



OSIsoft®

Regional Seminar Series



Visualizing PI Data with Dashboards and Reports

Michael Wood
Product Manager
OSIsoft LLC.

Empowering Business in Real-time.

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Experience



What's New with Visualization in PI System 2010?



Reports

Timestamp	B309_FG903	B555_FG120	B210_FG00
20-Apr-10 14:33:18	70.0065079	84.9462814	67.298210
20-Apr-10 14:28:18	68.5293	87.1578293	67.866409
20-Apr-10 14:18:18	67.4118	91.2100906	67.433746
20-Apr-10 14:08:18	66.3043	86.6964607	86.3389435
20-Apr-10 13:58:18	65.1968	82.4419708	82.160881
20-Apr-10 13:48:18	64.0893	71.2854004	87.7373886
20-Apr-10 13:38:18	62.9818	60.1289907	85.1711731
20-Apr-10 13:28:18	61.8743	69.7173538	82.9396286
20-Apr-10 13:18:18	60.7668	80.7458927	80.941864

Dashboards

Milling Process - Windows Internet Explorer

http://dfpweb2010/nuGreen/Engineering/Process/2010/04/16/Milling02Process.aspx

NUGREEN

Milling Assets

PI Trend

Equipment Documents

Milling Production Schedule

Production	Production		Inventories			Today's Performance					
	Rate (Tons/Hr)	Target (Tons/Hr)	Capacity (Tons/Hr)	Raw Material Available (Tons)	Days	Product Sales (Tons/Day)	Available (Tons)	Days	Energy 2%	Reliability 95%	Quality 98%
Houston	32.9	36.0	50	30,128	35.9	1,300	10,638	8.9	98206%	9957%	9847%

Notification Delivery

Chad Chisholm

DF PI Notifications

DF PI Notifications

Fuel gas utilization: Milling Process is OVER LIMIT

Name: Fuel gas utilization: Milling Process
 Server: DFPI2010RC
 Database: NuGreen
 Start Time: 4/16/2010 11:24:10 AM
 Trigger Time: 4/16/2010 11:24:10 AM
 Target: \\DFPI2010RC\NuGreen\NuGreen\
 Value: High
 Priority: Normal

Link:
[Milling Process - Fuel Gas Trend](#)
[Tucson - Process Overview](#)

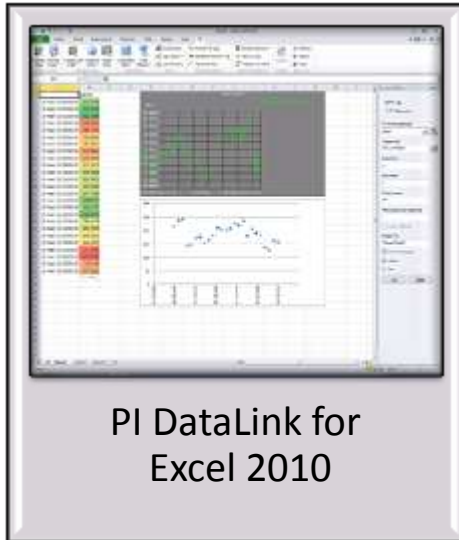
Actions:
[Acknowledge](#)
[Acknowledge with Comment](#)

Scorecards

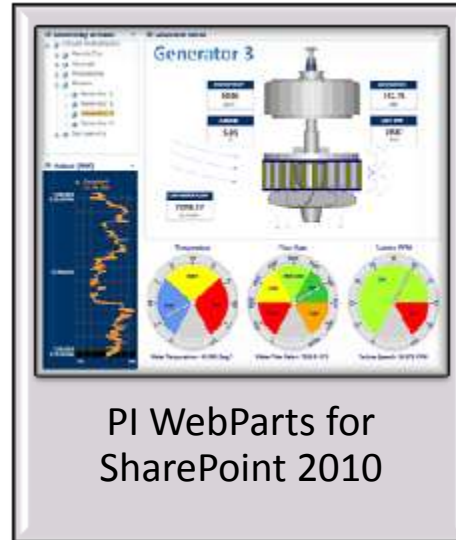
Operations Performance Scorecard

	Houston				Little Rock				Trend
	This Month	Today	Target	Trend	This Month	Today	Target	Trend	
Safety	0	0	0	Green	0	0	0	Green	Green
Environment	97.0	97.1	97.0	Green	98.6	99.0	98.5	Green	Green
Energy Use	363594	11998	363594	Yellow	111526	3646	111526	Yellow	Yellow
Quality	97.6	97.9	97.6	Green	97.3	97.6	97.6	Green	Green
Reliability	95.7	96.4	95.7	Green	95.6	96.3	95.6	Green	Green

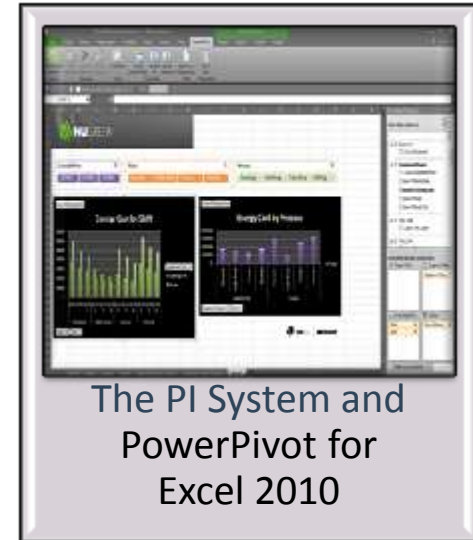
Visualization for PI System 2010



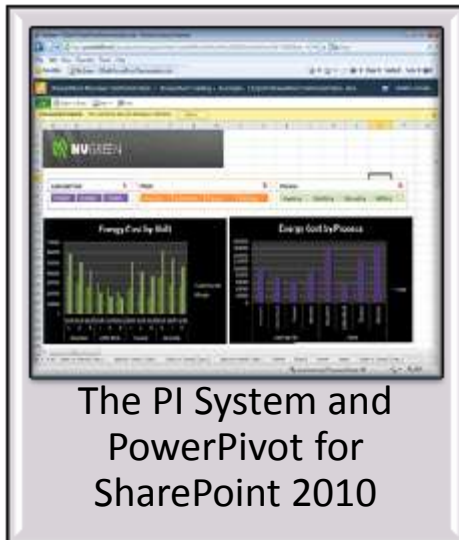
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



