



OSIsoft®

# REGIONAL SEMINAR 2012

E M E A

The Power of Data



# Business Analytics with PowerPivots, Microsoft SQL Server 2012 and the PI System

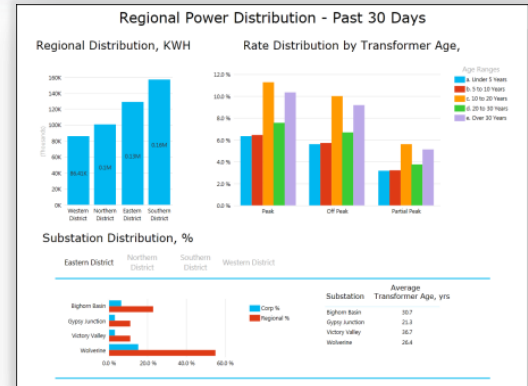
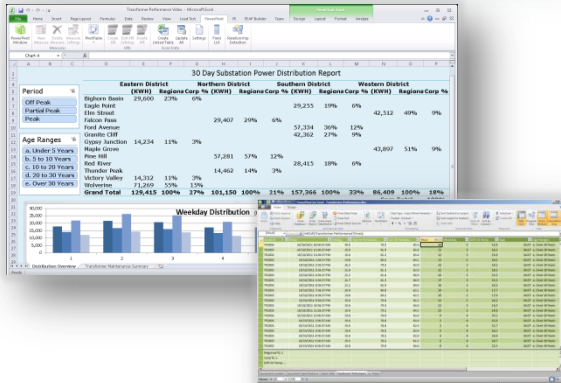
Presented by

**Martin Freitag**  
Senior Developer  
OSIsoft Europe

# Overview

- **Business Analytics Toolkit** – OSIsoft | Microsoft
- **Business Context** - PI Asset Framework (PI AF)
  - *Data Access* - PI OLEDB Enterprise
  - *Analytics and Reporting* - PowerPivot for Excel 2010
- **Demo**
- **Ad Hoc Analytics and Reporting** - PowerView
- **Additional Resources**

# Business Analytics Toolkit



## PowerPivot for Excel 2010

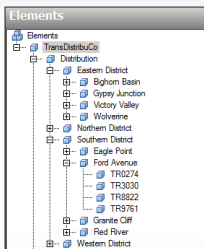


## PowerView

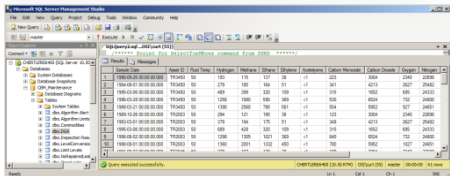
# PowerPivot Enables Data Integration



PI Server  
PI OLEDB Enterprise



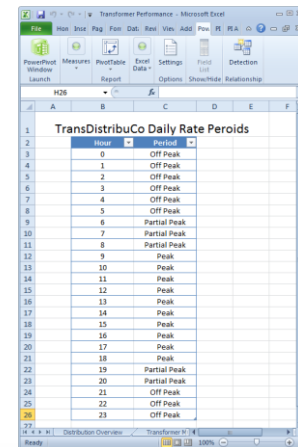
Microsoft®  
SQL Server™ 2012  
Business Intelligence



