



Visualizing PI System Data with Dashboards and Reports

Presented by
Laurie Dieffenbach
Product Manager

Experience



COLLECT



COLLECT

HISTORIZE



HISTORIZE

FIND



FIND

ANALYZE



ANALYZE

DELIVER



DELIVER

VISUALIZE



VISUALIZE

What's New with Visualization in PI System 2010?

Excel based Reports

Time	Value 1	Value 2	Value 3	Value 4
20-Apr-10 14:18:18	65.1665	84.06	58.4419708	86.3389435
20-Apr-10 14:08:18	71.5968	85.00498	71.2854004	87.7373886
20-Apr-10 14:03:18	71.15197	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

Dashboards in SharePoint

Milling Production Schedule

	Production			Raw Material Available		Inventories			Today's Performance		
	Rate (Tons/Hr)	Target (Tons/Hr)	Capacity (Tons/Hr)	Tons	Days	Sales (Tons/Day)	Product Available Tons	Days	Energy 2%	Reliability 95%	Quality 98%
Houston	32.9	35.0	50	30,128	35.9	1,200	10,638	8.9	88206%	9557%	9847%

PI Notification Delivery

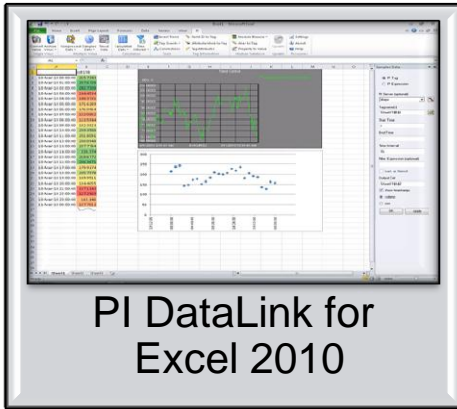
Name: Fuel gas utilization: Milling Process
 Server: DFPI2010RC
 Database: NuGreen
 Start Time: 4/16/2010 12:24:10
 Trigger: ...
 Target: ...

Link	Houston				...			
	This Month	Today	Target	Trend	This Month	Today	Target	Trend
Milling Process	0	0	0	Green	0	0	0	Green
Iron	97.0	97.1	97.1	Green	98.6	99.0	99.0	Green
Energy Use	363594	11998	11998	Yellow	111526	3646	3646	Green
Quality	97.6	97.9	97.9	Green	97.3	97.6	97.6	Green
Reliability	95.7	96.4	96.4	Green	95.6	96.3	96.3	Green

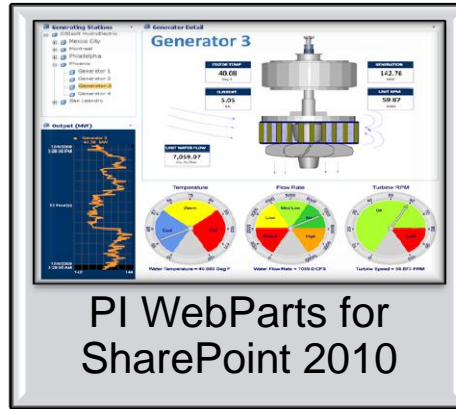
KPI Scorecards in Excel

Link	Houston				...			
	This Month	Today	Target	Trend	This Month	Today	Target	Trend
Milling Process	0	0	0	Green	0	0	0	Green
Iron	97.0	97.1	97.1	Green	98.6	99.0	99.0	Green
Energy Use	363594	11998	11998	Yellow	111526	3646	3646	Green
Quality	97.6	97.9	97.9	Green	97.3	97.6	97.6	Green
Reliability	95.7	96.4	96.4	Green	95.6	96.3	96.3	Green

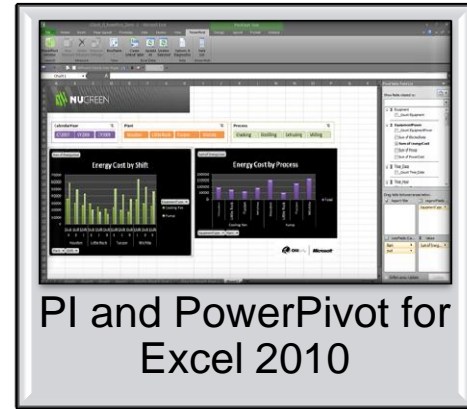
Visualization for PI System 2010



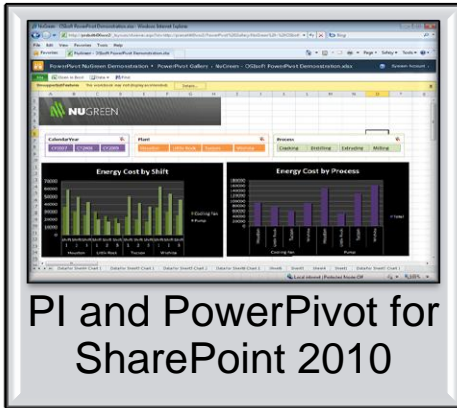
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