The PI System and
PowerPivot for
Excel 2010

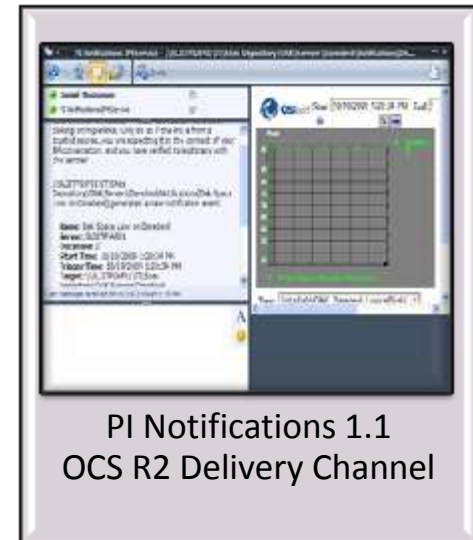


The PI System and
PowerPivot for
SharePoint 2010

PI OLEDB
Enterprise 2010

PI Web Services
2010

PI Data Access
Technologies

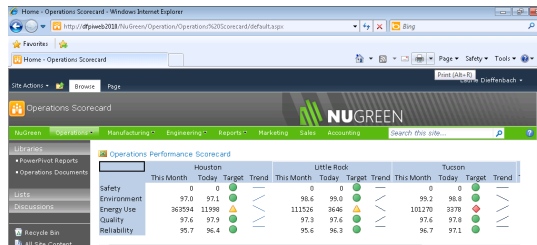


PI Notifications 1.1
OCS R2 Delivery Channel

Management



Knowledge Worker

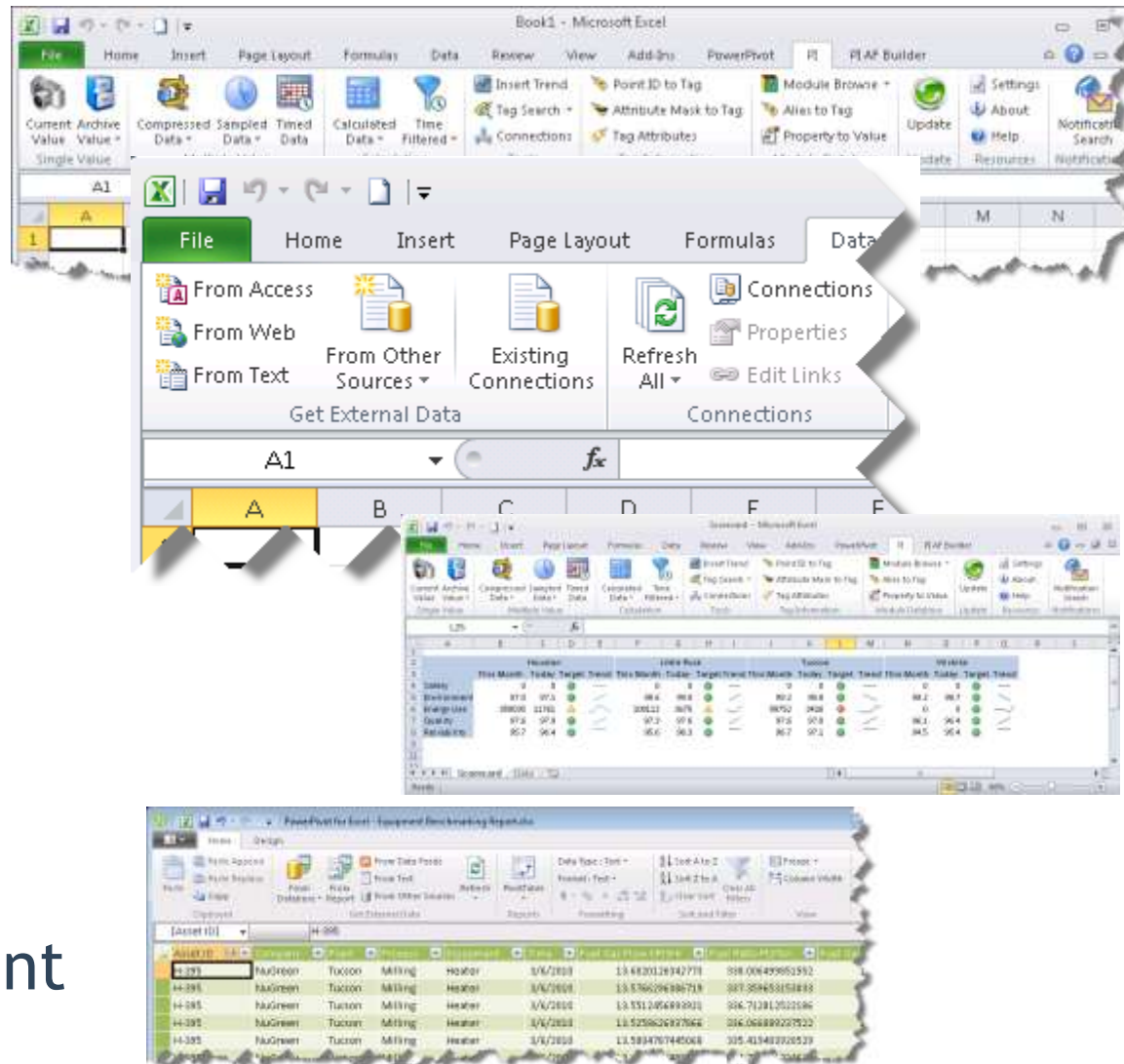


Production				Inventory				Product				Today's Performance			
Target	Capacity	Raw Material	Available	Sales	Product	Available	Energy	Reliability	Quality	2%	95%	98%	98%		
(Tons/Hr)	(Tons/Hr)	(Tons/Day)	(Tons/Day)	(Tons/Day)	(Tons/Day)	(Tons/Day)	(%)	(%)	(%)						
35.0	50	30,120	35.9	1,200	10,638	6.9	98200%	9557%	9847%						



Content Creator

- Use different data sources
- Create scorecards
- Create multidimensional reports
- Publish to SharePoint



- Access to all needed tools
- Contribute material for use by others
- Act to resolve problems and prevent recurrence



Equipment Benchmarking: Fuel Gas Efficiency

Equipment	Average of Fuel Ratio F331m
Home Engineering	
BD-414	1,683
Flame-On	
FO-029	323
Hot Spot	
HS-345	2,439
Inferno	
I-27	1,283
I-56	6,454
KPC, Limited	
KPC-387	433
Swift Brothers	
STM-305	878
STM-300	2,972
Average of Fuel Ratio F331m	2,000

Process Overview

Notification Limit Change

Use this form to change notification limit values.

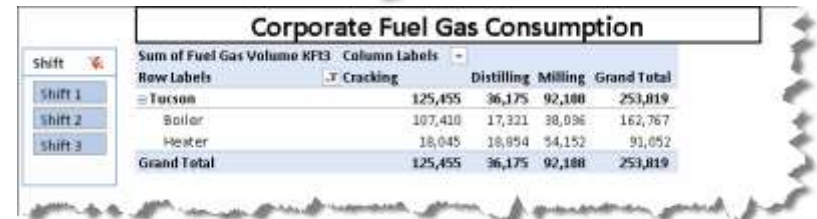
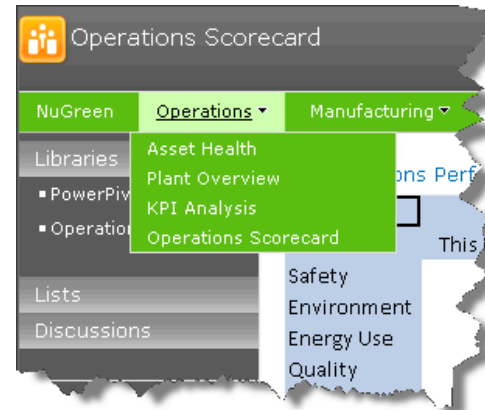
Please enter the effective date for changes:
Target Date: 4/16/2010 5:52:17 AM

Please select the appropriate unit:
Heater:
Heater 395: FG Limit
Heater 393: FG Limit
Heater 148: FG Limit

Please enter a new value Notification trigger limit:
Trigger Limit: _____

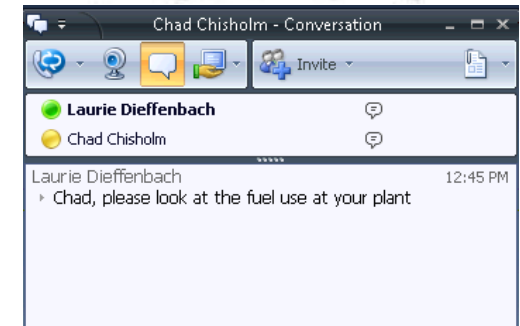
Change settings

- Easy navigation to needed information
- Content is already built, but can interact with it to focus on an issue
- Easy access to assistance from experts

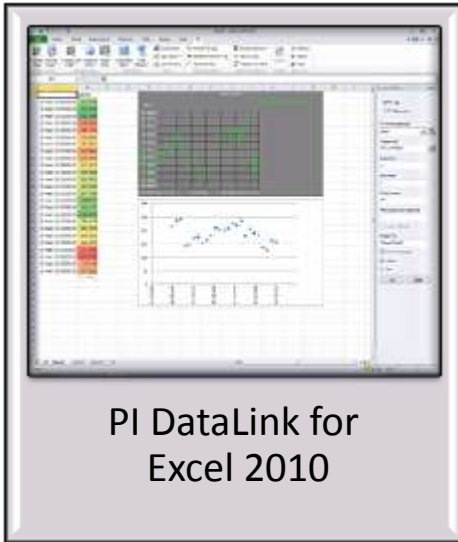


The screenshot shows a table titled 'Corporate Fuel Gas Consumption'. The table has columns for 'Shift', 'Row Labels', 'Cracking', 'Distilling', 'Milling', and 'Grand Total'. The data is as follows:

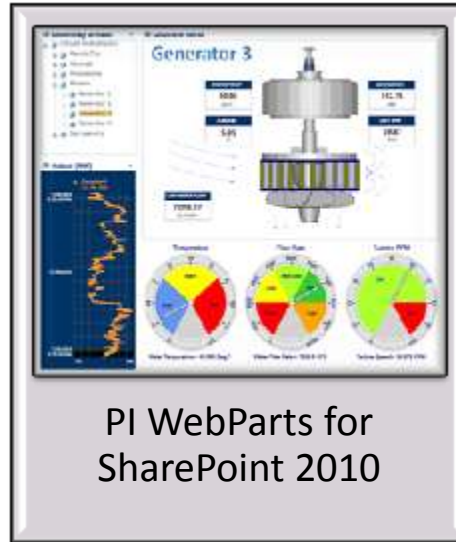
Shift	Row Labels	Cracking	Distilling	Milling	Grand Total
Shift 1	Tucson	125,455	36,175	92,188	253,819
Shift 2	Boiler	107,410	17,321	38,096	162,767
Shift 3	Heater	18,045	18,854	54,152	91,052
	Grand Total	125,455	36,175	92,188	253,819