Asset	Time	Age	Energy	Top Oil Temp.	LTC Oil Temper.	H2	Weekday	Diff Oil Temp.	CH4 to H2	CH4 to C2H6
TR2003	10/18/2011	33.675	20.5	79.1	65.3	10	3	15.8	1.5	0.
TR2003	10/19/2011	33.675	19.9	81.9	65.6	11	3	16.3	1.5	0.
TR2003	10/19/2011	33.675	19.4	81.2	65.4	12	3	15.8	1.5	0.
TR2003	10/18/2011	33.675	19.8	80.2	64.1	13	3	16.2	1.5	0.
TR2003	10/18/2011	33.675	20.3	79.3	62.8	14	3	16.5	1.5	0.
TR2003	10/18/2011	33.675	21.4	81.3	63.0	15	3	18.3	1.5	0.
TR2003	10/18/2011	33.675	22.1	81.4	66.0	16	3	15.3	1.5	0.
TR2003	10/18/2011	33.675	21.7	81.3	66.0	17	3	15.3	1.5	0.
TR2003	10/18/2011	33.675	21.1	81.0	64.6	18	3	16.5	1.5	0.
TR2003	10/18/2011	33.675	20.4	80.8	63.1	19	3	17.7	1.5	0.
TR2003	10/18/2011	33.675	19.8	80.2	62.5	20	3	17.6	1.5	0.
TR2003	10/18/2011	33.675	19.4	79.4	65.2	21	3	14.2	1.5	0.
TR2003	10/18/2011	33.675	19.4	79.3	64.8	22	3	14.5	1.5	0.
TR2003	10/18/2011	33.675	19.4	79.1	64.3	23	3	14.8	1.5	0.
TR2003	10/19/2011	33.675	19.4	78.9	63.8	0	4	15.1	1.5	0.
TR2003	10/19/2011	33.675	19.4	78.8	63.4	1	4	15.4	1.5	0.
TR2003	10/19/2011	33.675	19.4	78.6	62.9	2	4	15.7	1.5	0.
TR2003	10/19/2011	33.675	19.4	78.5	62.4	3	4	16.1	1.5	0.
TR2003	10/19/2011	33.675	19.4	78.3	62.0	4	4	16.4	1.5	0.
TR2003	10/19/2011	33.675	19.3	78.2	61.5	5	4	16.7	1.5	0.
TR2003	10/19/2011	33.675	20.9	79.9	64.4	6	4	15.5	1.5	0.
TR2003	10/19/2011	33.675	21.6	80.8	65.3	7	4	15.5	1.5	0.

[www.powerpivot.com](http://www.powerpivot.com)