PI and PowerPivot for
Excel 2010

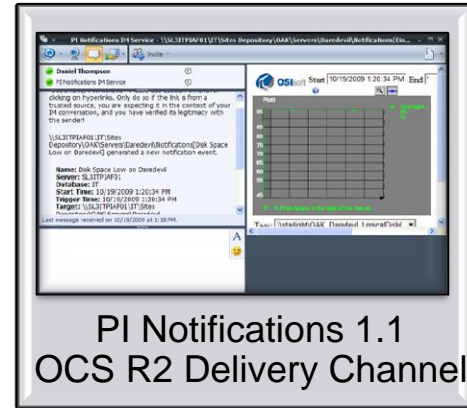


PI and PowerPivot for
SharePoint 2010

PI OLEDB
Enterprise 2010

PI Web Services
2010

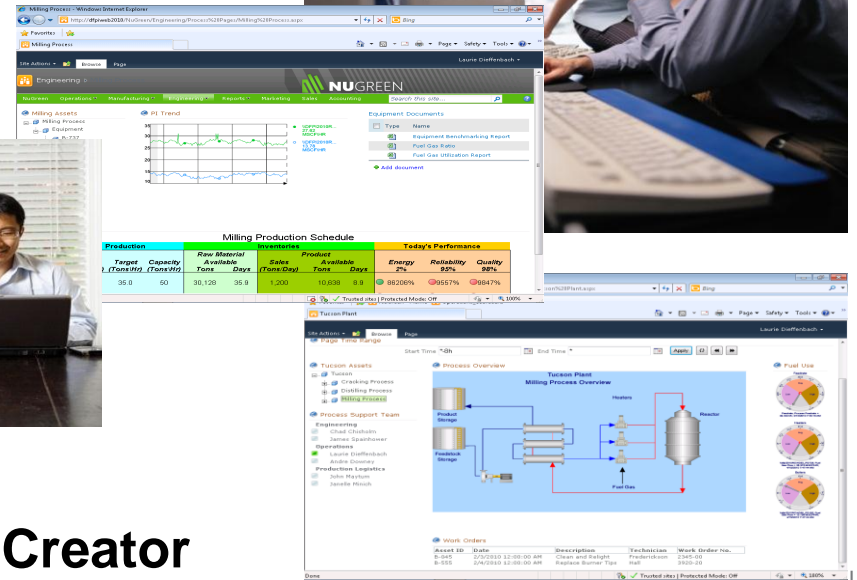
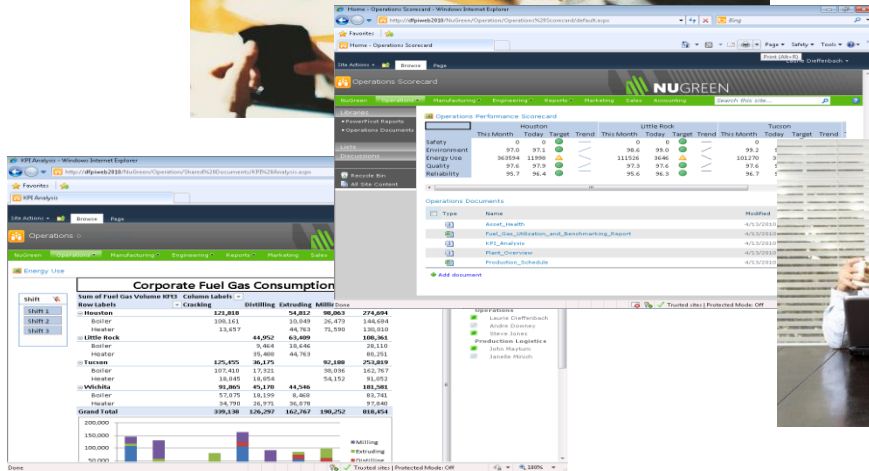
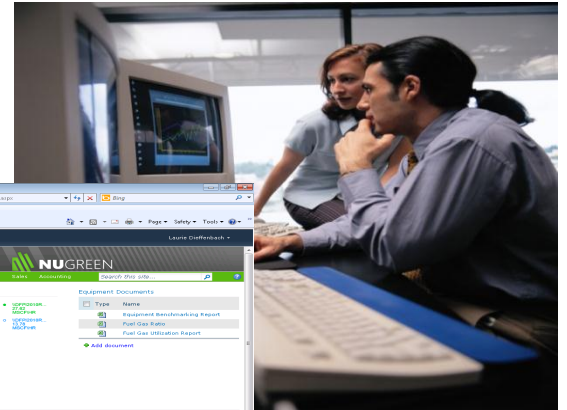
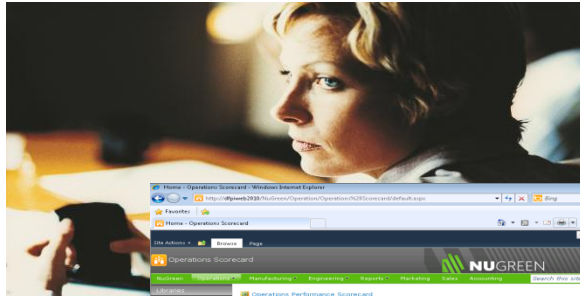
PI Data Access
Technologies



PI Notifications 1.1
OCS R2 Delivery Channel

Role-based Dashboarding Management

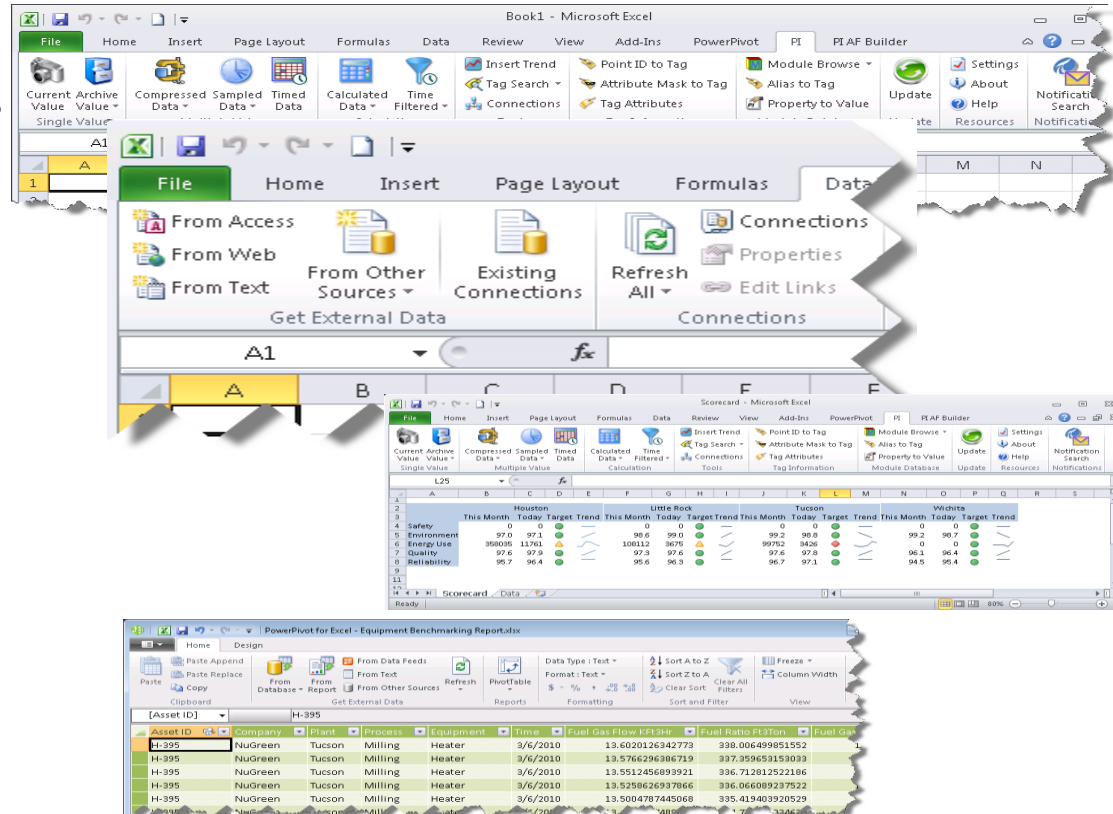
Knowledge Worker Engineering Staff



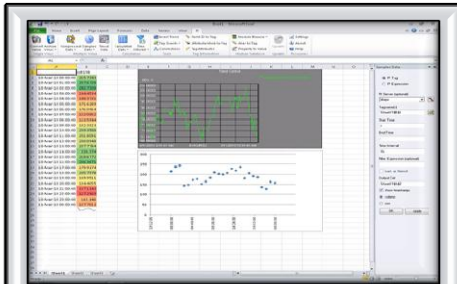
Content Creator

Content Creator Roles

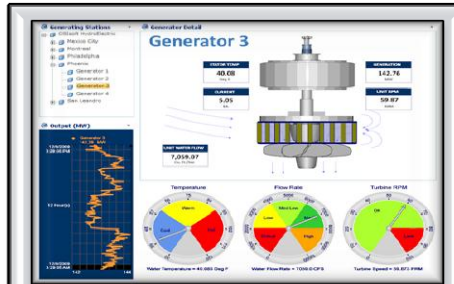
- Use different data sources
- Create scorecards
- Create multidimensional reports
- Publish to SharePoint