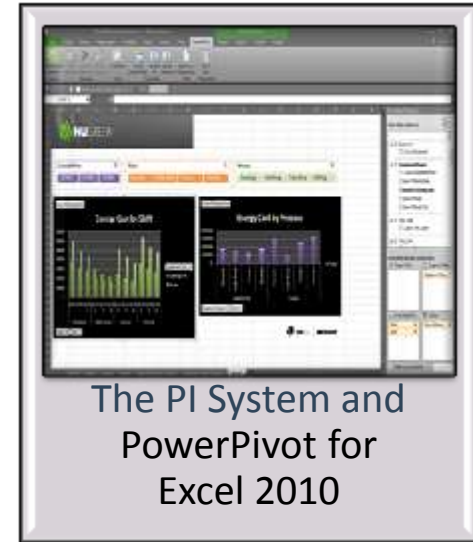
Visualization for PI System 2010



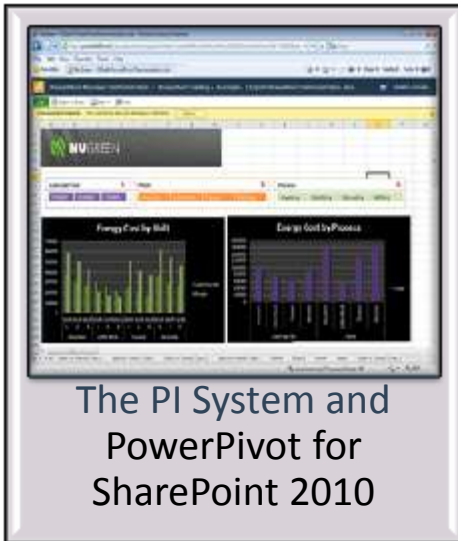
PI DataLink for
Excel 2010



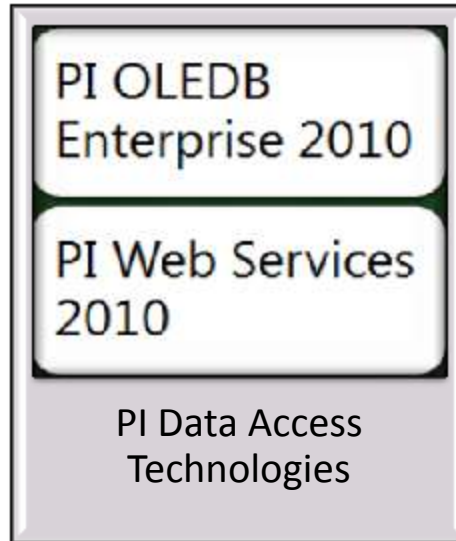
PI WebParts for
SharePoint 2010



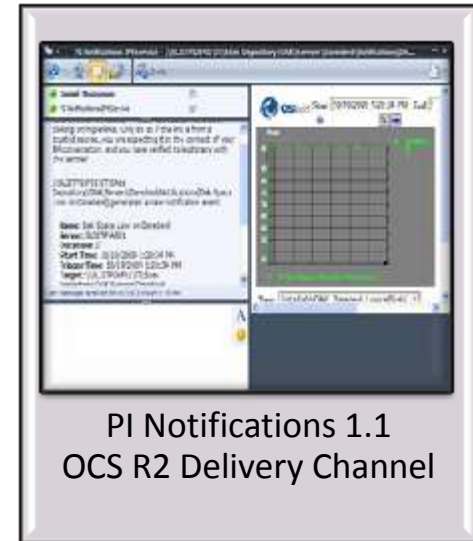
The PI System and
PowerPivot for
Excel 2010



The PI System and
PowerPivot for
SharePoint 2010



PI Data Access
Technologies



PI Notifications 1.1
OCS R2 Delivery Channel

PI DataLink 2010

- Supports Microsoft Office 2010 (32-bit)
(Office 2007 and Office 2003 as well)

PI DataLink Server 2010

- Supports SharePoint 2010 (64-bit)
(Microsoft Office SharePoint Server 2007 as well)

Internationalization and Localization

English, French, German, Spanish, Portuguese, Russian, Simplified Chinese, Japanese, Korean

PI DataLink + Excel 2010 + PowerPivot



FuelEfficiencyAnalysis - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View PowerPivot PI Design Layout Format Analyze

Clipboard Font Alignment Number Styles Cells Editing

Chart 1

Plant	Tucson
Row Labels	Average of Fuel Ratio
TZ-14	1409.798566
B-555	3972.94785
B-737	865.6271644
H-393	670.0664234
H-690	130.5528252
XG-40	395.931077
B-117	285.6060103
H-736	723.5415203
H-960	178.6457004
Grand Total	975.2839277

Fuel Consumption vs. Output

Average of Fuel Ratio

Plant: Tucson

Burners: Asset ID

Chart 1

PivotTable Field List

Show fields related to: (All)

- Company
- Equipment
- Fuel Rate
- Fuel Ratio
- Hour
- Plant
- Process
- Time
- Shift_Schedule

Drag fields between areas below:

Report Filter

Plant

Legend Fields ...

Axis Fields (Ca...): Burners, Asset ID

Σ Values: Average of F...

Defer Layout Update Update

Using Excel 2010 features with DataLink



The screenshot shows a Microsoft Excel 2010 window titled "Fuel Gas Analysis Start - Microsoft Excel". The spreadsheet displays a table of sampled data. The columns are labeled "Timestamp", "Tucson", and "Houston". The data rows show timestamps from 20-Apr-10 14:33:18 to 20-Apr-10 13:38:18, with corresponding values for four sensors: B309_FG903, B555_FG120, B210_FG005, and B235_FG293.

Timestamp	B309_FG903	B555_FG120	B210_FG005	B235_FG293
20-Apr-10 14:33:18	70.0065079	84.9462814	67.2982101	86.0312958
20-Apr-10 14:28:18	68.5293427	87.1578293	67.8664093	89.6309662
20-Apr-10 14:23:18	67.4987488	91.2100906	67.4337463	88.5298691
20-Apr-10 14:18:18	59.8878212	92.4278183	63.6964607	86.3389435
20-Apr-10 14:13:18	65.1665268	84.06353	68.4419708	82.160881
20-Apr-10 14:08:18	71.5968475	85.004982	71.2854004	87.7373886
20-Apr-10 14:03:18	71.1519775	83.1133118	65.0169907	85.1711731
20-Apr-10 13:58:18	66.2422104	80.9108353	69.7173538	82.9396286
20-Apr-10 13:53:18	65.6886215	80.7450027	67.8829193	80.941864
20-Apr-10 13:48:18	66.0907593	84.2832489	64.4166489	85.8176575
20-Apr-10 13:43:18	67.3596344	82.7519684	60.1664429	83.8520432
20-Apr-10 13:38:18	68.3992844	88.6196823	64.8003616	86.121376

The DataLink task pane on the right shows the configuration for the "DFPI2010RC" server. The "Tagname(s)" field is set to "\$B\$4:\$E\$4". The "Start Time" is set to "*" and the "End Time" is set to "%7d". The "Time Interval" is set to "5m". The "Filter Expression (optional)" field is empty. The "Output Cell" is set to "'Sheet1'!\$A\$5". The "show timestamps" checkbox is checked. The "column" radio button is selected.

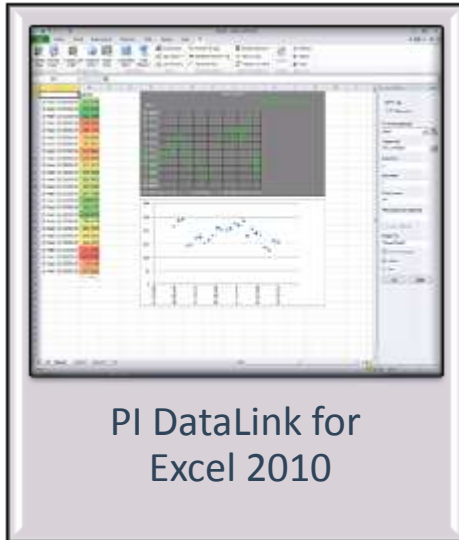
Creating reports to drive PI WebParts pages



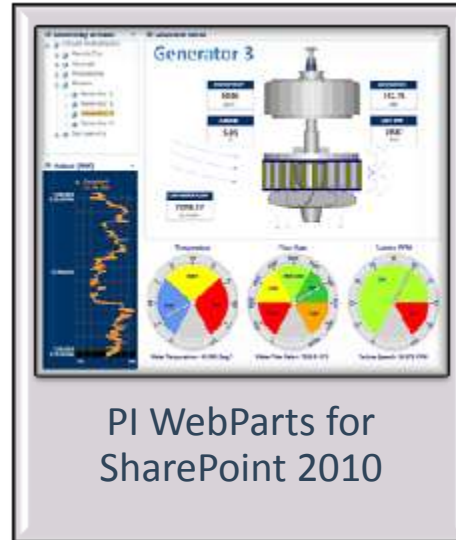
The screenshot shows a Microsoft Excel spreadsheet titled "Bighorn Basin Transformers". The spreadsheet has five columns: Transformer, Top Oil, LTC Oil, Bottom Oil, and Load. The data is as follows:

Transformer	Top Oil	LTC Oil	Bottom Oil	Load
TR2003	77.48888397	65.28782654	58.39207077	22.31632042
TR5620	71.17529297	60.75416565	80.14664459	22.04483223
TR3045	74.77812195	70.24856567	61.76383209	20.0871563
TR0842	84.53770447	64.9520874	53.26625061	19.83138657
TR9124	75.75057983	55.71472931	46.30812454	20.72727394

