

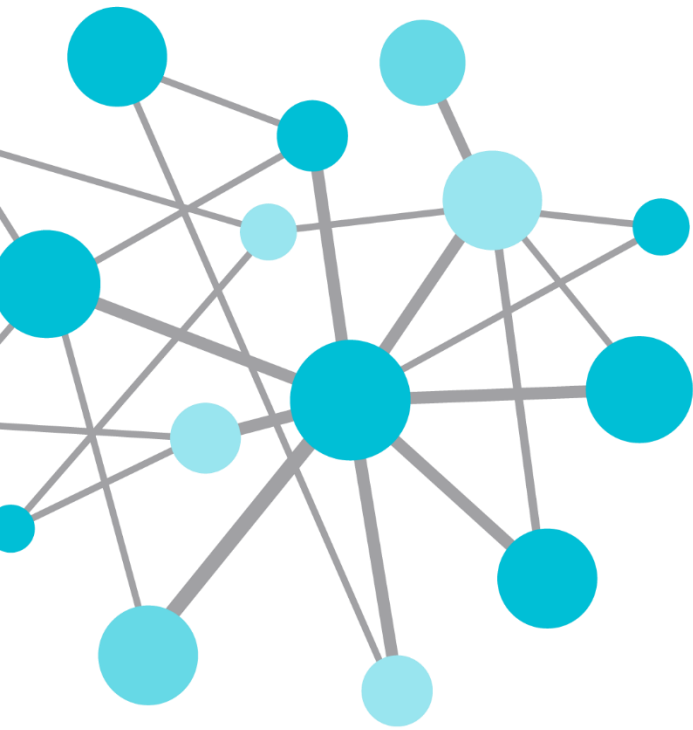
OSIsoft®

# FEDERAL WORKSHOP 2014

The **Power** of **Data**

DECISION READY IN REAL-TIME

**June 19 Huntsville, Alabama**



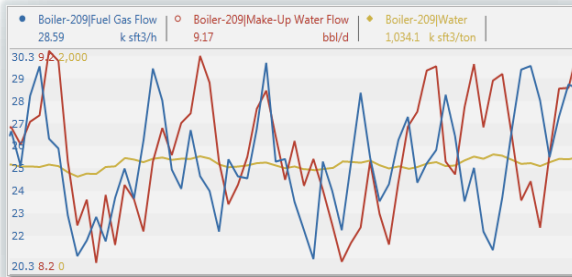
# Making Data Decision-Ready for the Intelligent Enterprise

Presented by **Curt Hertler**  
Partner Solutions Architect, OSIsoft

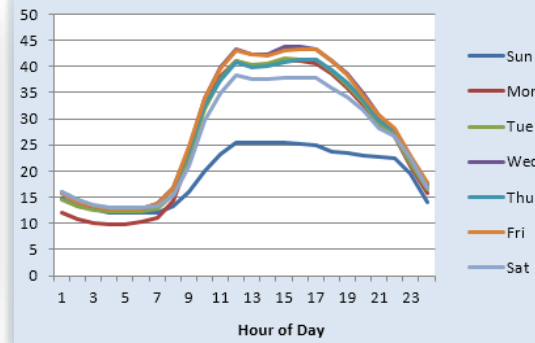


# Visual Contexts for PI System Data

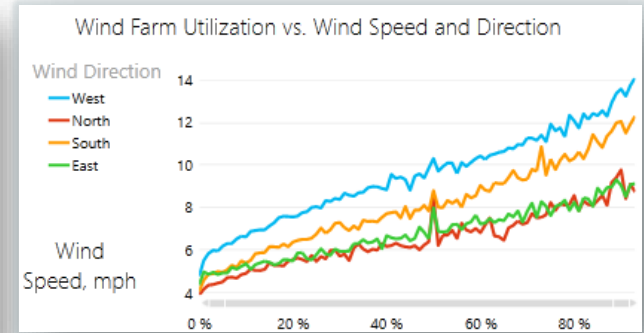
## Time and Events



## Profile



## Behavioral



## Performance Scorecard

	Bahrain			Kuwait		
	KPI Value	Plan Target	Dev %	KPI Value	Plan Target	Dev %
<b>Crude Unit</b>						
Light Naphtha 90 Pct. Pt.	179.9	180	-0.1 %	177.2	175	1.3 %
<b>FCCU</b>						
Conversion	63.4	64	-0.9 %	67.8	69	-1.7 %
FCC Gasoline (R+M)/2	86.2	86	0.2 %	85.2	86	-0.9 %
FCC Gasoline RVP	12.3	13	-1.6 %	11.8	12	0.0 %
<b>FCCU 2</b>						
Conversion				60.2	62	-3.0 %
FCC Gasoline (R+M)/2				87.0	86	1.8 %
FCC Gasoline RVP				13.1	12	9.2 %

## Ad Hoc

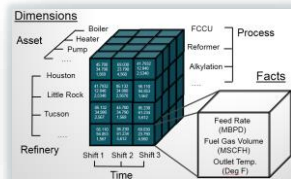
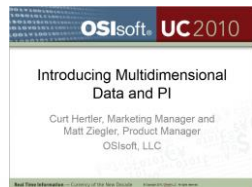


## Geospatial

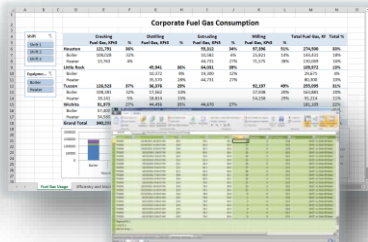


# Evolution of Microsoft Self-Service BI

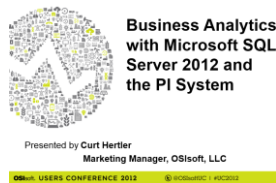
2010



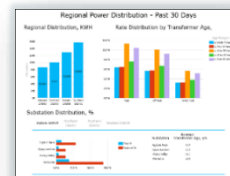
2011



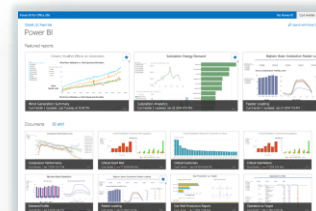
2012



2013



2014



Power BI



PowerPivot Gallery

Power View



PowerPivot

Power View

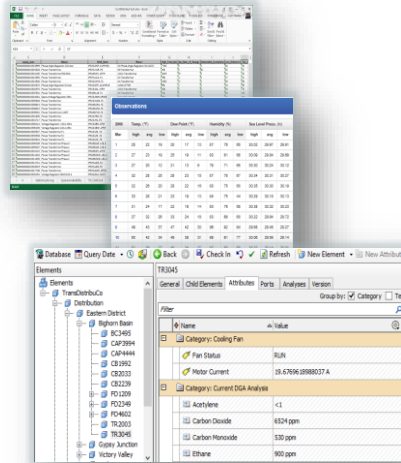
Power Query

PI OData Service



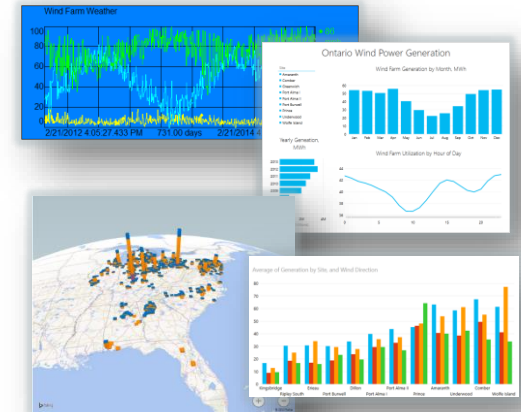
PI OLEDB Enterprise

# From Data to “Decision Ready” Data



Data

Access to analytical tools  
Always up to date  
Access to data where  
you need it  
Knowledge you need to get  
answers  
Easier and more direct access to  
organizational data in Excel