Visualization for PI System 2010



PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



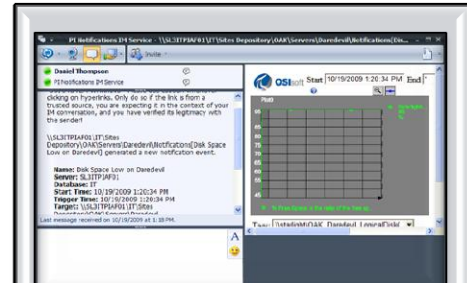
PI and PowerPivot for
Excel 2010



PI and PowerPivot for
SharePoint 2010

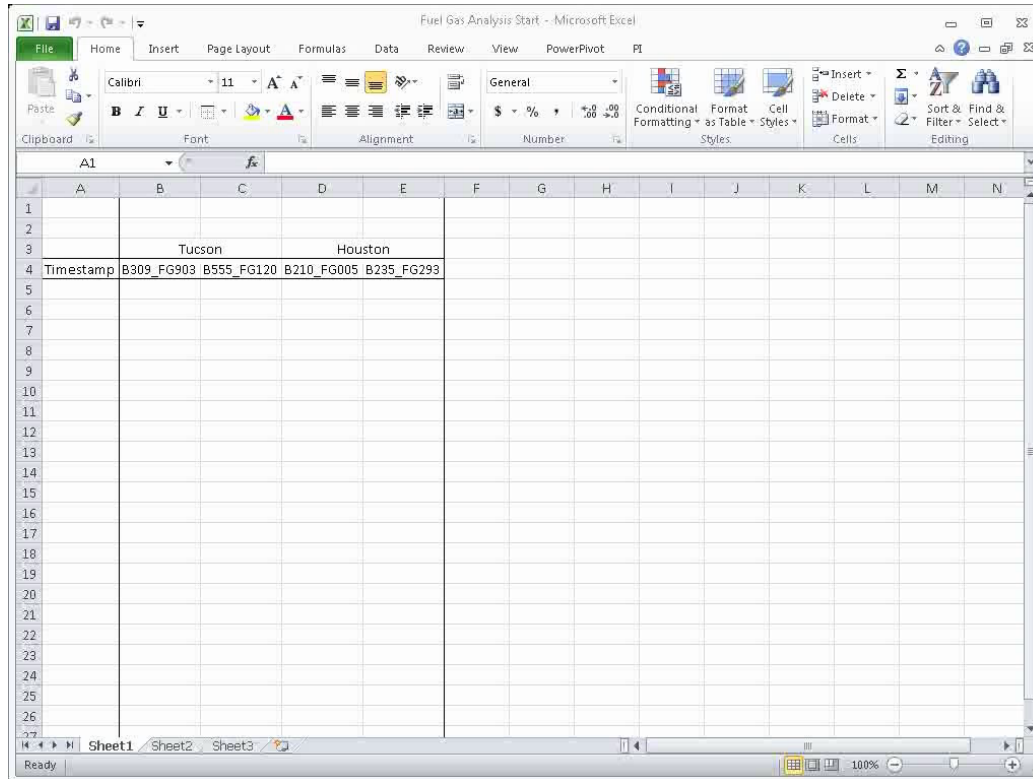
PI OLEDB
Enterprise 2010
PI Web Services
2010

PI Data Access
Technologies

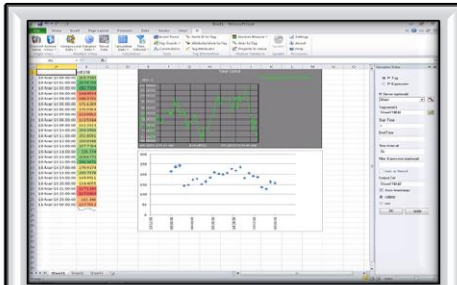


PI Notifications 1.1
OCS R2 Delivery Channel

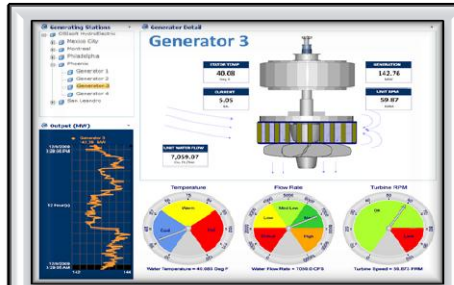
Using Excel 2010 features with PI DataLink