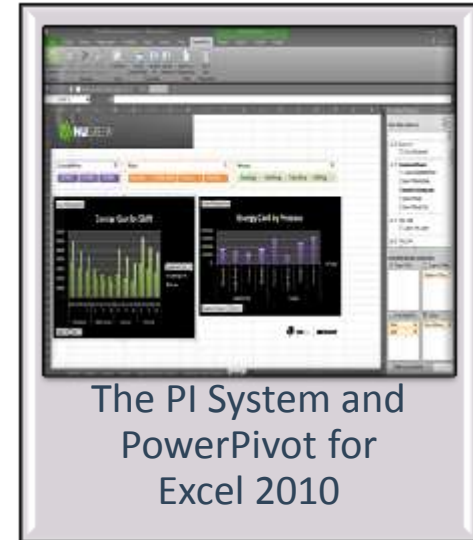
Visualization for PI System 2010



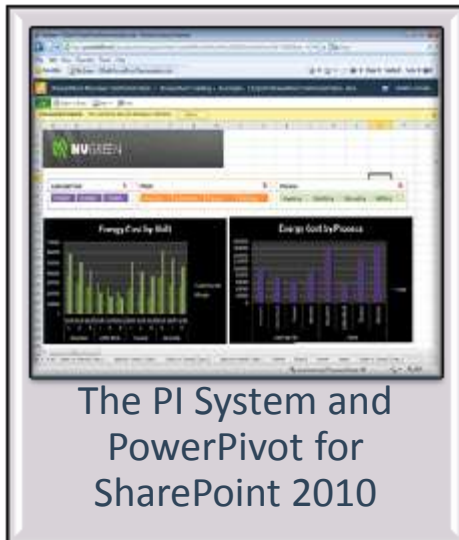
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



The PI System and
PowerPivot for
Excel 2010

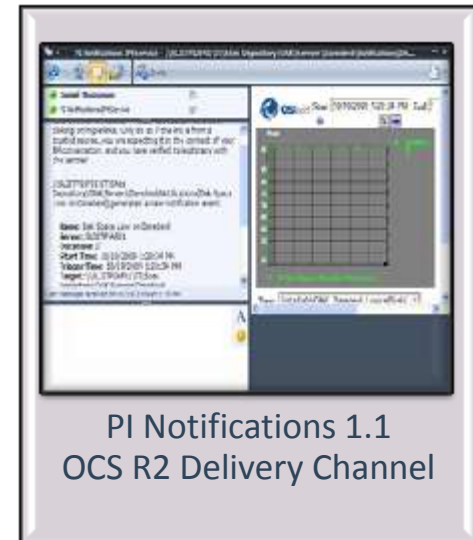


The PI System and
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SharePoint 2010

PI OLEDB
Enterprise 2010

PI Web Services
2010

PI Data Access
Technologies



PI Notifications 1.1
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Building Multi-dimensional Reports



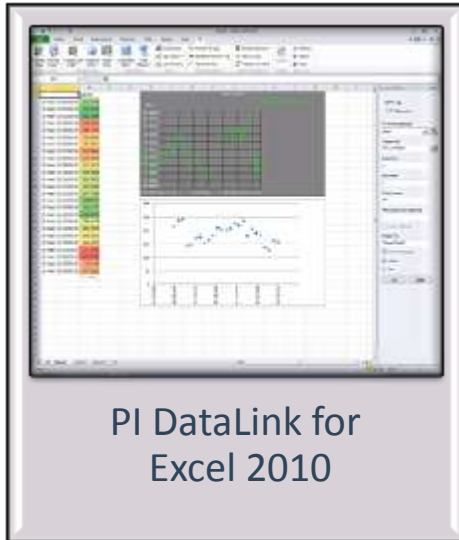
The screenshot displays a Microsoft Excel window with a PivotTable report titled 'Sum of Fuel Rate'. The PivotTable is structured with 'Plant' as the Row Labels and 'Process' as the Column Labels. The data is summarized by plant and process, with a Grand Total row at the bottom.

Sum of Fuel Rate	Cracking Process	Distilling Process	Edruding Process	Milling Process	Grand Total
Houston	70110.31768		31663.72837	56315.85238	158089.8984
Boiler	62206.52446		6410.04912	15820.12501	84436.69859
Heater	7903.793213		25253.67925	40495.72737	73653.19984
Little Rock		26590.48543	36613.28283		63203.76826
Boiler		6505.51197	11359.60358		17865.11555
Heater		20084.97346	25253.67925		45338.65271
Tucson	72287.82957	21198.43499		53413.42916	146899.6937
Boiler	61923.1734	10411.14106		22628.98292	94963.29739
Heater	10364.65616	10787.29392		30784.44624	51936.39632
Wichita	53241.12537	25791.92008	25568.48443		104601.5299
Boiler	33566.34125	10554.49555	5173.021467		49293.85826
Heater	19674.78412	15237.42453	20395.46297		55307.67162
Grand Total	195639.2726	73580.84049	93845.49564	109729.2815	472794.8903

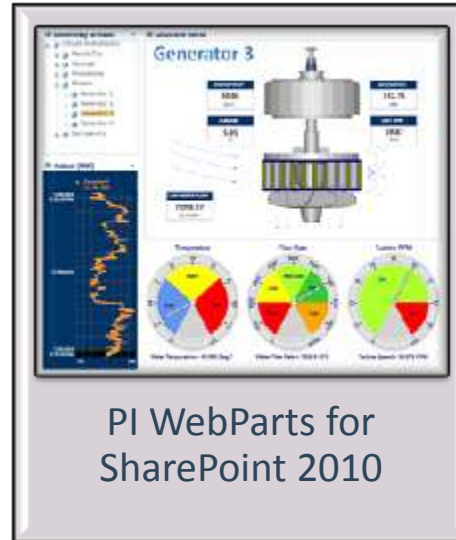
The PivotTable Field List pane on the right shows the following configuration:

- Report Filter: Process (dropdown)
- Row Labels: Plant (dropdown)
- Column Labels: Process (dropdown)
- Values: Sum of Fuel Rate (dropdown)

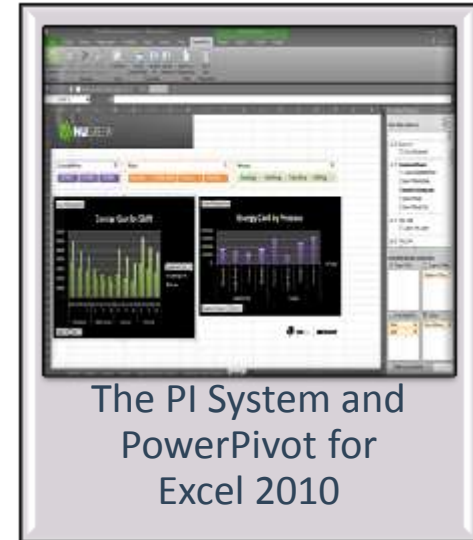
Visualization for PI System 2010



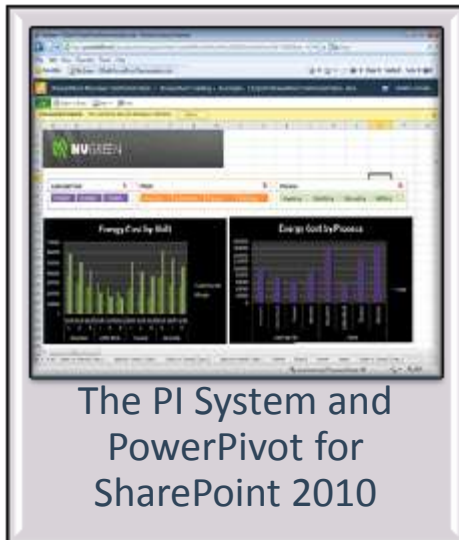
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



The PI System and
PowerPivot for
Excel 2010

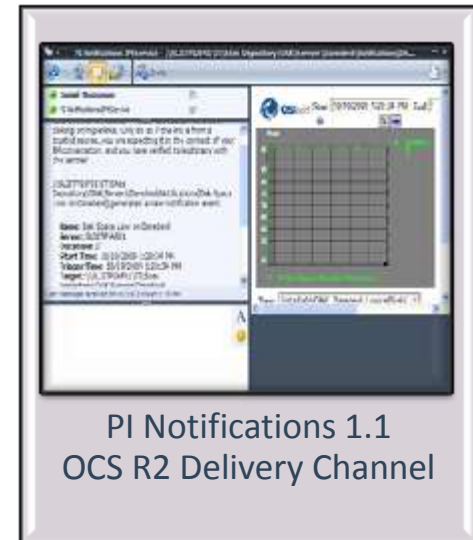


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PI OLEDB
Enterprise 2010

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2010

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Technologies

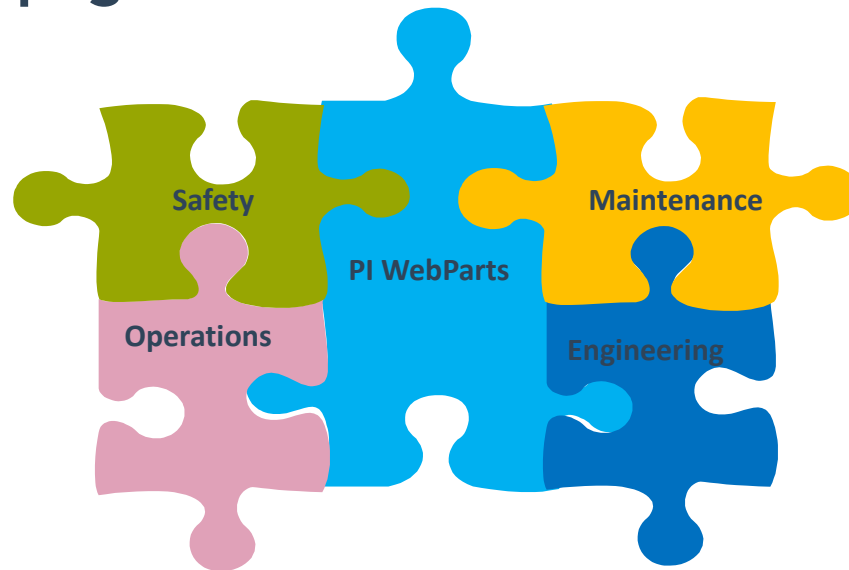


PI Notifications 1.1
OCS R2 Delivery Channel

Value of PI WebParts 2010



- Aligns with
 - PI for Office 2010 (2007 still supported)
 - PI Server 2010
- **Easy configuration, no code programming**
- **Leverage existing applications**
- **Fewer pages to maintain**