Windows Azure  
Marketplace



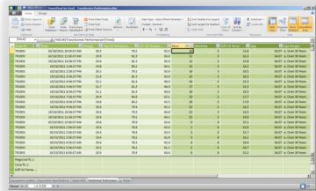
Microsoft®  
Excel 2010

# PowerPivot Based on Gemini Technology

End Users



IT Professionals



Excel hosted client +



in memory BI engine

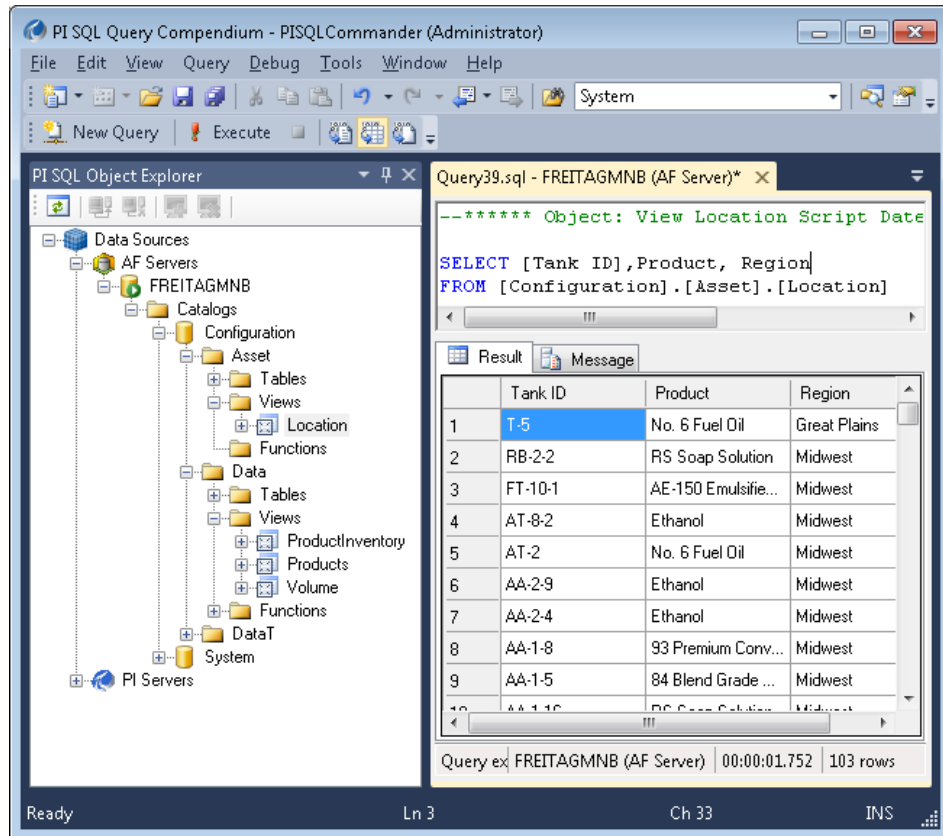


SharePoint for managed collaboration

# PI OLEDB Enterprise

## Important Considerations

- Allows looking at PI System databases as if they were a relational system
- Insures accurate aggregation of real-time events
- Scale-up by adding PI AF Structure
- Access PI Event Frames in next release



The screenshot displays the PI SQL Query Compendium interface. The left pane shows the PI SQL Object Explorer with a tree view of the FREITAGMNB database structure, including Catalogs, Configuration, Asset, Tables, Views, Location, Functions, Data, ProductInventory, Products, Volume, DataT, and System. The right pane shows a query window with the following SQL query:

```
--***** Object: View Location Script Date
SELECT [Tank ID],Product, Region
FROM [Configuration].[Asset].[Location]
```

The query result is displayed in a table with the following data:

	Tank ID	Product	Region
1	T-5	No. 6 Fuel Oil	Great Plains
2	RB-2-2	RS Soap Solution	Midwest
3	FT-10-1	AE-150 Emulsifie...	Midwest
4	AT-8-2	Ethanol	Midwest
5	AT-2	No. 6 Fuel Oil	Midwest
6	AA-2-9	Ethanol	Midwest
7	AA-2-4	Ethanol	Midwest
8	AA-1-8	93 Premium Conv...	Midwest
9	AA-1-5	84 Blend Grade ...	Midwest
10	AA-1-16	RS Soap Solution	Midwest

The status bar at the bottom indicates the query executed on the FREITAGMNB (AF Server) in 00:00:01.752, returning 103 rows.

# Business Context1: Product Inventories Profile



## My Objectives

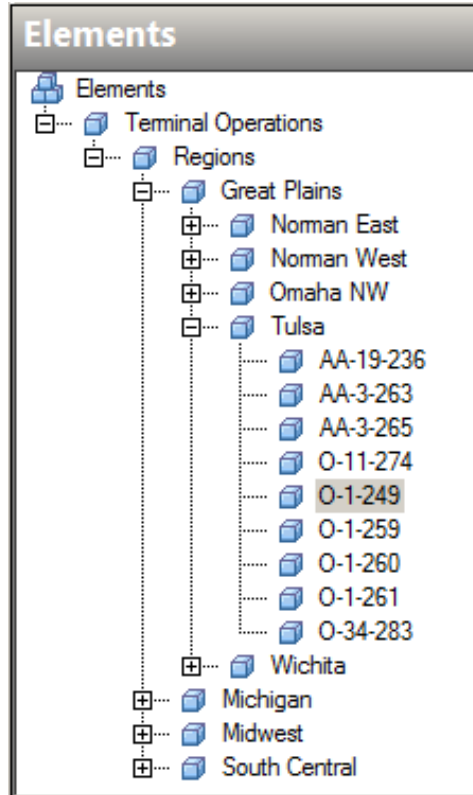
- Product Inventory - aggregations
- Relate it to actual commodity prices
- ***Want to do it myself !***