Visualization for PI System 2010



PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



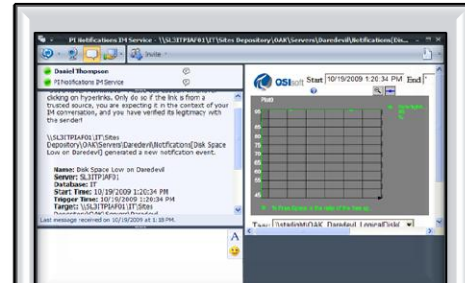
PI and PowerPivot for
Excel 2010



PI and PowerPivot for
SharePoint 2010

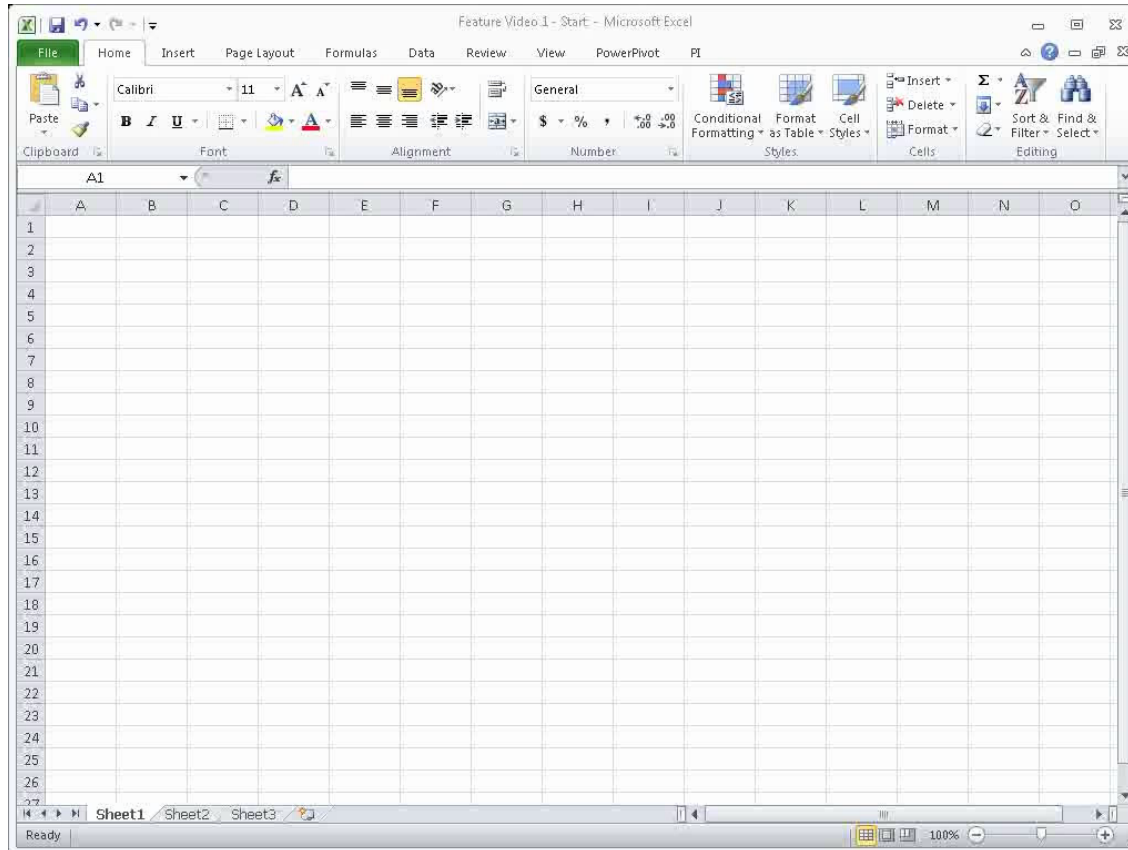
PI OLEDB
Enterprise 2010
PI Web Services
2010

PI Data Access
Technologies

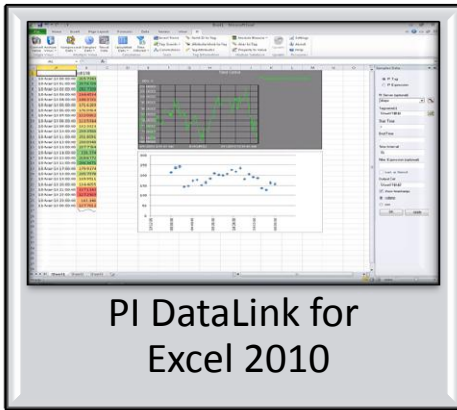


PI Notifications 1.1
OCS R2 Delivery Channel

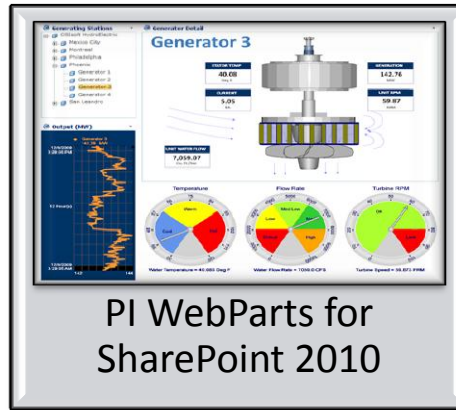
Building Multi-dimensional Reports



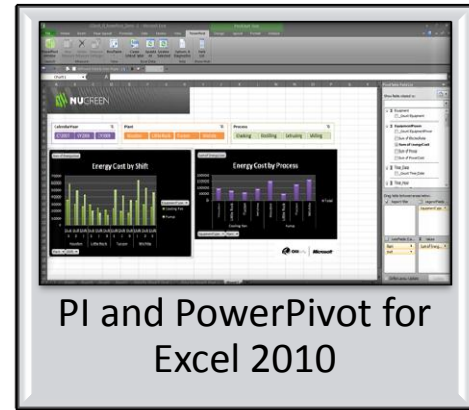
Visualization for PI System 2010



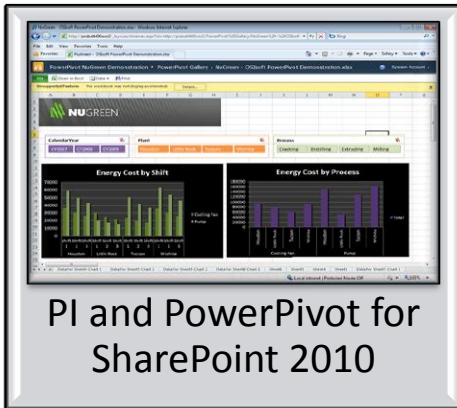
PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010