Scorecards in SharePoint



Home - Operations Scorecard - Windows Internet Explorer

http://dfpiweb2010/NuGreen/Operation/Operations%20Scorecard/default.aspx

Home - Operations Scorecard

Print (Alt+R) Laune Dieffenbach

Operations Scorecard

NuGreen Operations Manufacturing Engineering Reports Marketing Sales Accounting Search this site...

Libraries

- PowerPivot Reports
- Operations Documents

Lists

Discussions

Recycle Bin

All Site Content

Operations Performance Scorecard

	Houston				Little Rock				Tucson			
	This Month	Today	Target	Trend	This Month	Today	Target	Trend	This Month	Today	Target	Trend
Safety	0	0	●	—	0	0	●	—	0	0	●	—
Environment	97.0	97.1	●	↘	98.6	99.0	●	↘	99.2	98.8	●	↘
Energy Use	363594	11998	▲	↘	111526	3646	▲	↘	101270	3378	◆	↘
Quality	97.6	97.9	●	↗	97.3	97.6	●	↗	97.6	97.8	●	↗
Reliability	95.7	96.4	●	—	95.6	96.3	●	—	96.7	97.1	●	—

Operations Documents

Type	Name	Modified
	Asset_Health	4/13/2010 2:39 PM
	Fuel_Gas_Utilization_and_Benchmarking_Report	4/13/2010 2:39 PM
	KPI_Analysis	4/13/2010 2:39 PM
	Plant_Overview	4/13/2010 2:39 PM
	Production_Schedule	4/13/2010 2:31 PM

+ Add document

Done Trusted sites | Protected Mode: Off 100%

Get to relevant content



Transformer Detail - Windows Internet Explorer
http://transdistco/SitePages/Transformer%20Detail.aspx

File Edit View Favorites Tools Help

★ Favorites Transformer Detail

Site Actions Browse Page Tamara Carbaugh

TransDistribuCo 2010 Portal Transformer Detail
Welcome to the TransDistribuCo portal!

TransDistribuCo 2010 Portal Stations Station Detail Transformer Detail Search this site...

Transformer

Station: **Bighorn Basin**
Asset ID: **TR0842**

Oil Temperatures (C)

- Top Oil: **84.1 Deg C**
- LTC Oil: **63.5 Deg C**
- Bottom Oil: **52.4 Deg C**

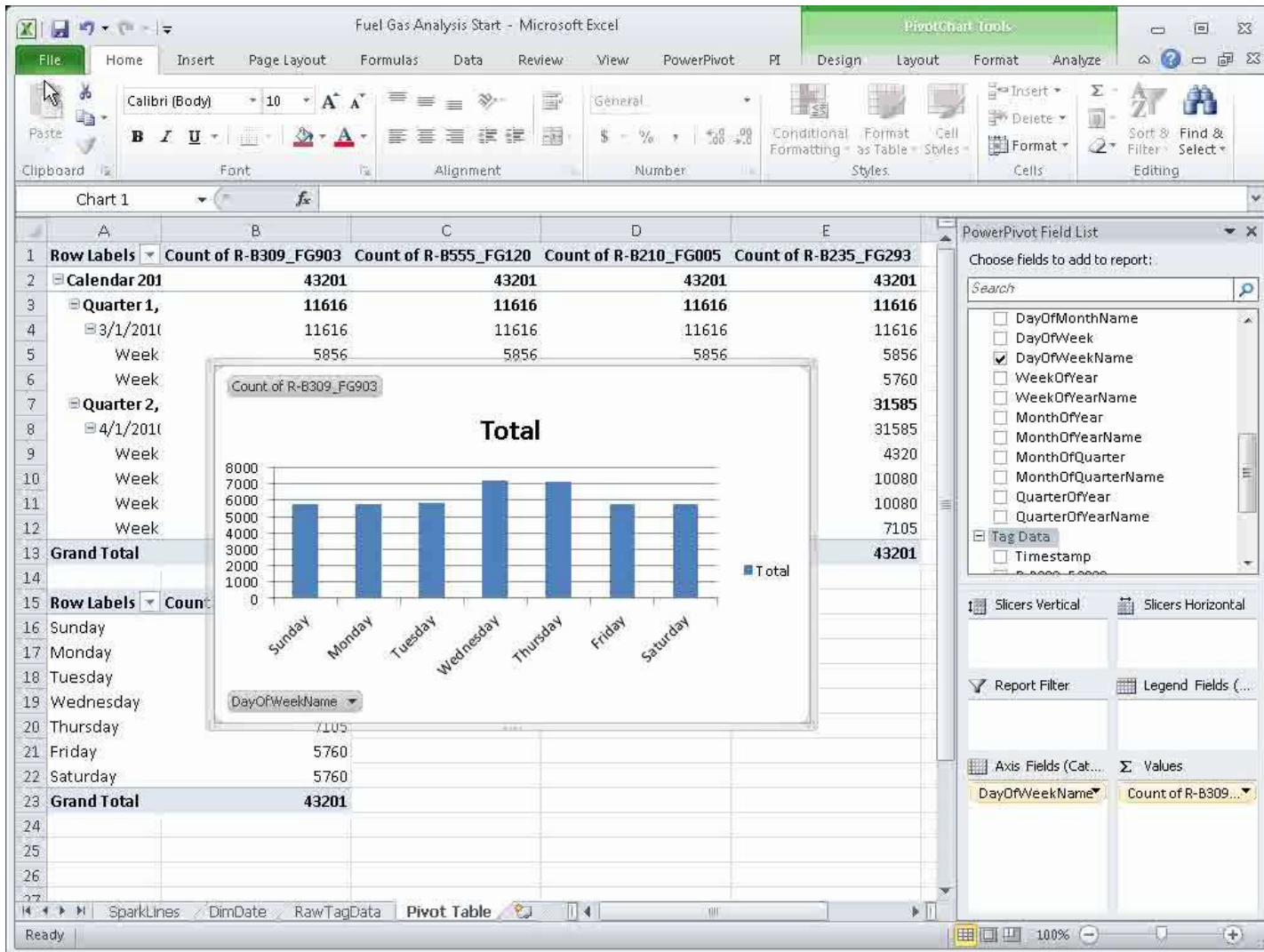
LTC Motor: **21.8 Amps** **STOP**

Cooling Fans: **21.8 Amps** **STAGE 1**

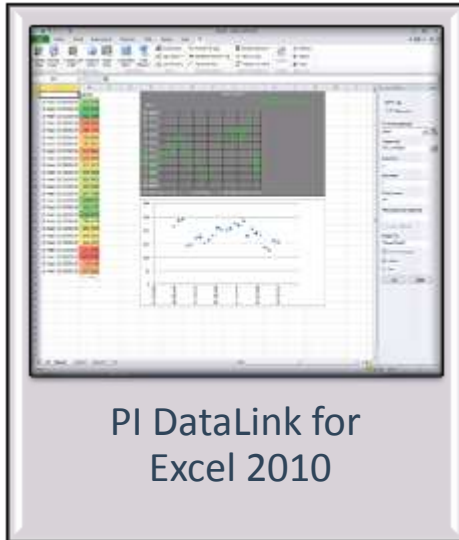
Load (MWatts): **20.8 Mwatts**

Load (MWatts) chart showing fluctuations over time from 12:13:50 PM to 2:13:50 PM on 6/23/2010. The load ranges from approximately 18 to 23 MWatts.