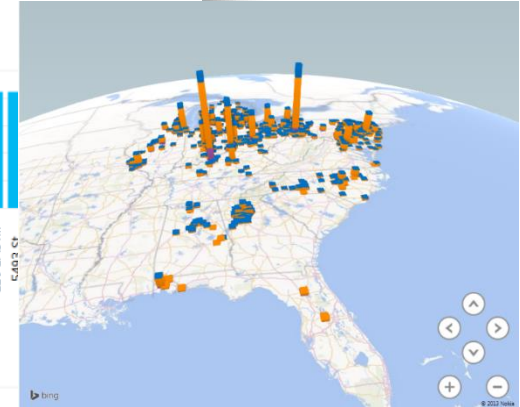
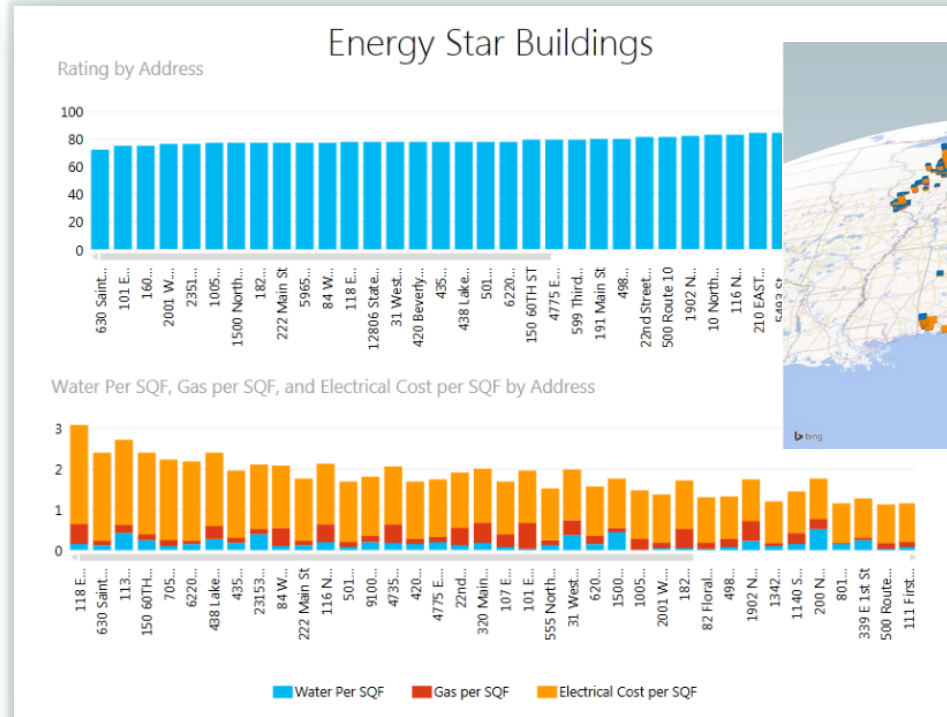
“Decision Ready” Data

# Less time to “Decision Ready”

Carnegie Mellon University – School of Architecture

## Asset Management

- Utility usage and costs for 1600 branch offices.
- Rapid delivery of analytical reporting.
- Increased the value of the data.





# Making “Decision Ready” Accessible

PSE&G

## Asset Risk Assessment

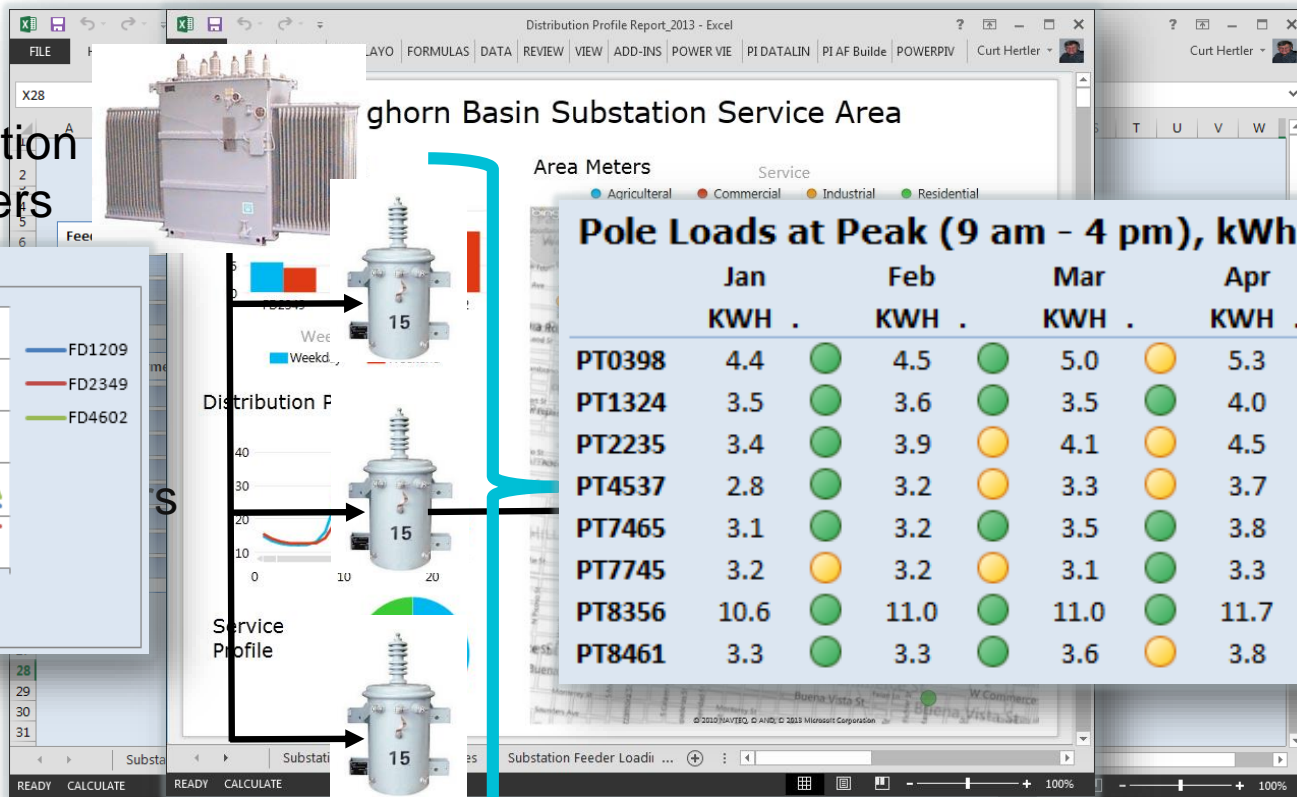
- Collaborative effort to demonstrate value to organization.
- Leveraged Power BI for Office 365 tenant.
- Support for mobile devices