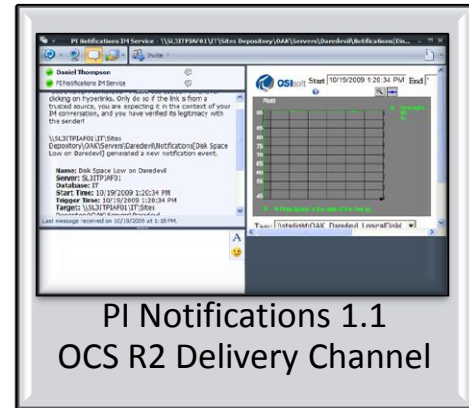


PI and PowerPivot for
Excel 2010



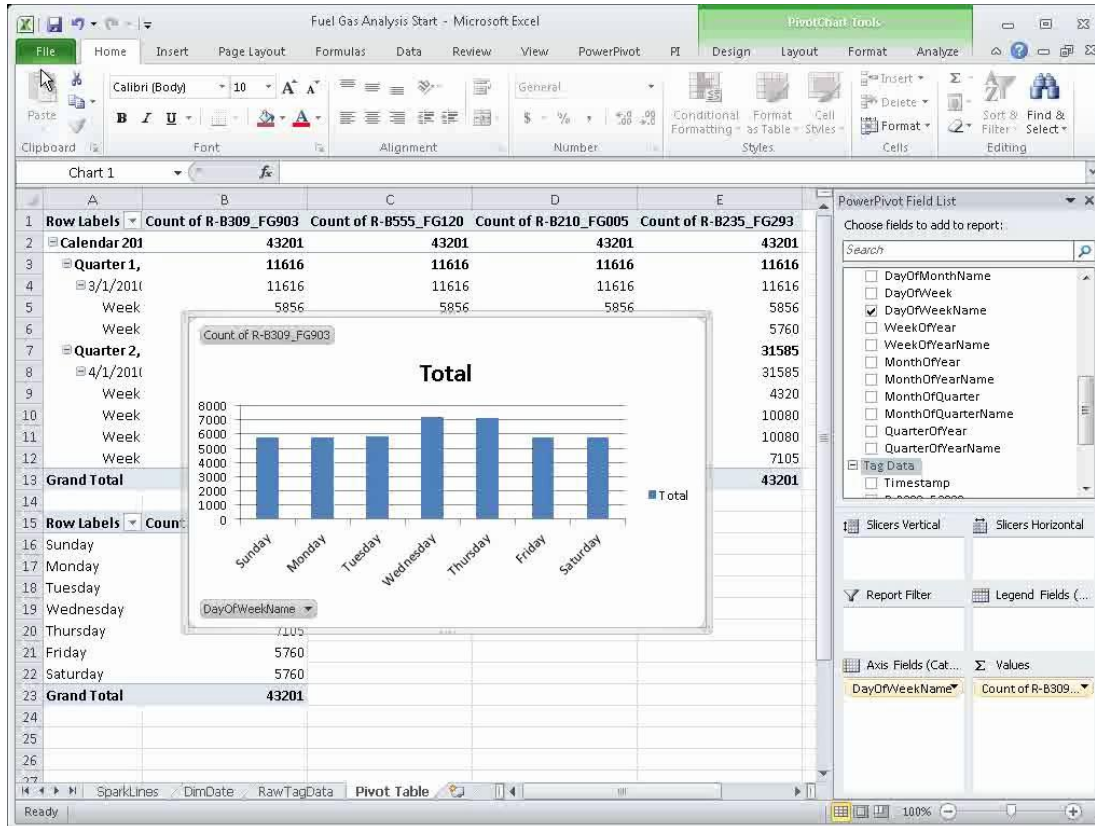
PI and PowerPivot for
SharePoint 2010

PI OLEDB
Enterprise 2010
PI Web Services
2010
PI Data Access
Technologies



PI Notifications 1.1
OCS R2 Delivery Channel

Publishing to SharePoint



Management Roles

Easy navigation to needed information



Content is already built, but can interact with it to focus on an issue

Shift	Sum of Fuel Gas Volume KFE3	Cracking	Distilling	Milling	Grand Total
Shift 1					
Shift 2					
Shift 3					
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

Easy access to assistance from experts



Scorecards in SharePoint using Excel Services

The screenshot shows a SharePoint dashboard titled "Operations Scorecard" for "NUGREEN". The dashboard is displayed in a Windows Internet Explorer browser window. The URL is <http://dfpiweb2010/NuGreen/Operation/Operations%20Scorecard/default.aspx>. The dashboard features a navigation menu with categories like Manufacturing, Engineering, Reports, Marketing, Sales, and Accounting. A search bar is present with the text "Search this site...".

The main content area displays the "Operations Performance Scorecard" for three locations: Houston, Little Rock, and Tucson. The scorecard is organized into a table with columns for "This Month", "Today", "Target", and "Trend" for each location. The rows represent different performance metrics: Safety, Environment, Energy Use, Quality, and Reliability. Each cell contains numerical values and a visual indicator (green circle for good, yellow triangle for warning, red diamond for critical) along with a trend arrow.

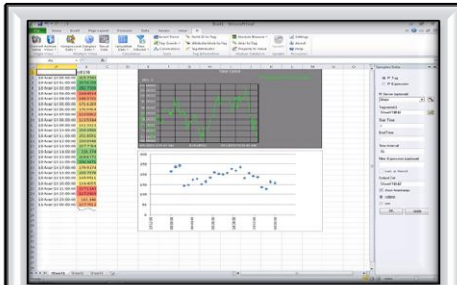
	Houston				Little Rock				Tucson			
	This Month	Today	Target	Trend	This Month	Today	Target	Trend	This Month	Today	Target	Trend
Safety	0	0	0	↔	0	0	0	↔	0	0	0	↔
Environment	97.0	97.1	97.1	↘	98.6	99.0	99.0	↘	99.2	98.8	98.8	↘
Energy Use	363594	11998	11998	↗	111526	3646	3646	↗	101270	3378	3378	↗
Quality	97.6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

Below the scorecard, there is a section titled "Operations Documents" which lists several documents with their names and modification dates:

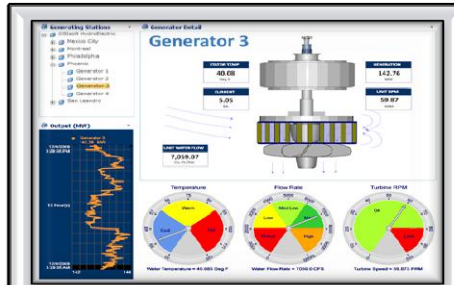
Type	Name	Modified
	Asset_Health	4/13/2010 2:39 PM
	Fuel_Gas_Utilization_and_Benchmarking_Report	4/13/2010 2:39 PM
	KPI_Analysis	4/13/2010 2:39 PM
	Plant_Overview	4/13/2010 2:39 PM
	Production_Schedule	4/13/2010 2:31 PM

At the bottom of the dashboard, there is a link to "Add document".

Visualization for PI System 2010



PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



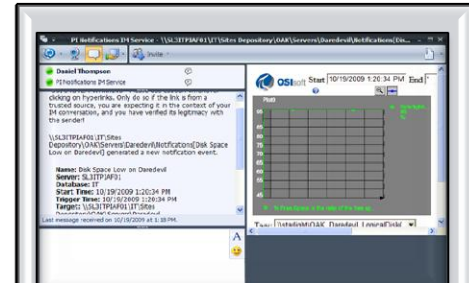
PI and PowerPivot for
Excel 2010



PI 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

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

Sum of Fuel Gas Volume KFT3 Column Labels

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

Shift: Shift 1, Shift 2, Shift 3

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

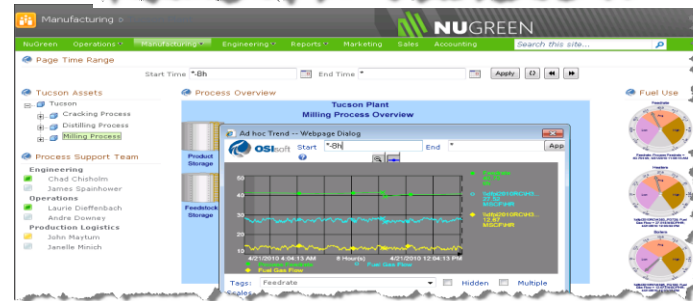
Done Trusted sites | Protected Mode: Off 100%