# Business Context1: *PI Asset Framework Structure*

## Asset Hierarchy

- Region
- Refinery
- Tank



## Tank Attr.

- Equip. Spec.
- Actual and historical values

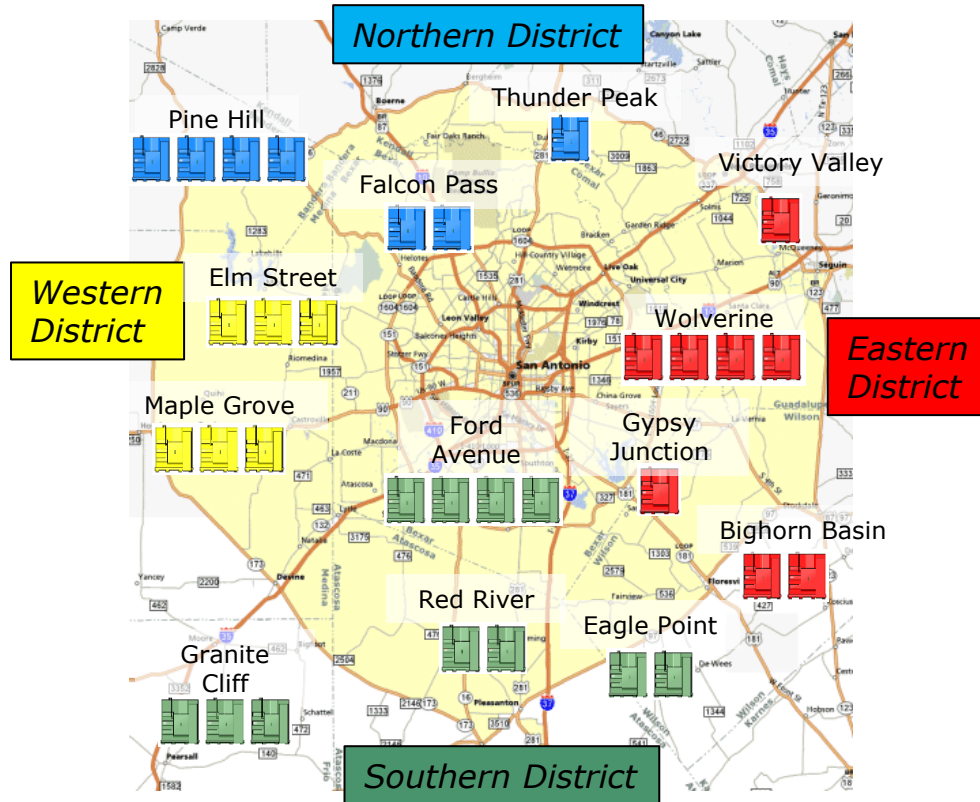
O-1-249

General | Child Elements | Attributes | Ports | Version

Filter

Name	Value
Tank Product	
Net Volume	5814.6552734375 bbl
Product	87 Regular Conventional
Product Group	Gasoline
Tank Specifications	
Asset ID	O-1-249
Heel	2000 bbl
Maximum	200000 bbl
Nominal Volume	101000 bbl
Range	198000
Terminal	Tulsa

# Business Context2: Substation Power Distr. Profile



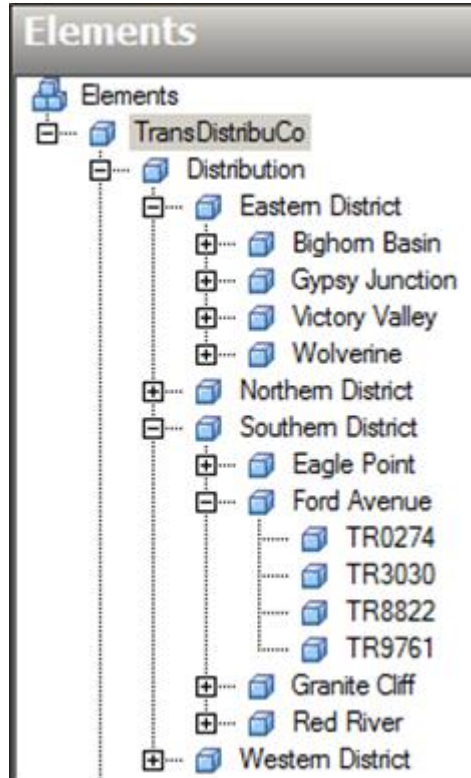
## My Objectives

- Regional and Rate Period Power Distribution
- Aging Asset Risk Assessment
- ***Want to do it myself !***