# Demand Profile and Network Analysis



Substation  
Feeders

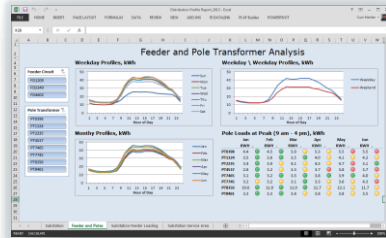




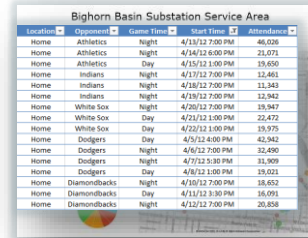
# Excel 2013 Anatomy

## Worksheets

Pivot  
Tables &  
Charts



Pivot  
Tables  
Reports

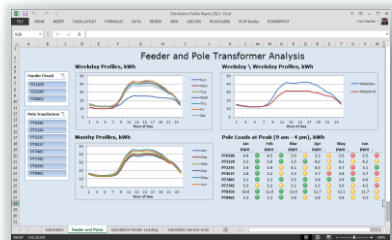


Location	Opponent	Game Time	Start Time	Attendance
Home	Athletics	Night	4/13/12 7:00 PM	46,036
Home	Athletics	Night	4/14/12 6:00 PM	23,071
Home	Athletics	Day	4/15/12 1:00 PM	19,690
Home	Indians	Night	4/17/12 7:00 PM	12,461
Home	Indians	Night	4/18/12 7:00 PM	11,343
Home	Indians	Night	4/19/12 7:00 PM	12,342
Home	White Sox	Night	4/20/12 7:00 PM	19,947
Home	White Sox	Day	4/21/12 1:00 PM	22,472
Home	White Sox	Day	4/22/12 1:00 PM	19,575
Home	Dodgers	Day	4/5/12 4:00 PM	42,942
Home	Dodgers	Night	4/6/12 7:00 PM	32,490
Home	Dodgers	Night	4/7/12 5:30 PM	31,909
Home	Dodgers	Day	4/8/12 1:00 PM	19,021
Home	Diamondbacks	Night	4/10/12 7:00 PM	18,652
Home	Diamondbacks	Day	4/11/12 1:30 PM	16,091
Home	Diamondbacks	Night	4/12/12 7:00 PM	20,858

# Excel 2013 Anatomy

Worksheets

Pivot  
Tables &  
Charts



Power  
View  
Reports



Excel  
Tables

Location	Opponent	Game Time	Start Time	Attendance
Home	Athletics	Night	4/13/12 7:00 PM	46,026
Home	Athletics	Night	4/14/12 6:00 PM	21,071
Home	Athletics	Day	4/15/12 1:00 PM	19,650
Home	Indians	Night	4/17/12 7:00 PM	12,461
Home	Indians	Night	4/18/12 7:00 PM	11,341
Home	Indians	Night	4/19/12 7:00 PM	12,942
Home	White Sox	Night	4/20/12 7:00 PM	19,947
Home	White Sox	Day	4/21/12 1:00 PM	22,472
Home	White Sox	Day	4/22/12 1:00 PM	19,975
Home	Dodgers	Day	4/25/12 4:00 PM	62,942
Home	Dodgers	Night	4/26/12 7:00 PM	12,440
Home	Dodgers	Night	4/27/12 3:30 PM	31,909
Home	Dodgers	Day	4/28/12 1:00 PM	19,021
Home	Diamondbacks	Night	4/30/12 7:00 PM	18,652
Home	Diamondbacks	Day	4/11/12 3:30 PM	16,091
Home	Diamondbacks	Night	4/12/12 7:00 PM	20,858



Data Model

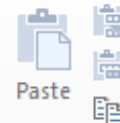
PowerPivot  
Tables

The screenshot shows an Excel worksheet with multiple PowerPivot tables. The tables are organized into several columns, each representing a different data source. The tables contain various metrics and data points.

Data Sources



Relational Data



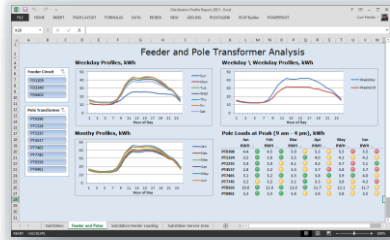
Paste

Clipboard

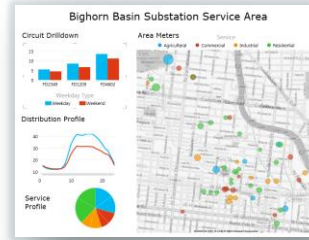
# Excel 2013 Anatomy

Worksheets

Pivot  
Tables &  
Charts



Power  
View  
Reports



Excel  
Tables

Location	Opponent	Game Time	Start Time	Attendance
Home	Athletics	Night	4/13/12 7:00 PM	46,026
Home	Athletics	Night	4/14/12 6:00 PM	21,071
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Home	Indians	Night	4/18/12 7:00 PM	11,343
Home	Indians	Night	4/19/12 7:00 PM	12,942
Home	White Sox	Night	4/20/12 7:00 PM	19,947
Home	White Sox	Day	4/21/12 1:00 PM	22,472
Home	White Sox	Day	4/22/12 1:00 PM	15,975
Home	Dodgers	Day	4/25/12 4:00 PM	62,942
Home	Dodgers	Night	4/26/12 7:00 PM	12,490
Home	Dodgers	Night	4/27/12 3:30 PM	31,909
Home	Dodgers	Day	4/28/12 1:00 PM	19,021
Home	Diamondbacks	Night	4/30/12 7:00 PM	18,652
Home	Diamondbacks	Day	4/11/12 3:30 PM	16,091
Home	Diamondbacks	Night	4/12/12 7:00 PM	20,858