Knowledge Worker Roles

Access to all needed tools

Row Labels	Column Labels
Average of Fuel Ratio F3Ton	
Milling	
Borne Engineering	
BX-414	1,683
Flame-On	
FO-009	322
Hot Spot	
HS-345	2,439
Inferno	
I-27	1,283
I-56	6,456
KPC, Limited	
KPC-X87	430
Swift Brothers	
STM-305	878
STM-900	2,872
Average of Fuel Ratio F3Ton	
	2,000

Contribute material for use by others



Act to resolve problems and prevent recurrence

The screenshot shows a 'Notification Limit Change' form within the NUGREEN software. The form is titled 'Notification Limit Change' and includes the instruction: 'Use this form to change notification limit values.' The form contains the following fields and options:

- Target Date:** 4/16/2010
- Time:** 5:52:17 AM
- Heater:** Heater 395: FG Limit (selected), Heater 393: FG Limit, Heater 148: FG Limit
- Trigger Limit:** (empty field)

At the bottom of the form, there is a 'Change settings' button.

Providing Appropriate Detail

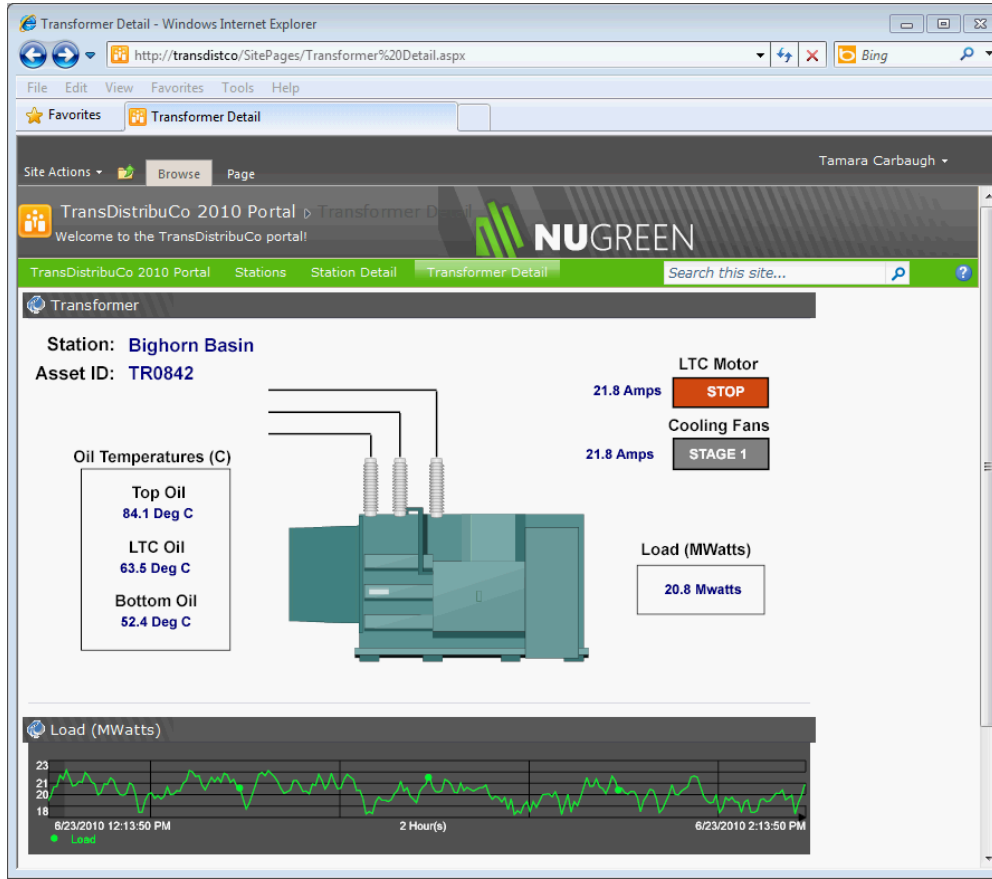
The screenshot displays a web application for the Tucson Plant, showing a detailed view of the Milling Process Overview. The interface includes a navigation menu with categories like Operations, Manufacturing, Engineering, Reports, Marketing, Sales, and Accounting. A search bar is present, and the user's name, Chad Chisholm, is visible in the top right corner.

The central focus is the **Tucson Plant Milling Process Overview** diagram. It illustrates the flow from **Feedstock Storage** and **Product Storage** through a series of **Heaters** (indicated by red arrows) into a **Reactor**. **Fuel Gas** is also shown entering the process. The diagram uses blue lines for material flow and red lines for heating/fuel flow.

On the right side, there are three circular gauges labeled **Fuel Use**, each showing a color-coded distribution of fuel usage. The gauges are labeled **Feedsite**, **Heater 1**, and **Heater 2**. Each gauge includes a legend with five categories: Pink, Yellow, Green, Blue, and Red. The gauges also display numerical data for Fuel Use Flow and Fuel Use Flow with a unit of 1000.00.

The bottom of the screen shows a status bar with "Done", "Local intranet | Protected Mode: Off", and a zoom level of "100%".

Getting to relevant content



PI WebParts 2010



Legacy maintenance software

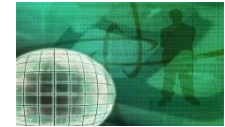
- Functional
- Maintenance staff is trained on it
- Company has made a large investment in it and has created a web front end for it