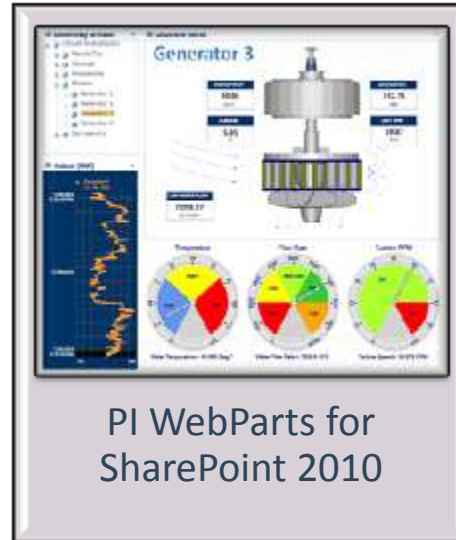
Publishing to SharePoint



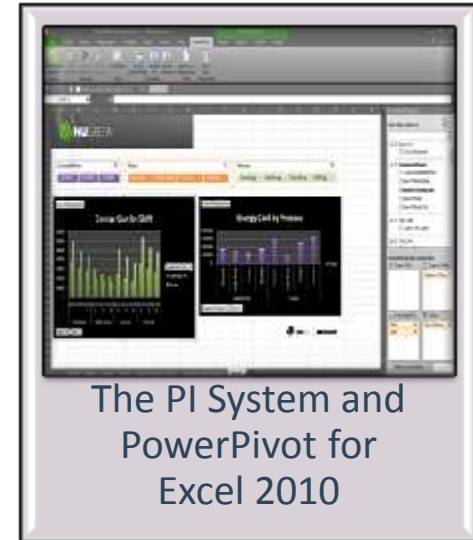
Visualization for PI System 2010



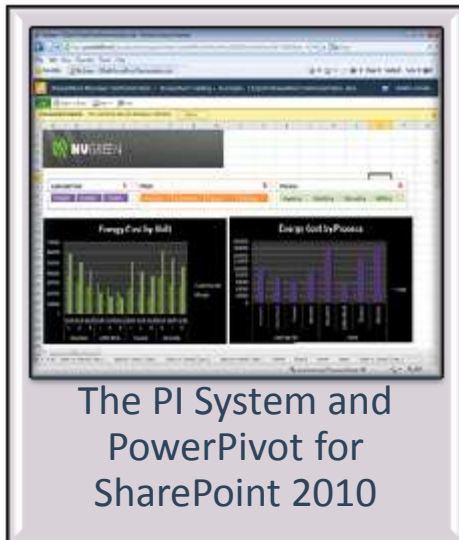
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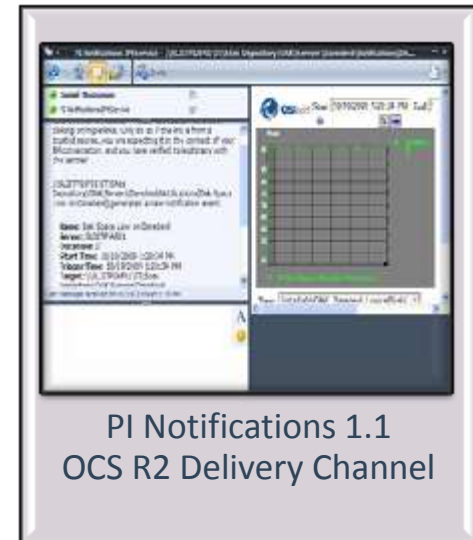


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2010

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Technologies



PI Notifications 1.1
OCS R2 Delivery Channel

Using Reports in SharePoint



KPI Analysis - Windows Internet Explorer
 http://dfpiweb2010/NuGreen/Operation/Shared%20Documents/KPI%20Analysis.aspx

Site Actions | Browse | Page | Laurie Dieffenbach

NuGreen | Operations | Manufacturing | Engineering | Reports | Marketing | Sales | Accounting | Search this site...

Energy Use

Corporate Fuel Gas Consumption

Shift: Shift 1, Shift 2, Shift 3

Row Labels	Cracking	Distilling	Extruding	Milling	Grand Total
Houston	121,818		54,812	98,063	274,694
Boiler	108,161		10,049	26,473	144,684
Heater	13,657		44,763	71,590	130,010
Little Rock		44,952	63,409		108,361
Boiler		9,464	18,646		28,110
Heater		35,488	44,763		80,251
Tucson	125,455	36,175		92,188	253,819
Boiler	107,410	17,321		38,036	162,767
Heater	18,045	18,854		54,152	91,052
Wichita	91,865	45,170	44,546		181,581
Boiler	57,075	18,199	8,468		83,741
Heater	34,790	26,971	36,078		97,840
Grand Total	339,138	126,297	162,767	190,252	818,454

Process Support:
 Engineering: Chad Chisholm, James Spainhower
 Operations: Laurie Dieffenbach, Andre Downey, Steve Jones
 Production Logistics: John Maytum, Janelle Minich

Done | Trusted sites | Protected Mode: Off | 100%

KPI Analysis - Windows Internet Explorer
http://dfpiweb2010/NuGreen/Operation/Shared%20Documents/KPI%20Analysis.aspx

Site Actions | Browse | Page | Laurie Dieffenbach

NuGreen | Operations | Manufacturing | Engineering | Reports | Marketing | Sales | Accounting | Search this site...

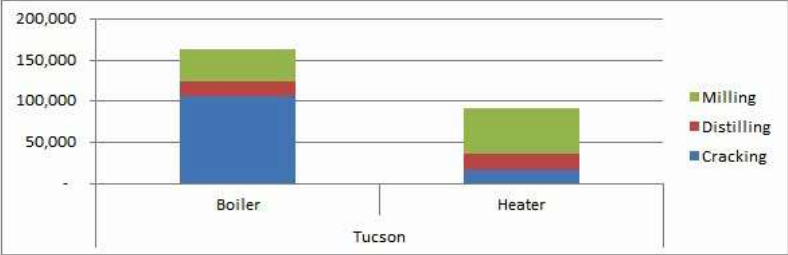
Energy Use

Corporate Fuel Gas Consumption

Shift: Shift 1 | Shift 2 | Shift 3

Sum of Fuel Gas Volume Kft3 | Column Labels: Cracking | Distilling | Milling | Grand Total

Row Labels	Cracking	Distilling	Milling	Grand Total
Tucson	125,455	36,175	92,188	253,819
Boiler	107,410	17,321	38,036	162,767
Heater	18,045	18,854	54,152	91,052
Grand Total	125,455	36,175	92,188	253,819



Process Support:
Engineering: Chad Chisholm, James Spainhower
Operations: Laurie Dieffenbach, Andre Downey, Steve Jones
Production Logistics: John Maytum, Janelle Minich

Trusted sites | Protected Mode: Off | 100%

Appropriate Detail Available



Tucson Plant - Windows Internet Explorer
http://dfpiweb2010/NuGreen/Manufacturing/Plant%20Pages/Tucson%20Plant.aspx

Site Actions | Browse | Page | Chad Chisholm

Manufacturing | NUGREEN

NuGreen | Operations | Manufacturing | Engineering | Reports | Marketing | Sales | Accounting | Search this site...

Page Time Range: Start Time *8h | End Time * | Apply

Tucson Assets

- Tucson
 - Cracking Process
 - Distilling Process
 - Milling Process**

Process Support Team

- Engineering
 - Chad Chisholm
 - James Spainhower
- Operations
 - Laurie Dieffenbach
 - Andre Downey
- Production Logistics
 - John Maytum
 - Janelle Minich

Process Overview

Tucson Plant Milling Process Overview

Fuel Use

- Feedrate: Fuel Gas Flow, Fuel Gas Flow = 43,267 Mm, 5/23/10 11:22:15 AM
- Heater 1: Fuel Gas Flow, Fuel Gas Flow = 27,234 + with, 5/23/10 11:28:36 AM
- Heater 1: Fuel Gas Flow, Fuel Gas Flow = 13,117 + with, 5/23/10 11:28:36 AM

Done | Local intranet | Protected Mode: Off | 100%

Navigate to Appropriate Information

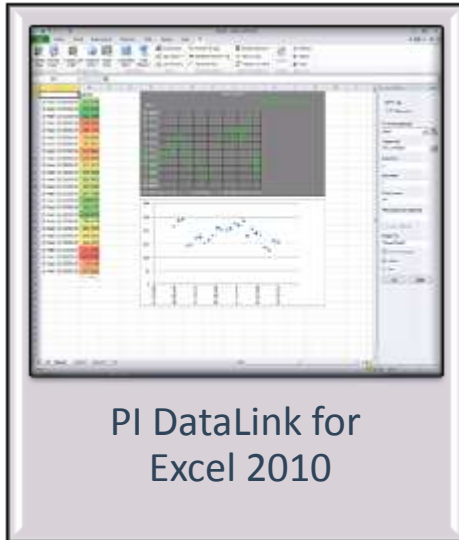


The screenshot shows a web browser window titled "Tucson Plant - Windows Internet Explorer". The address bar contains the URL: <http://dfpiweb2010/NuGreen/Manufacturing/Plant%20Pages/Tucson%20Plat>. The browser's Favorites bar shows "Tucson Plant".