Data Model

PowerPivot  
Tables

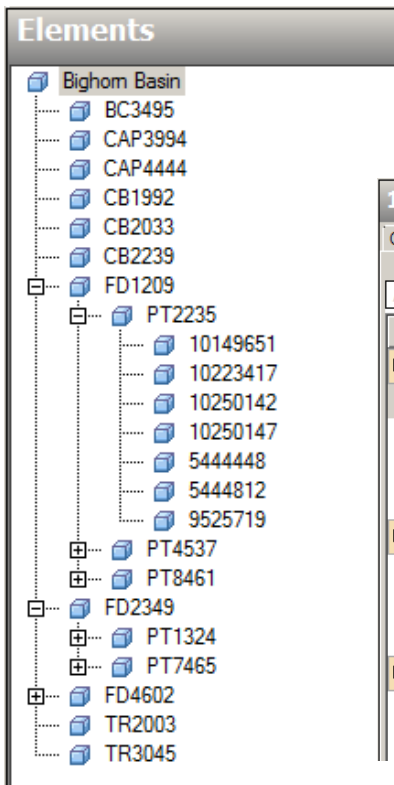


# Distribution Network – PI Asset Framework



## Network Hierarchy

- Feeder
- Pole Transformer
- Meter



10149651	
General   Child Elements   Attributes   Ports   Version	
Filter	
Name	Value
Category: Location	
Address	470 Beso Ln, San Antonio,...
Entity	Cindy Bear
Latitude	29.431031
Longitude	-98.521563
Category: Meter Readings	
KVAH	-0.021651281043887138
KVARH	0.0071160625666379929
KWH	-0.015789896249771118
Category: Specifications	
Manufacturer	L&T
Service	Residential

## Pole Transformer Attributes

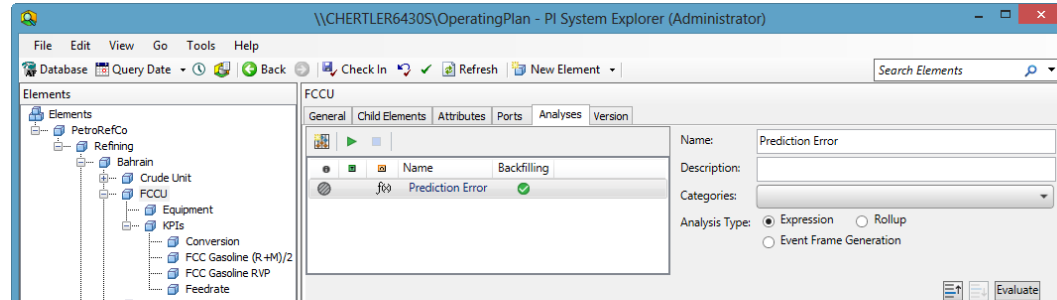
- Location
- Capacity rating

## Meter Attributes

- Meter reads (PI System Data)
- Location and manufacturer
- Service and responsible entity

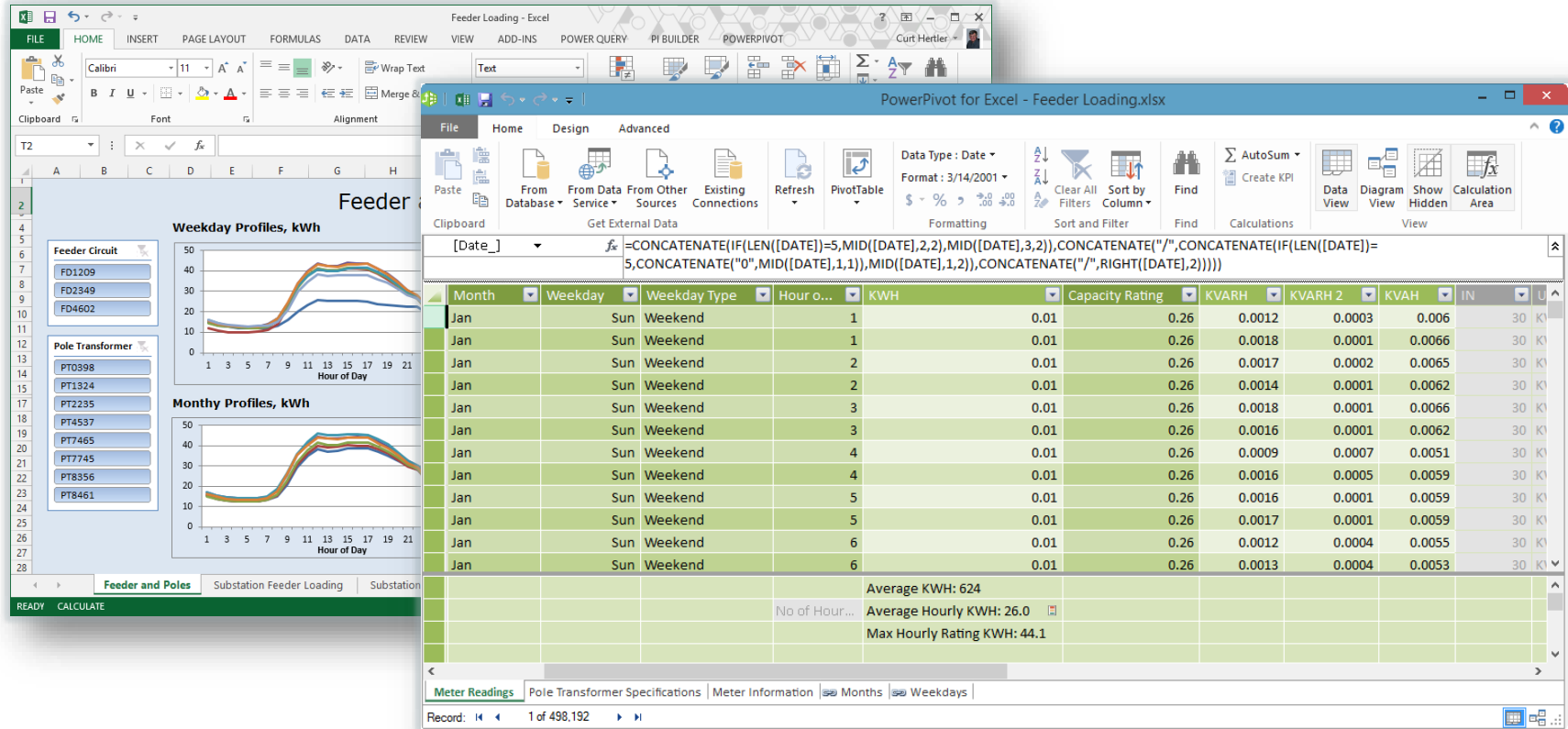
# Asset Based Analytics in PI Server 2014

