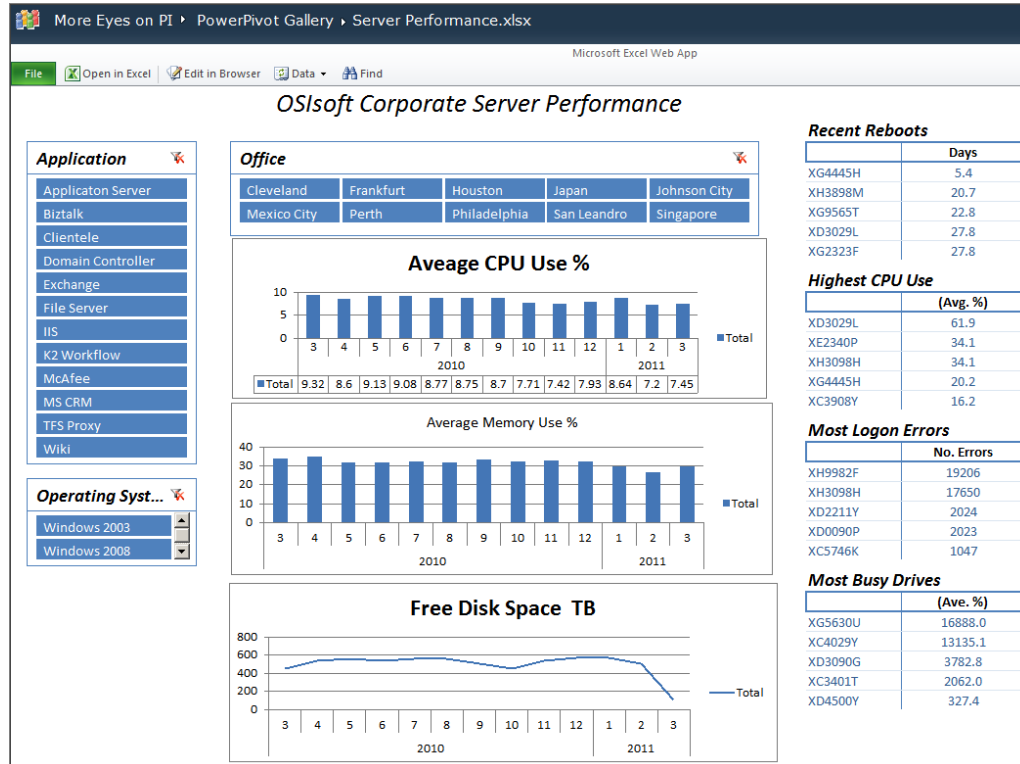


WWW.PowerPivot.com

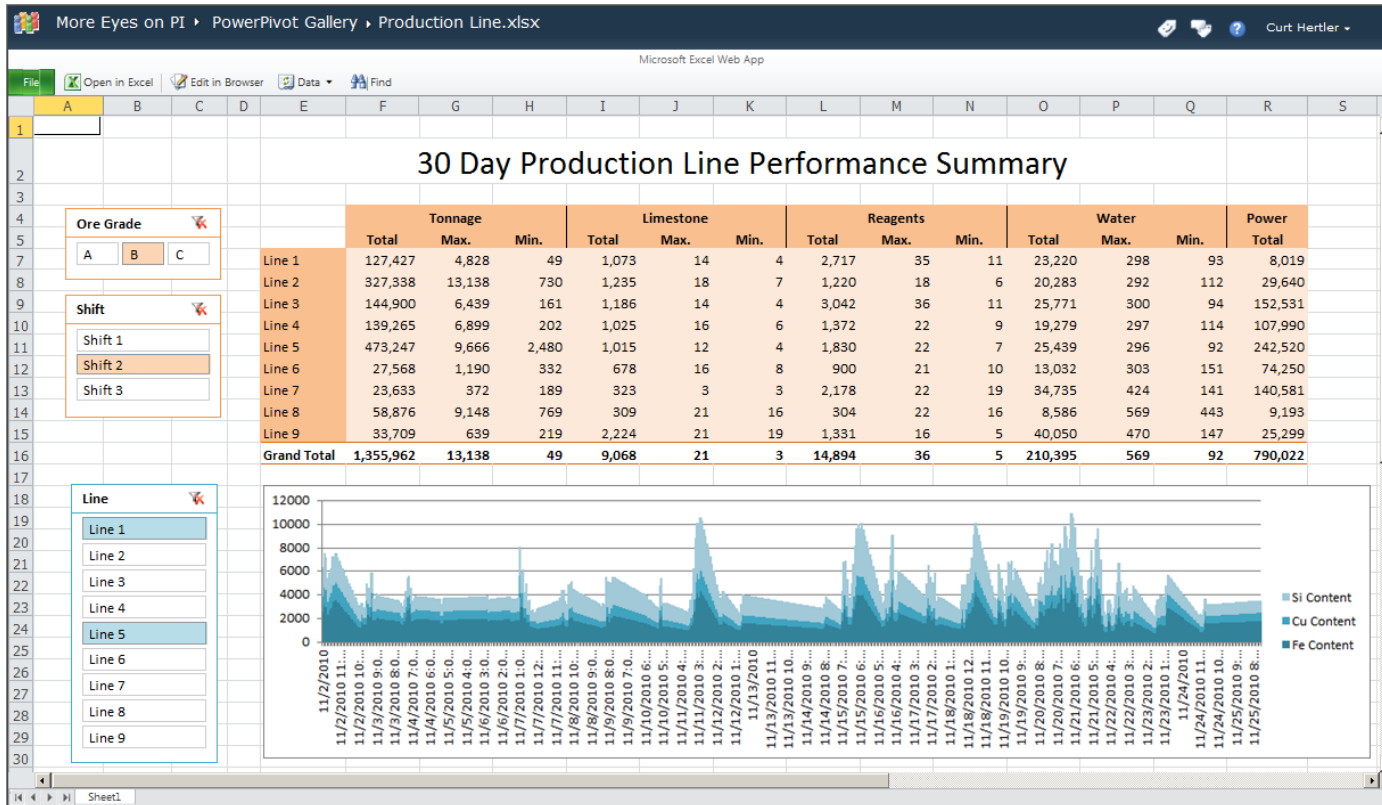
# Performance Profiling



# Historical Analytics



# Feedstock Analysis



# Energy Benchmarking

## Refinery Process Energy Performance

Month

- 1
- 2
- 3
- 4
- 10
- 11
- 12

### 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 Distillate	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
<b>Grand Total</b>	<b>1,060,919</b>	<b>1,405</b>	<b>863,497</b>	<b>3,442</b>	<b>1,242,304</b>	<b>1,540</b>	<b>489,195</b>	<b>452</b>	<b>830,754</b>	<b>738</b>	<b>425,036</b>	<b>534</b>

Crude

- ISMO
- MAYA
- OLMECA

### 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 Distillate	19,646	137	17,576	491	12,693	134	46,605	478	21,618	59	17,465	100
Hydrosulfurization	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
<b>Grand Total</b>	<b>231,778</b>	<b>224</b>	<b>168,707</b>	<b>390</b>	<b>143,418</b>	<b>132</b>	<b>208,944</b>	<b>159</b>	<b>184,485</b>	<b>124</b>	<b>170,579</b>	<b>106</b>

### 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
Hydrosulfurization	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
<b>Grand Total</b>	<b>280,805</b>	<b>9,345,846</b>	<b>186,004</b>	<b>22,427,401</b>	<b>329,601</b>	<b>9,874,891</b>	<b>228,925</b>	<b>4,290,180</b>	<b>299,880</b>	<b>8,739,056</b>	<b>180,236</b>	<b>3,818,875</b>



# Resources

- OSIssoft Resources
  - Recorded Users Conference 2010 and 2011 Presentations
  - Recorded OSIssoft vCampus Presentations
  - Prescriptive Architecture Guides
- Books
  - “PowerPivot for the Data Analyst”, Bill Jelen
  - “Practical PowerPivot & DAX Formulas for Excel 2010”, Art Tennick
- Microsoft Resources
  - PowerPivot ([www.PowerPivot.com](http://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](http://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](http://datamarket.azure.com))



Thank you