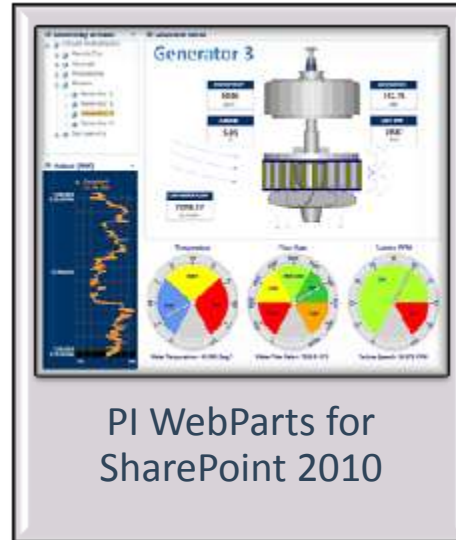
The website's navigation bar includes "Site Actions" (with a folder icon), "Browse", and "Page". Below this is a "Manufacturing" section with a dropdown arrow. The main navigation menu is green and includes "NuGreen", "Operations", "Manufacturing", "Engineering", "Reports", and "Market". The "Engineering" menu is currently expanded, showing a list of options: "Cracking Process", "Extruding Process", "Milling Process", "Data Entry", and "Process Overview". A mouse cursor is pointing at the "Engineering" menu item.

Below the navigation bar, there are two main content areas: "Page Time Range" and "Tucson Assets".

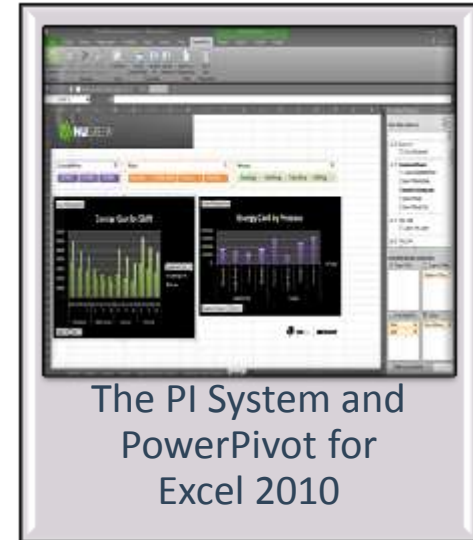
Visualization for PI System 2010



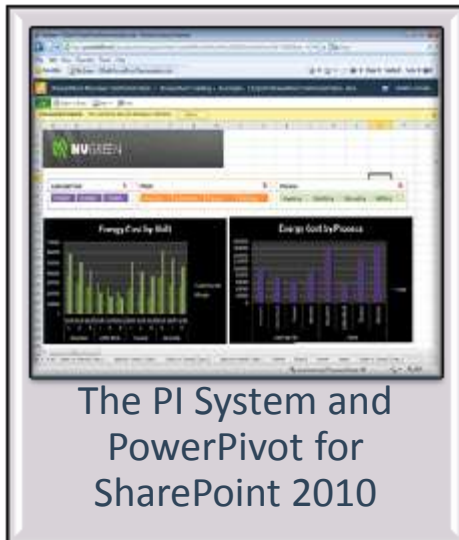
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



The PI System and
PowerPivot for
Excel 2010

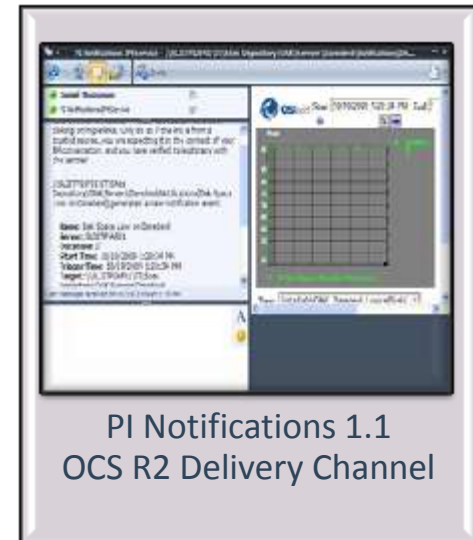


The PI System and
PowerPivot for
SharePoint 2010

PI OLEDB
Enterprise 2010

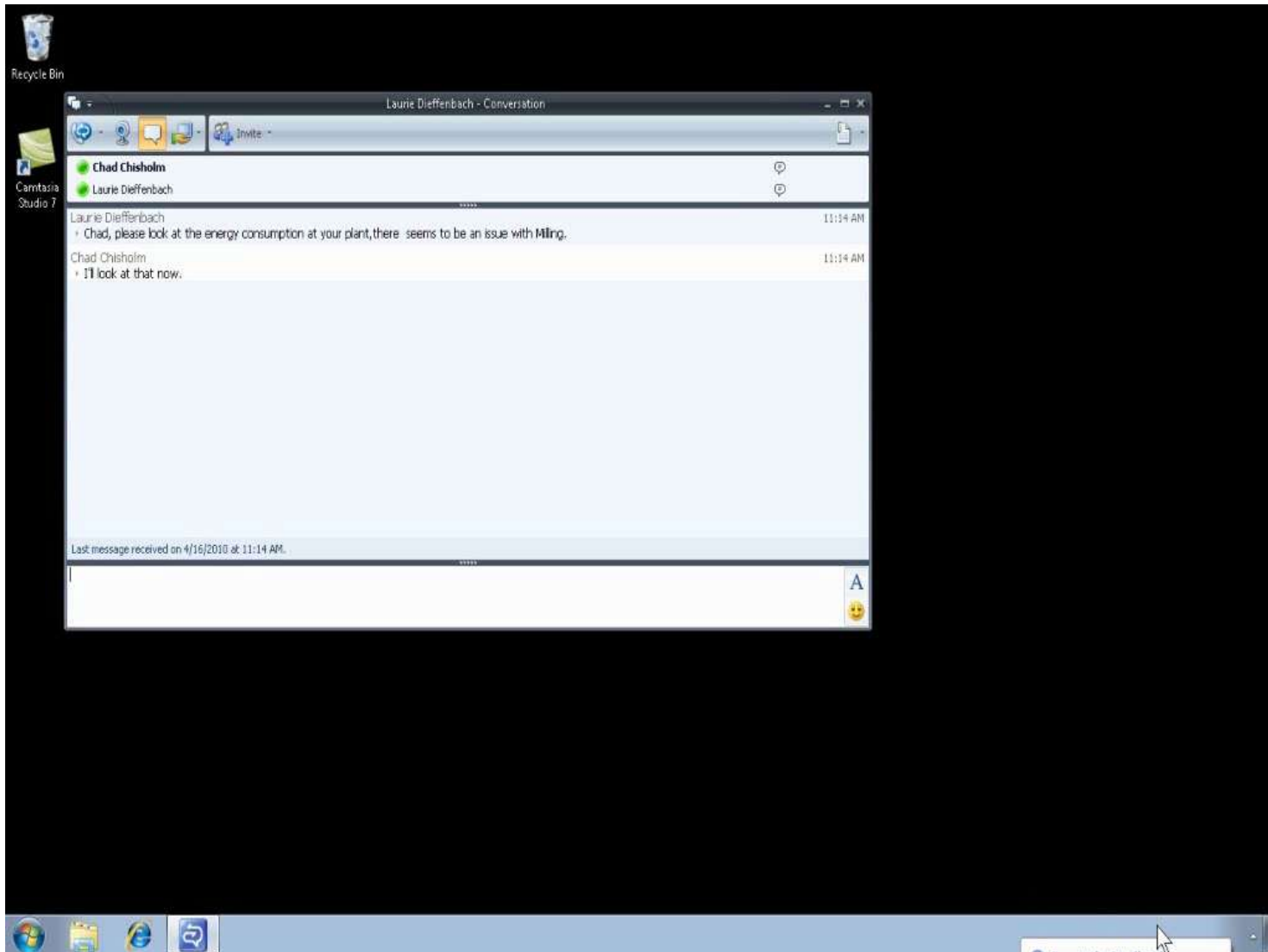
PI Web Services
2010

PI Data Access
Technologies



PI Notifications 1.1
OCS R2 Delivery Channel

Respond to Events



Notification Limit Change

Use this form to change notification limit values.