Excel Reports



- Reports that engineers and managers rely on

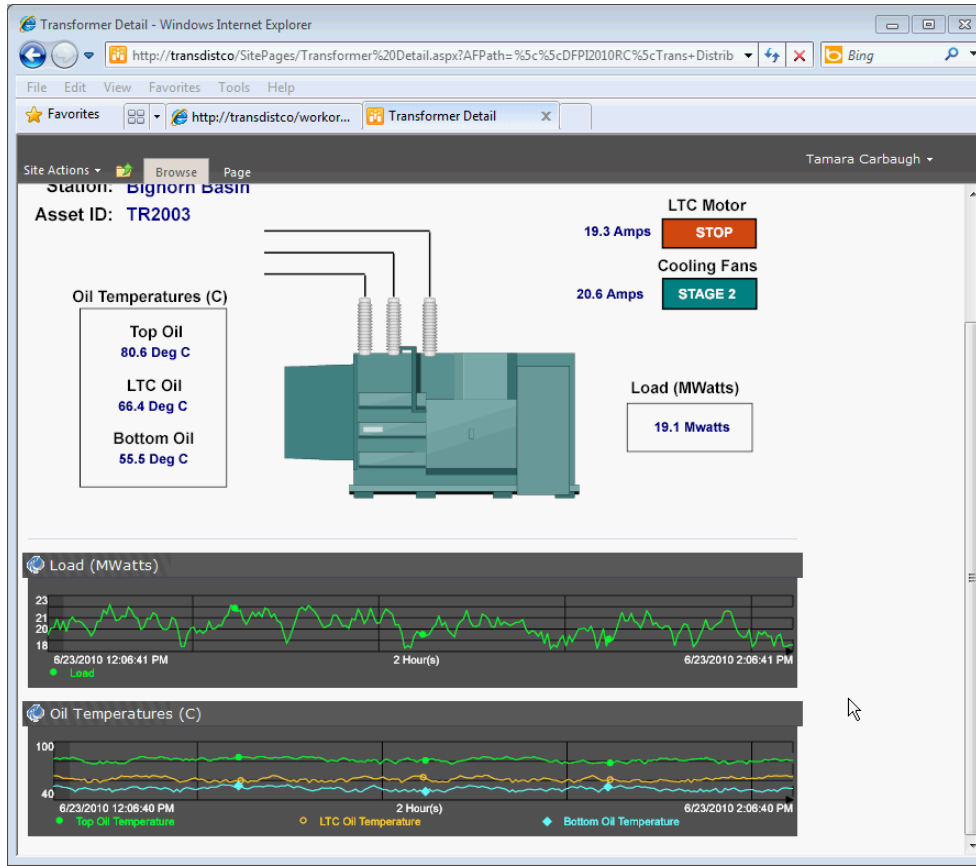


Manuals, Safety, Maps

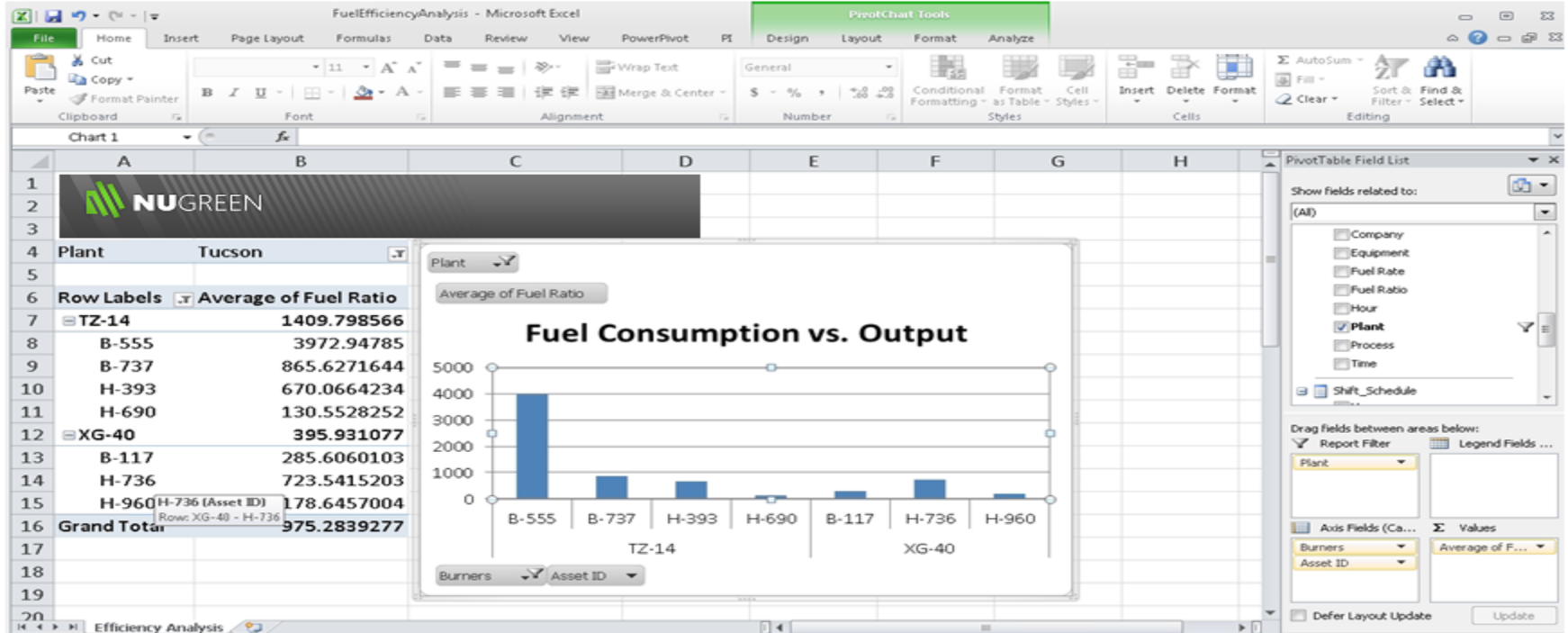
- Key data that is stored online
 - Safety
 - Equipment manuals
 - Weather
 - Maps

Integrate the PI System with existing investments

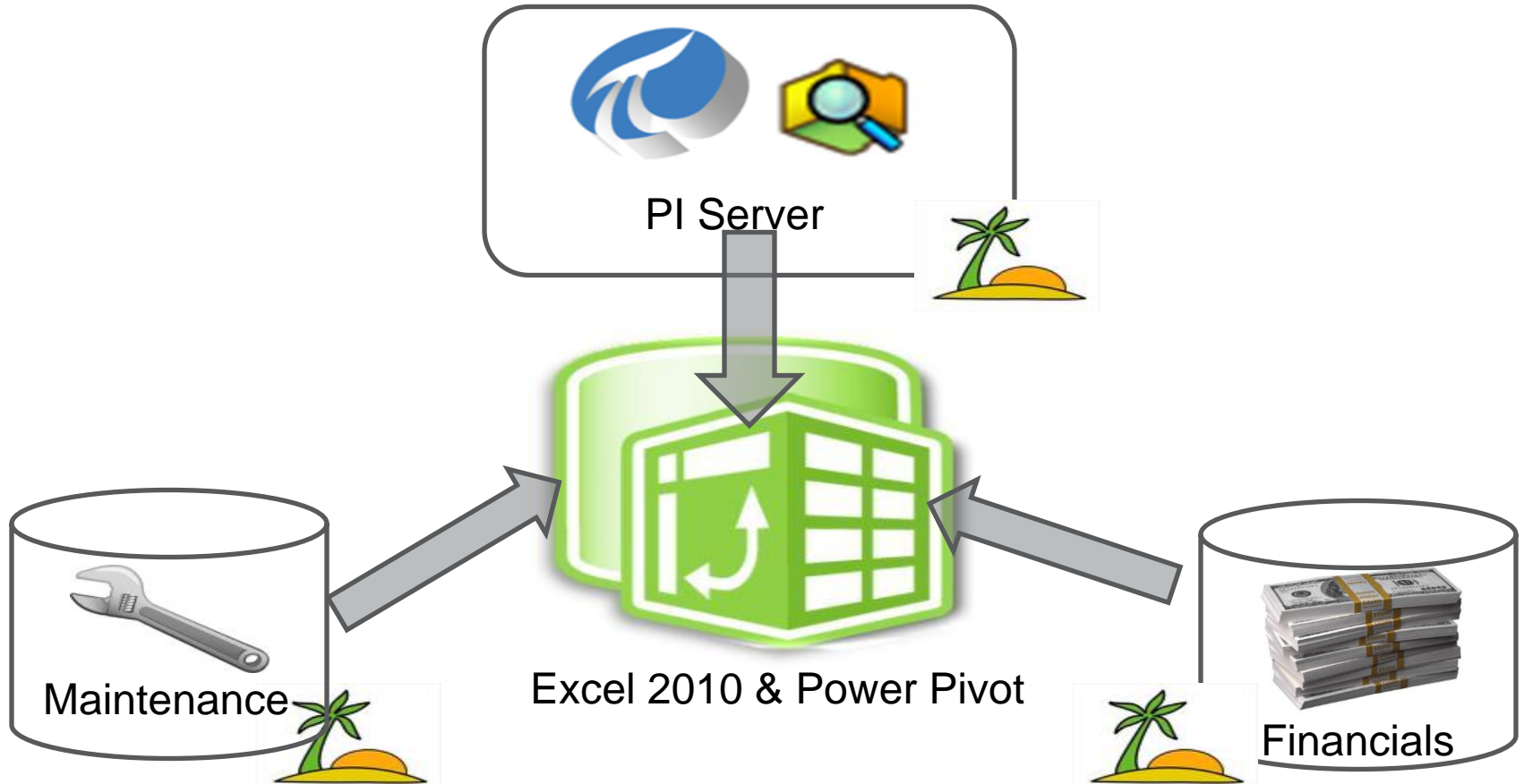
Integrating Existing Apps with PI WebParts