# Business Context2: *PI Asset Framework Structure*

## Asset Hierarchy

- District
- Substation
- Transformer



## Transformer Attributes

- PI System Data
- Rich Equip. Spec.
- DGA analysis

Name	Value
<b>Category: Current DGA Analysis</b>	
Acetylene	4 ppm
Carbon Dioxide	3004 ppm
Carbon Monoxide	123 ppm
Ethane	190 ppm
Ethylene	38 ppm
Hydrogen	294 ppm
Methane	121 ppm
Nitrogen	22698 ppm
Oxygen	2340 ppm
<b>Category: Load Tap Changer</b>	
LTC Oil Temperature	65.0885009765625 °F
LTC Oil Temperature - 1H A...	62.7173211853571 °F
<b>Category: Performance</b>	
Energy	20.6299715201975 MWh
Load	20.1319046020508 MW
<b>Category: Specifications</b>	
Installation Date	6/10/1992 12:00:00 AM
Manufacturer	PowerMaster
Model	PM-56
<b>Category: Tank</b>	
Bottom Oil Temperature	48.3781089782715 °F
Top Oil Temperature	79.2328872680664 °F
Top Oil Temperature - 1H A...	83.2808045109946 °F

# Demo

## PowerPivots allow

- **Summarize** and **group** *raw, tabular* data
- *Categorical* and *Numeric* data in Excel
- *Contextual* and *Time Series* in PI

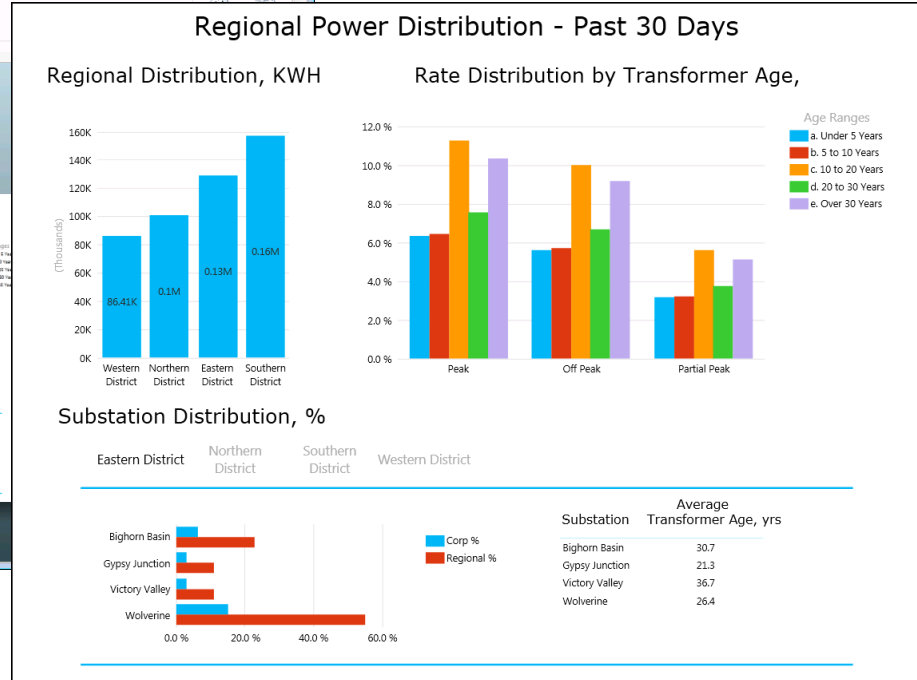
## Demo Environment

- Local PI Server with an AF Database representing oil inventories in various locations
- PI OLEDB Enterprise
- Excel 2010 with the PowerPivot AddIn



# SharePoint 2010 Enterprise – PowerView

The screenshot shows a SharePoint 2010 PowerView dashboard titled "Distribution Profile". The dashboard includes a navigation pane on the left with sections for Libraries, Lists, Discussions, and Recycle Bin. The main content area displays several charts and tables related to power distribution. A large chart titled "Regional Power Distribution - Past 30 Days" is the central focus, showing regional distribution in KWH and rate distribution by transformer age. Below it, there are smaller charts for "Substation Distribution, %" and "Substation Distribution, %".