- Continuous calculation
- Event framing
- Backfill



Name	Expression	V:	Output Attribute	
ModelError	<code>TagVal('Conversion','*')-TagVal('Predicted Conversion','*')</code>		<a href="#">Predicted Conversion Error</a>	⊗
HourChanged	<code>If Hour('*') = Hour('*-1s') Then 0 Else 1</code>		<a href="#">Click to map</a>	⊗
LastHour	<code>PrevEvent('Totalized Error','*')</code>		<a href="#">Click to map</a>	⊗
TotalHourlyError	<code>If HourChanged = 1 then TagTot('Predicted Conversion Error',L</code>		<a href="#">Totalized Error</a>	⊗
<code>If HourChanged = 1 then TagTot('Predicted Conversion Error',LastHour,'*') Else NoOutput()</code>				

# Excel 2013 with Power Pivot

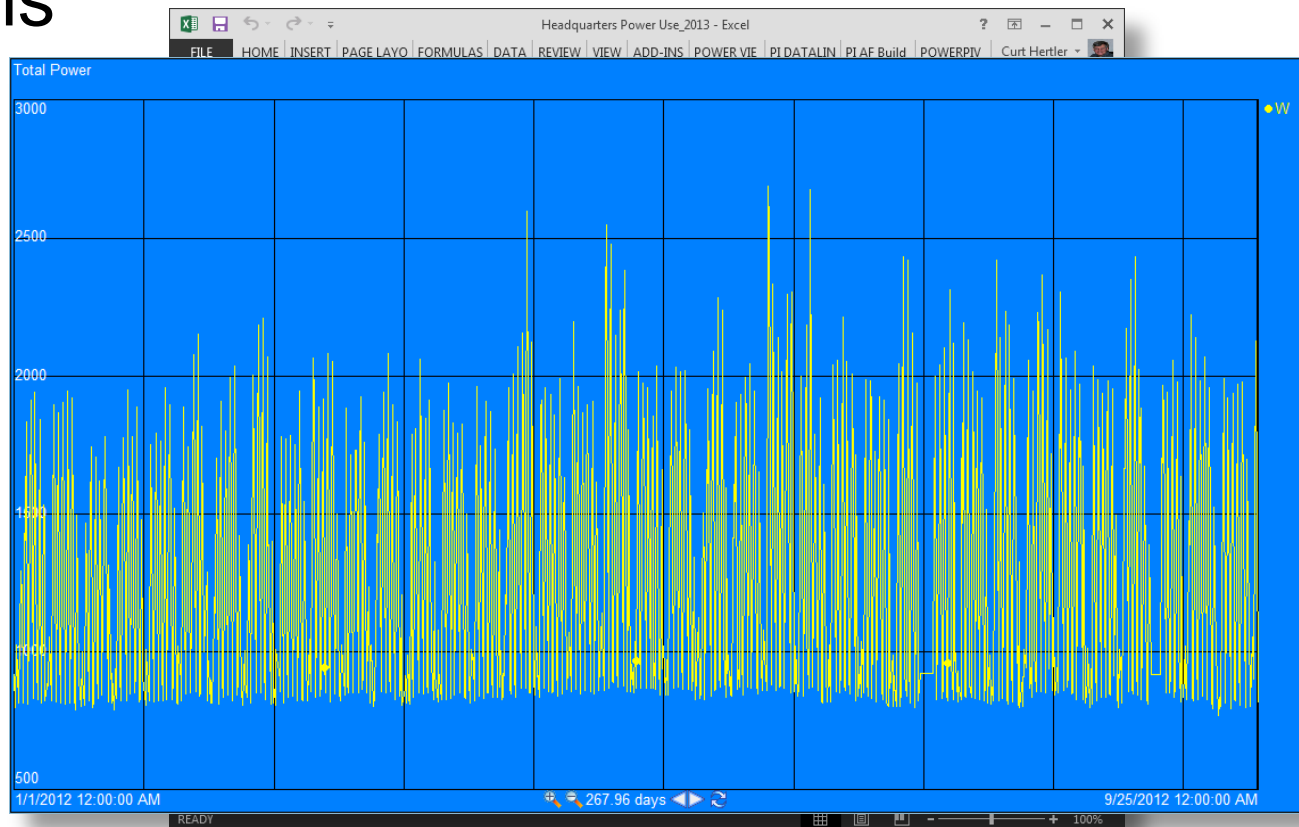




# Ad Hoc Analysis

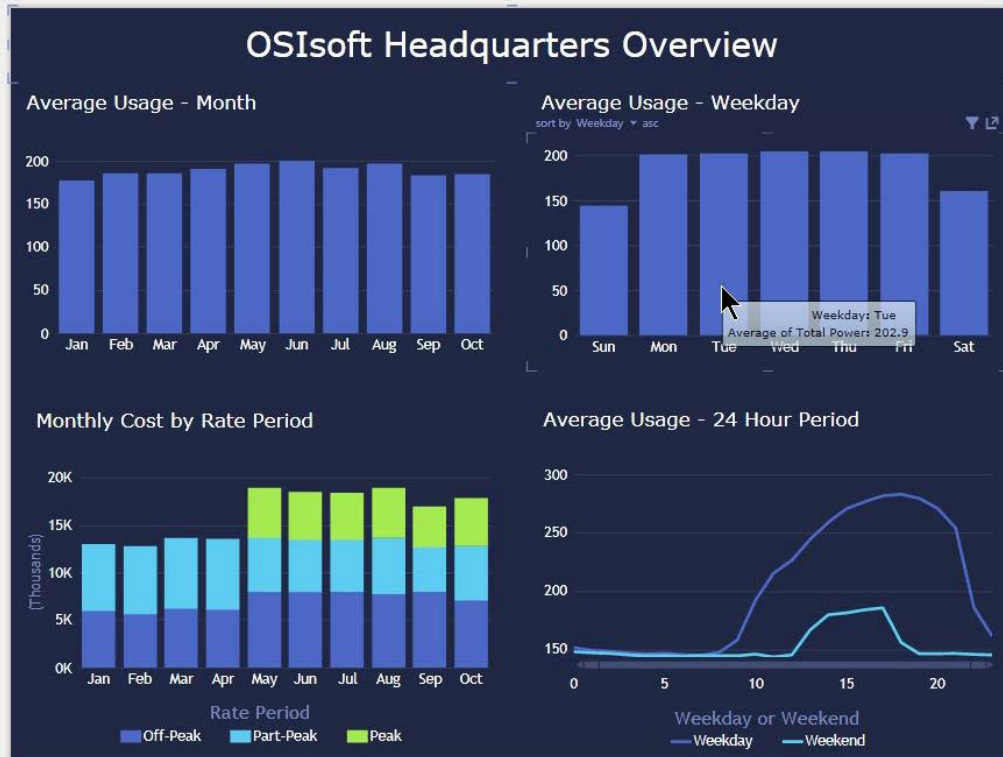


Power Use at  
OSIsoft  
Headquarters





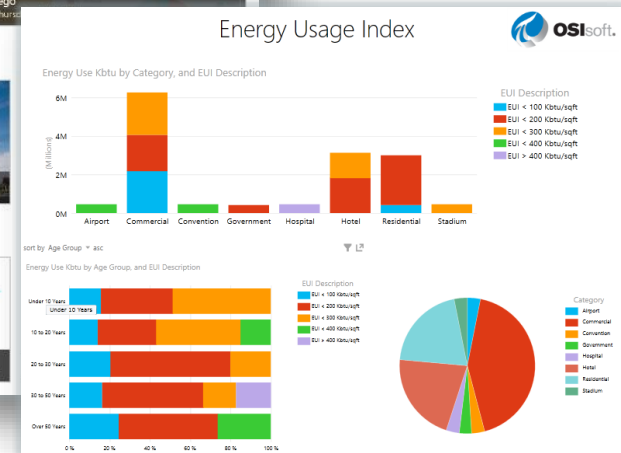
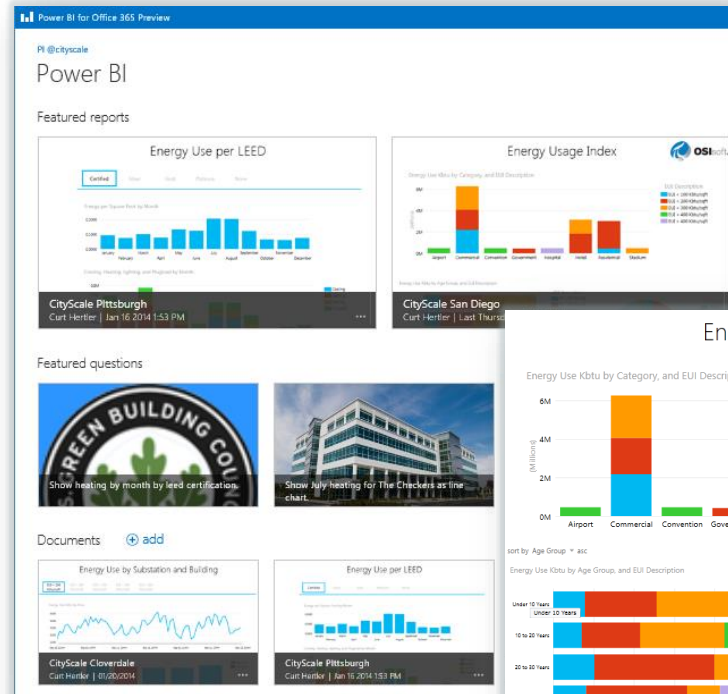
