OSIsoft.

REGIONAL SEMINAR 2012

APAC

The Power of Data

MALAYSIA

Explore and Expose your Data with PI Data Access and Business Intelligence

Presented by **Han Yong Lee**

Exploring and Exposing Data

Gain **visibility** into the right data, at the right place, at the right time

How?

Need an easy way to **disseminate** information

Business Challenges

Disparate systems	• Acquired independently, over time • Different departments/units
Domain, industry, or user-specific needs	• PI System is an infrastructure
Many different targets	• Diverse types of workers • Different platforms, media

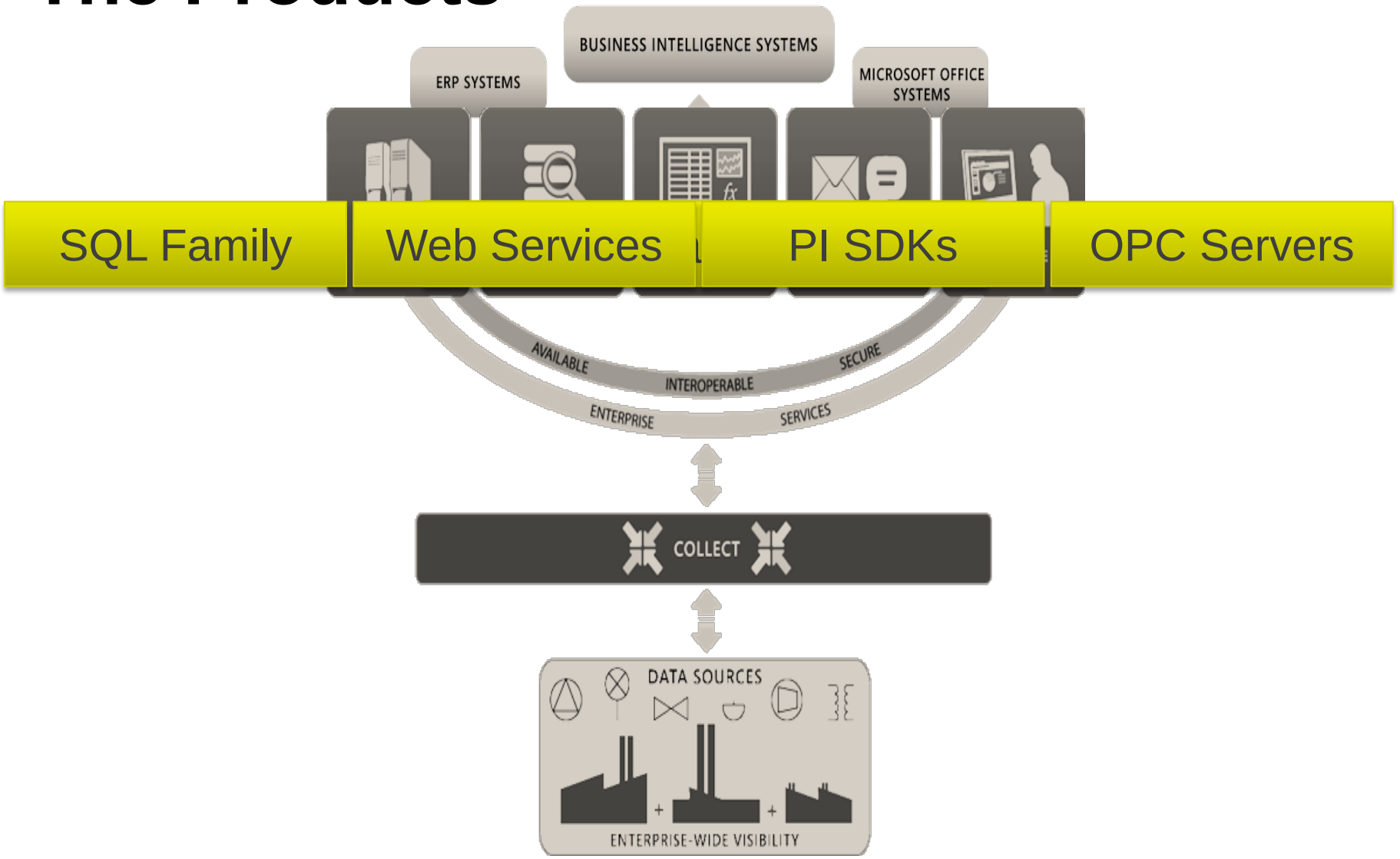
A few use cases, some ideas

- LoB Systems/Databases
- Orchestration/Workflows
- Web/Non-Windows Platforms
- Analysis/BI/Reporting
- Custom Applications