Please enter the effective date for changes:

Target Date: 

Please select the appropriate unit:

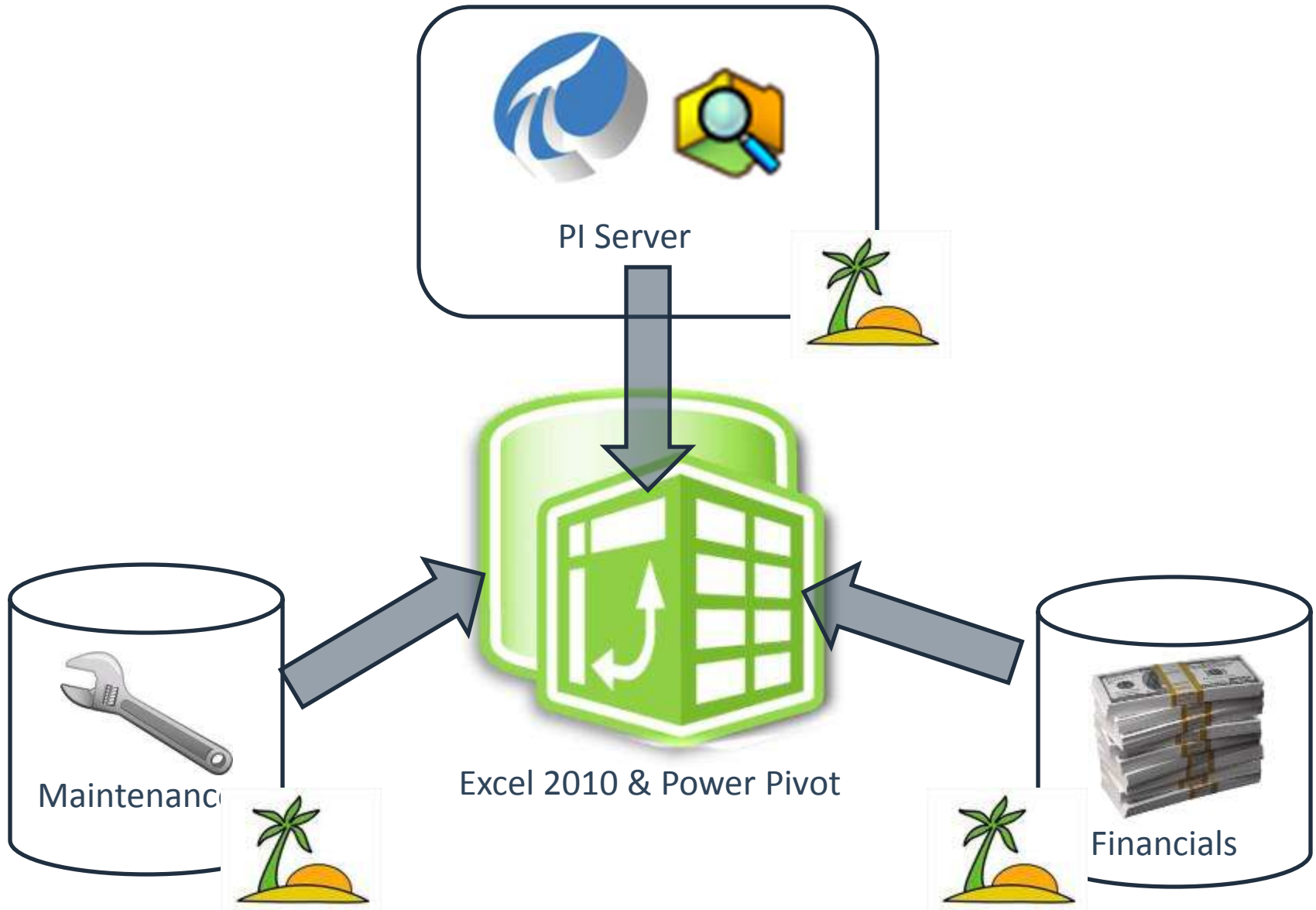
Heater:

- Heater 395: FG Limit
- Heater 393: FG Limit**
- Heater 148: FG Limit

Please enter a new value Notification trigger limit:

Trigger Limit:

User-driven Reporting



Managed Self Service BI



PowerPivot for Excel



Microsoft
Excel 2010

PowerPivot for SharePoint



Microsoft
SharePoint 2010
Microsoft
SQL Server 2008 R2



30 Day Corporate Fuel Gas Consumption

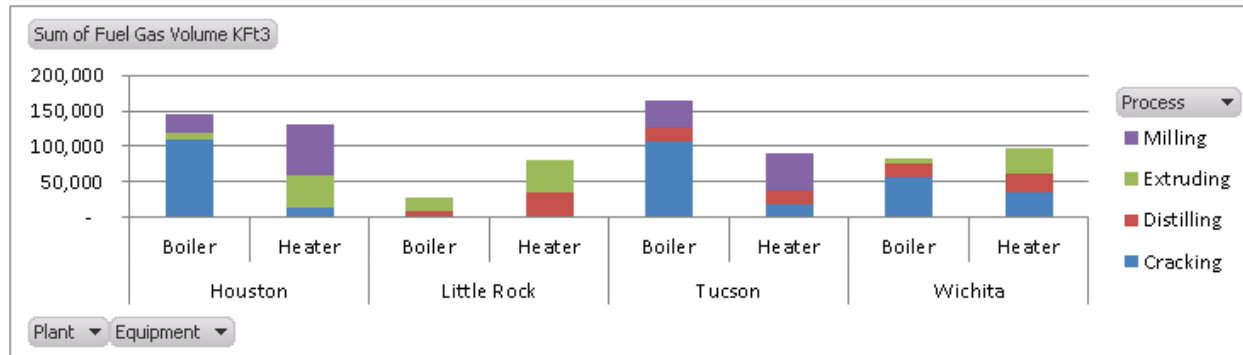
shift

Shift 1

Shift 2

Shift 3

Sum of Fuel Gas Volume Column Lab <input type="button" value="v"/>					
Row Labels	<input type="button" value="v"/> Cracking	Distilling	Extruding	Milling	Grand Total
<input type="checkbox"/> Houston	121,929		54,828	98,453	275,210
Boiler	108,315		10,023	26,842	145,180
Heater	13,614		44,804	71,611	130,029
<input type="checkbox"/> Little Rock		45,024	63,146		108,169
Boiler		9,559	18,341		27,900
Heater		35,465	44,804		80,269
<input type="checkbox"/> Tucson	126,003	36,492		92,282	254,777
Boiler	107,830	17,662		38,106	163,598
Heater	18,173	18,829		54,176	91,178
<input type="checkbox"/> Wichita	91,736	45,233	44,704		181,673
Boiler	56,933	18,295	8,628		83,856
Heater	34,803	26,938	36,076		97,817
Grand Total	339,668	126,748	162,677	190,735	819,829



Keeping Insights Up to Date



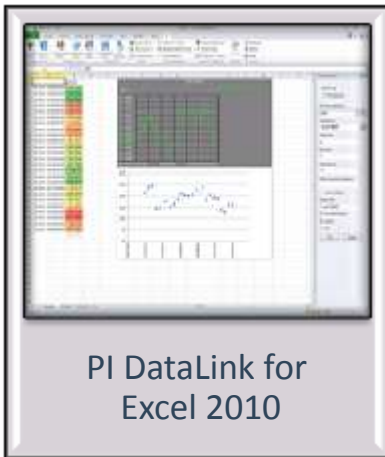
Refreshing Data in SharePoint 2010

SharePoint can refresh the data from the specified data sources over the Web, in the cloud, from internal databases, PI System 2010, Excel files, and any other location with network connectivity.

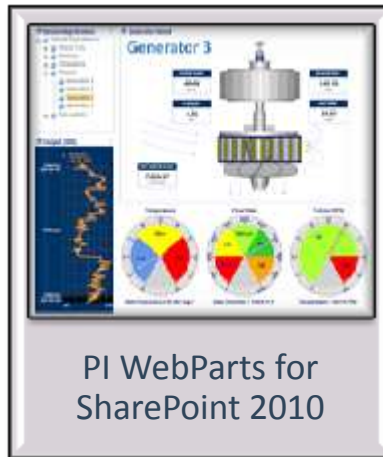
Visualization for PI System 2010



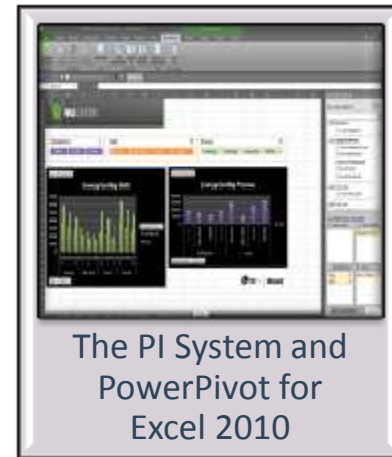
Everything you need to work with PI data in Microsoft Office (2010)



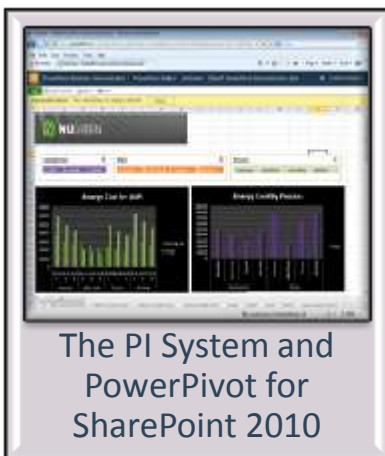
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



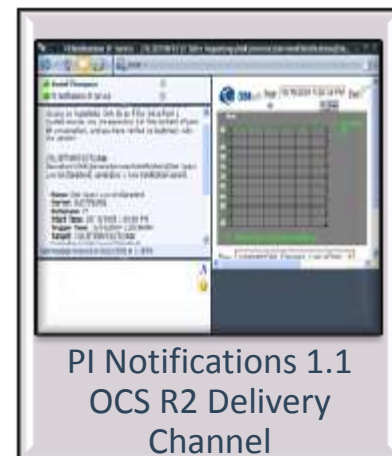
The PI System and
PowerPivot for
Excel 2010



The PI System and
PowerPivot for
SharePoint 2010



PI Data Access
Technologies



PI Notifications 1.1
OCS R2 Delivery
Channel



Thank you

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