# DEMO



# Power BI for Office 365

## BI functionality for Office 365

- Ask and Answer  
*Power BI Q&A*
- Analysis Anywhere  
*Power BI App*
- Easier Data Access  
*Power Query for Excel 2013*  
*PI Web API – OData Feature*
- Scheduled data refresh

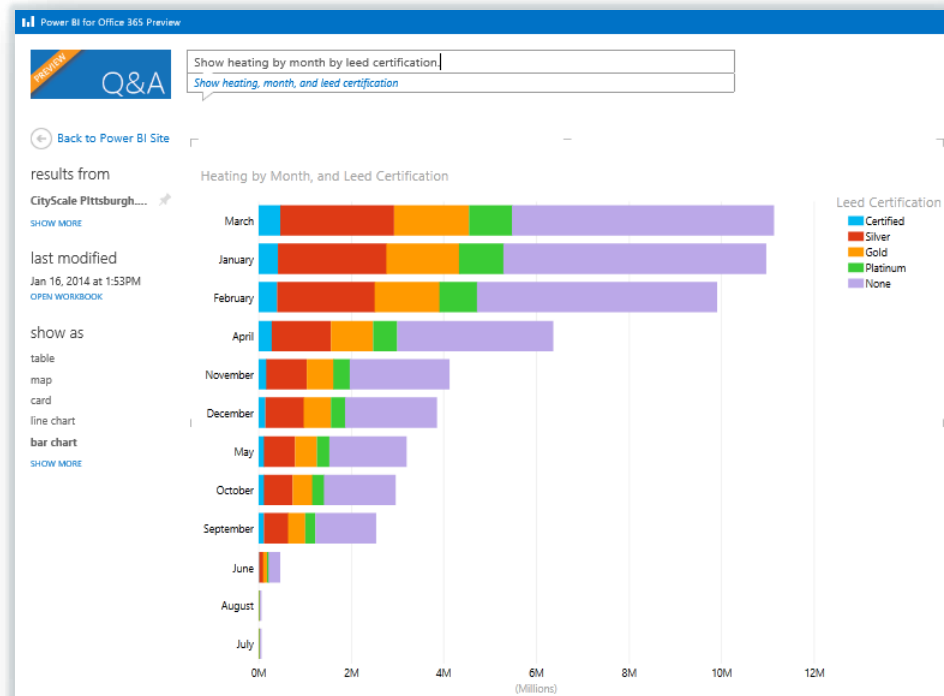


# Power BI Q&A

*“Show heating by month by LEED certification.”*

## Ask and Answer

- Ask ad hoc questions using natural language
- Answers returned with Power View visuals
- Access to all Power BI data
- Additional visuals and analysis supported from the browser





# DEMO



Browser window showing the Power BI Q&A interface. The address bar displays the URL: <https://sites.powerbi.com/infonav/app/cityscale2.sharepoint.com/?SPAppWebUrl=https%3A%2F%2Fcityscale2-bdf14fa78f736b.sharepoint.com%2Fsites%2FAppCatalog%2FPowerBI>. The browser tabs include "CityScale San Diego demo.xlsx" and "Power BI Q&A". The menu bar shows "File", "Edit", "View", "Favorites", "Tools", and "Help".