# PowerView Reports in PowerPoint

**Power View**  
Microsoft SQL Server Reporting Services  
Version 11.0.2100.60  
© 2012 Microsoft Corporation. All rights reserved.

**Export to PowerPoint**

**Diagnostics**  
[Sync diagnostic information with the server.](#)  
Not synced during this session.

**Substation Distribution, %**

Substation	Eastern District	Northern District	Southern District	Western District
Highway Basin	~10%	~15%	~20%	~25%
Golden Junction	~15%	~20%	~25%	~30%
Valley Valley	~20%	~25%	~30%	~35%
Walden	~25%	~30%	~35%	~40%

**Substation Transformer Condition and Benchmarking**

Substation	Average Transformer Age, yrs
Highway Basin	22.7
Golden Junction	23.2
Valley Valley	26.7
Walden	26.8

**Power View Slides - Microsoft PowerPoint**

File Home Insert Design Transitions Animations Slide Show Review View Add-Ins

Clipboard Slides Font Paragraph Drawing Editing

1. Regional Power Distribution - Past 30 Days

2. Power Distribution Profile - Past 30 Days

3. Substation Transformer Condition and Benchmarking

Slide Sorter "Office Theme" 100%

# Additional Information

## OSIsoft Resources

- “Business Analytics with your PI System Data using Microsoft PowerPoint”
- PI T&D Users Group Site [extranet.osisoft.com](http://extranet.osisoft.com)
- OSIsoft vCampus [vcampus.osisoft.com](http://vcampus.osisoft.com)

## Microsoft Resources

- [www.microsoft.com/en-us/bi/powerpivot.aspx](http://www.microsoft.com/en-us/bi/powerpivot.aspx)

## Helpful Books

- “PowerPivot for the Data Analyst”, Bill Jelen
- “Practical PowerPivot & DAX Formulas for Excel 2010”, Art Tennick

The screenshot shows a presentation slide with the OSIsoft logo at the top left. The title is "Business Analytics with your PI System Data Using Microsoft PowerPoint". Below the title, it says "2011 OSIsoft T & D Users Group Meeting" and "September 23, 2011, Philadelphia". The author is identified as "Curt Hertler, Marketing Manager, OSIsoft, LLC" with the email "cuh@osisoft.com". The slide content includes an "I. Overview" section that discusses the release of PI OLEDB Enterprise and Microsoft PowerPivot for Excel 2010, highlighting their combined capabilities for advanced data analysis and enterprise awareness. It also mentions that the document is organized into five sections, starting with the PI Asset Framework (AF) structure. At the bottom of the slide, there is a table titled "30 Day Substation Power Distribution Report" and a bar chart titled "Regional Distribution by Weekdays".

Asset	Region	Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Substation	Region 1	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 2	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 3	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 4	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 5	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 6	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 7	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 8	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 9	Week 1	1000	1000	1000	1000	1000	1000	1000
Substation	Region 10	Week 1	1000	1000	1000	1000	1000	1000	1000

# OSIsoft Virtual Campus (vCampus)

- **Online, community-oriented** program
  - Software + Resources + Collaboration
  - Focus on development and integration
  - Partners, customers and OSIsoft
  - Exclusive contents (CTPs, Betas, technical papers)
- Personal **development PI System**
  - Development licenses for PI Data Access products (for developers and integrators)



<http://vCampus.osisoft.com>  
[vCampus@osisoft.com](mailto:vCampus@osisoft.com)





# vCampus Live! 2012

WHERE PI GEEKS MEET



**Week of November 26<sup>th</sup>**

**Grand Hyatt Union Square, San Francisco**

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OSIsoft Senior Developer



# THANK YOU

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