PI DataLink + Excel 2010 + PowerPivot



User-driven Reporting with Power Pivot



Managed Self Service BI

PowerPivot for Excel



Microsoft®
Excel 2010

PowerPivot for SharePoint



Microsoft®
SharePoint® 2010

Microsoft®
SQL Server® 2008 R2



BI for Manufacturing

30 Day Corporate Fuel Gas Consumption

Fuel
Man

Fla

Bo

Ho

Sw

KP

Inf

Gran

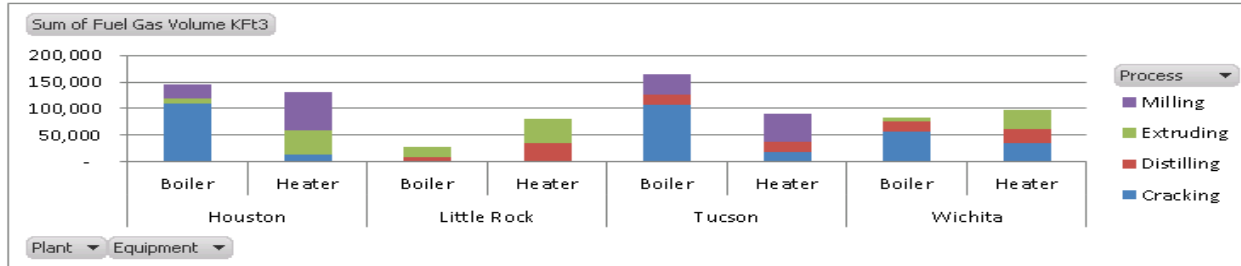
shift

Shift 1

Shift 2

Shift 3

Sum of Fuel Gas Volume Column Lab					
Row Labels	Cracking	Distilling	Extruding	Milling	Grand Total
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
Little Rock		45,024	63,146		108,169
Boiler		9,559	18,341		27,900
Heater		35,465	44,804		80,269
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
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



275,210	322
108,169	1,684
254,777	2,422
181,673	873
819,829	2,902
440	1,271
6,393	2,000

Keeping Insights Up to Date



PowerPivot user specifies the data sources



SharePoint automatically refreshes the data



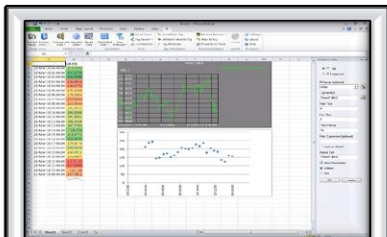
Refreshing Data in SharePoint 2010

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.

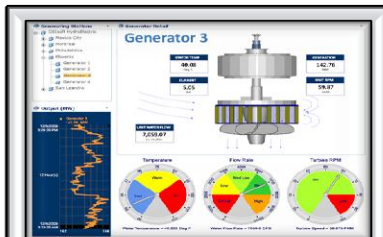
PI for Office 2010

Visualization for PI System 2010

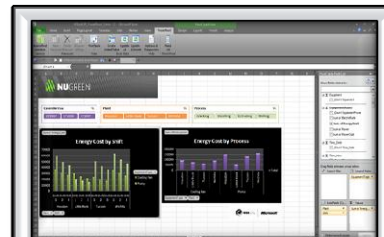
Everything you need to work with PI System data in Microsoft Office (2010)



PI DataLink for
Excel 2010



PI WebParts for
SharePoint 2010



PI and PowerPivot for
Excel 2010

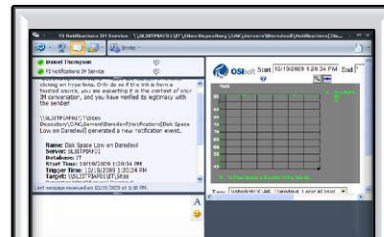


PI and PowerPivot for
SharePoint 2010

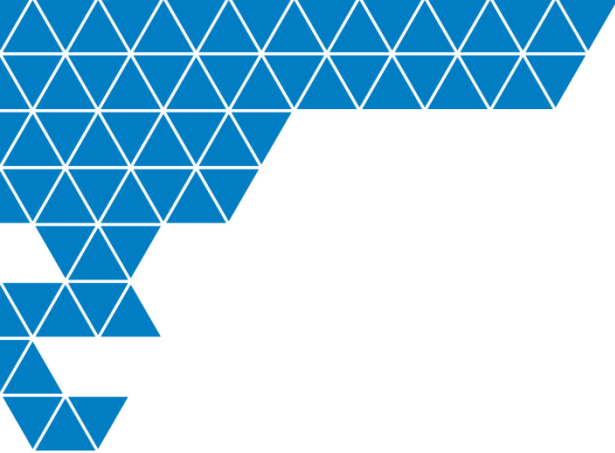
PI OLEDB
Enterprise 2010

PI Web Services
2010

PI Data Access
Technologies



PI Notifications 1.1
OCS R2 Delivery Channel



Thank you