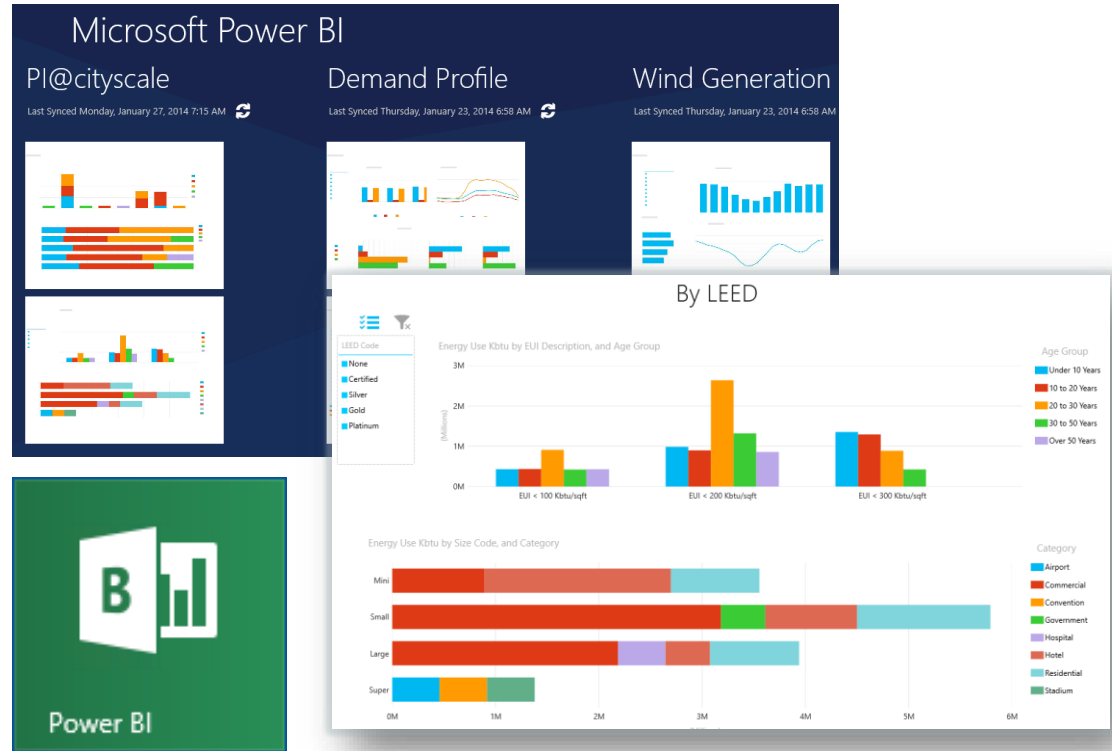
The main content area features a blue header with the text "Power BI for Office 365 Preview". Below this, there is a "Q&A" section with a "PREVIEW" label. A text input field is present, and a "Back to Power BI Site" button is visible. A vertical sidebar on the right contains the text "ABOUT THIS DATA".

The Windows taskbar at the bottom shows various application icons, including Outlook, Lync, PowerPoint, Word, Excel, and the Windows Azure logo. The system clock indicates the time is 9:42 AM on 1/20/2014.

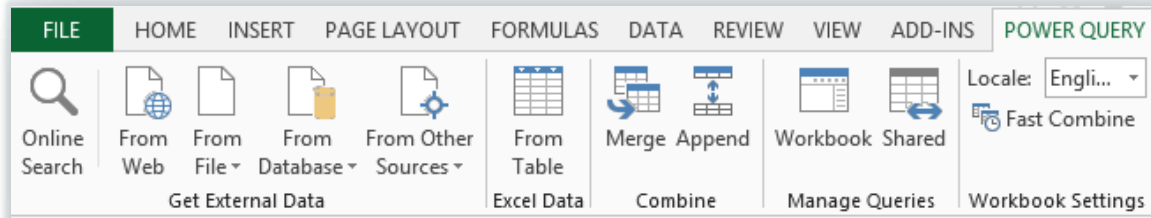
# Power BI App – Windows 8

## Analysis Anywhere

- Free app on Windows Store
- Displays Power View reports posted in SharePoint for Office 365
- Supports most Power View visuals
- Exposes view filters for additional analysis

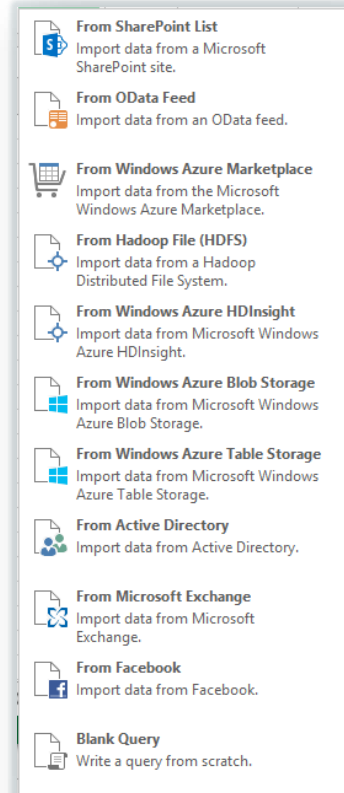


# Power Query for Excel 2013

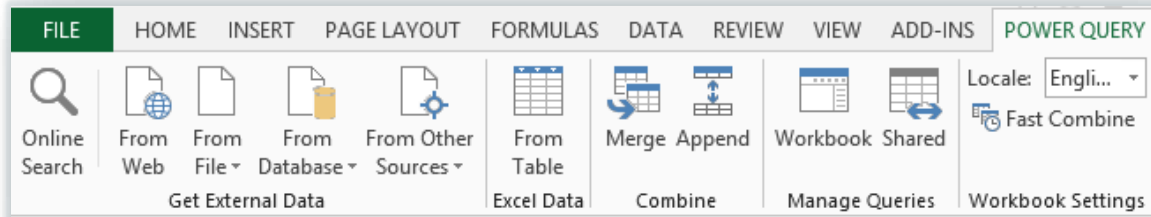


## Free Add-In for Excel 2010 or 2013

- Access to useful data sources
  - Popular relational databases
  - Hadoop, Microsoft Exchange, Facebook, etc.
  - OData Feeds, like the PI OData feature of the PI Web API

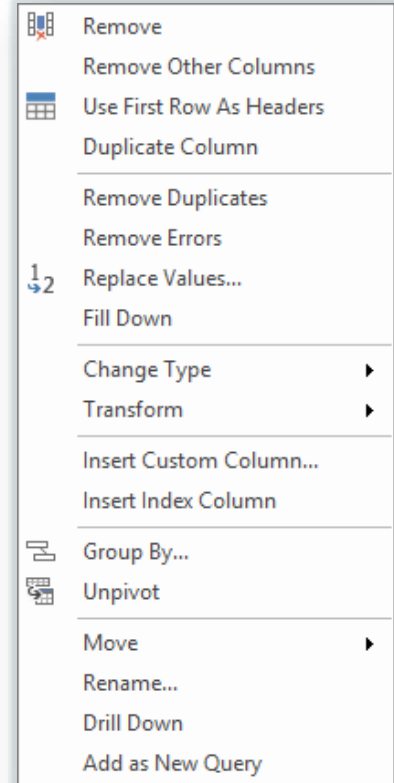


# Power Query for Excel 2013

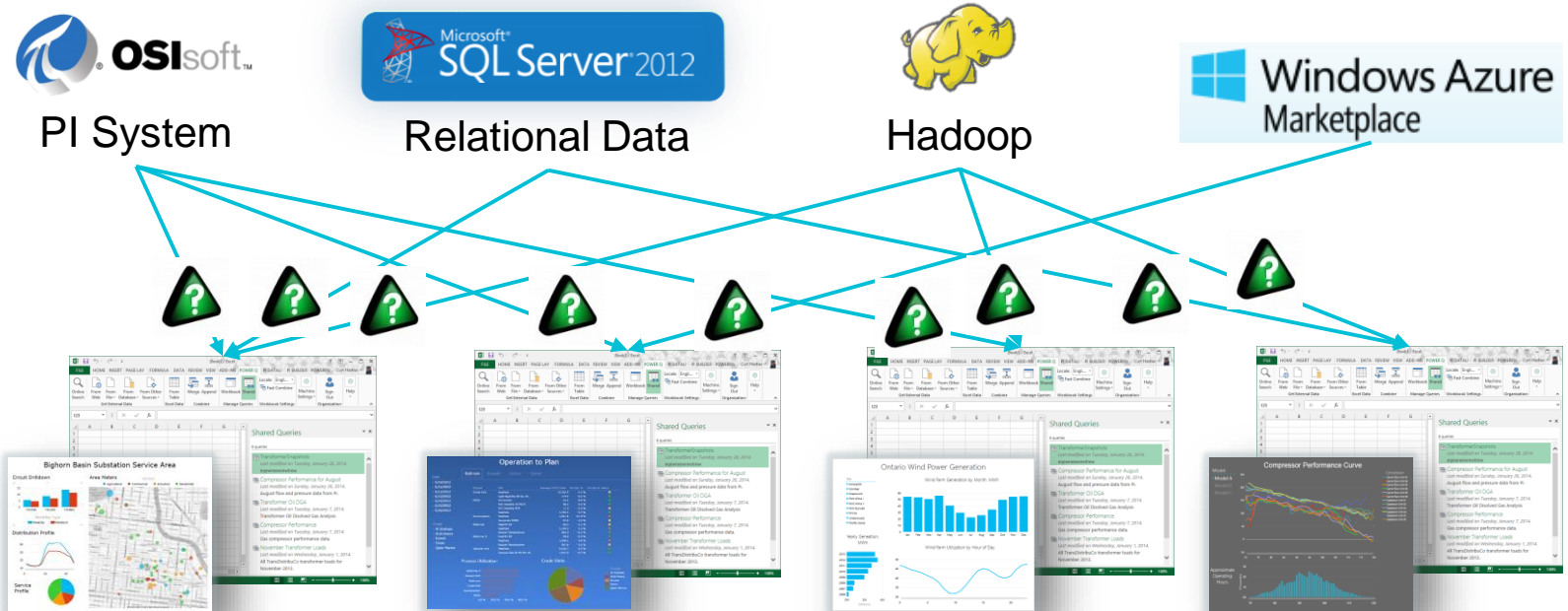


## Free Add-In for Excel 2010 or 2013

- Shape datasets for Power View analysis
  - Remove columns and filter rows
  - Insert calculated columns
  - Reformat text and numeric data
  - Append and merge
- Author and share of scripted queries in Power BI for Office 365



# Excel-centric Data Architecture



# Data Stewardship Architecture



PI System



Relational Data



Hadoop



Power BI for  
Office 365

“Compressor  
Performance”

“March  
Operating  
Targets”

“Reactor 304  
Event Frames”

“Substation  
Loads”

“Physical  
Properties”

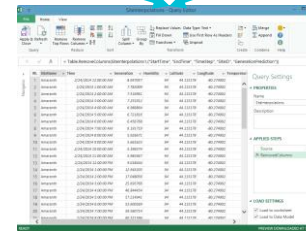
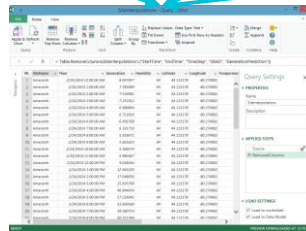
“Predicted  
Yields”

“Substation  
Loads”

“Work  
Orders by  
Asset”

“Feedstock  
Costs”

Excel Users  
with  
Power Query Search

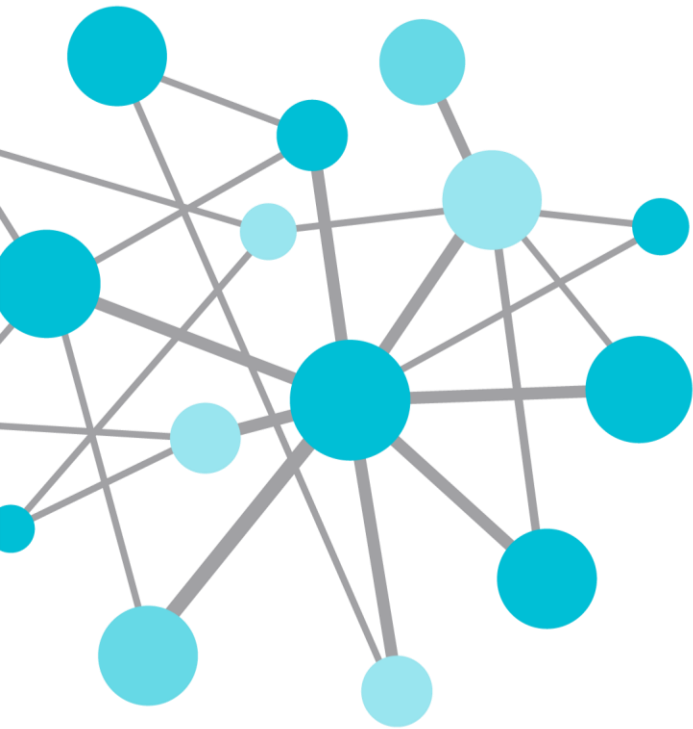




# Curt Hertler

[curt@osisoft.com](mailto:curt@osisoft.com)

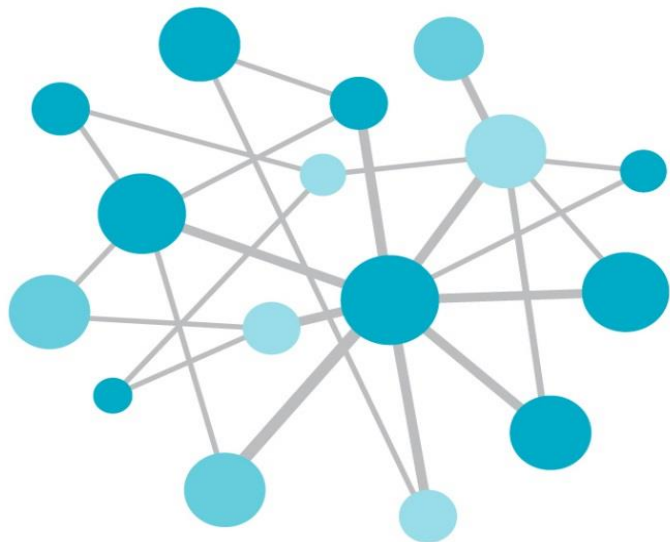
Partner Solutions Architect  
OSIsoft, LLC



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YOU

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OSIsoft®

# FEDERAL WORKSHOP 2014

The **Power** of **Data**

DECISION READY IN REAL-TIME

**Upcoming Federal Workshop:**

October 29 - Washington, DC

JW Marriott, Pennsylvania Avenue, NW