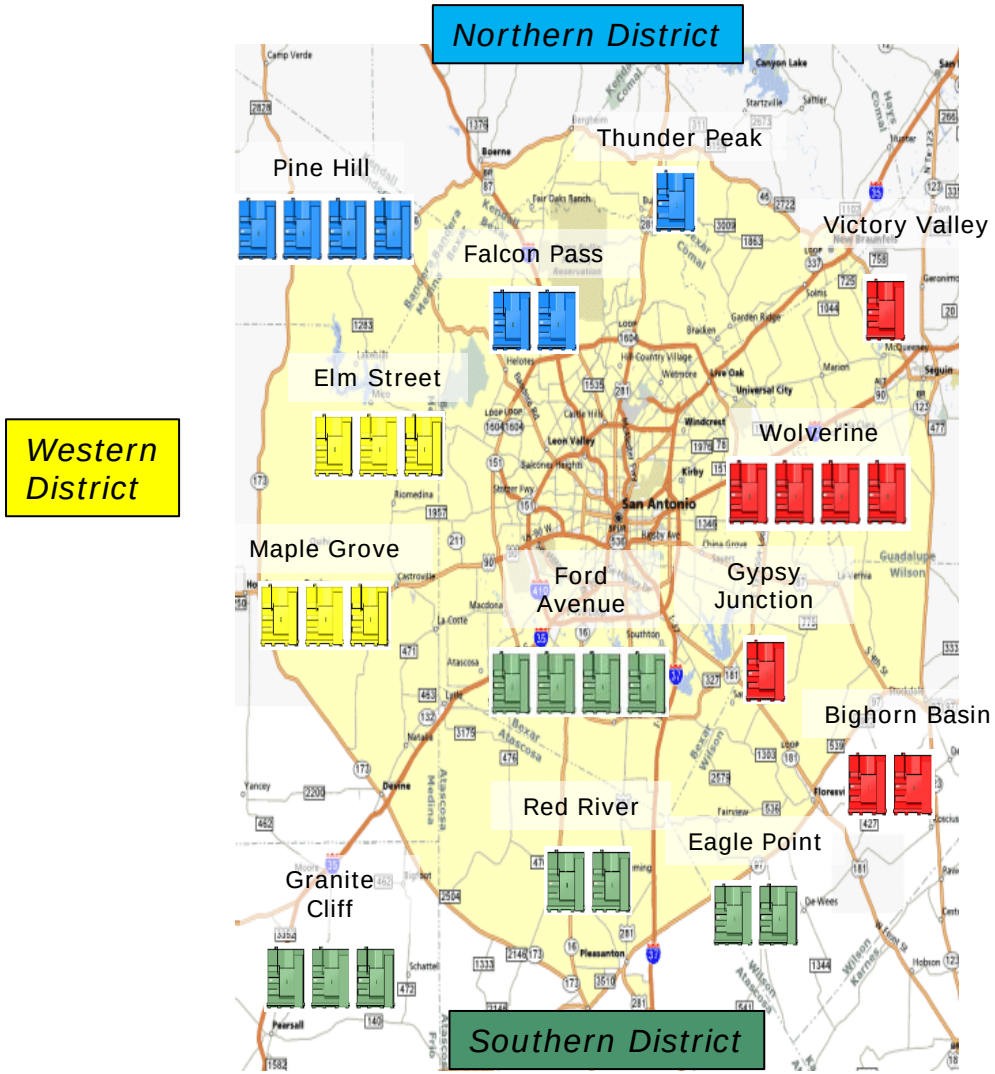
Custom Downtime Analysis Engine

Automated Ordering to Suppliers

The Products



Example: Substation Power Distribution Profile



My Objectives

- Profile 30 day Power Distribution
- Filter and Analyze by [illegible]ion and Rate Period
- Aging Asset Risk Assessment

Business Analytics Toolkit

OSIsoft. | Microsoft

Microsoft Excel 2010

Microsoft SQL Server 2012 Business Intelligence

Microsoft SharePoint 2010 Enterprise

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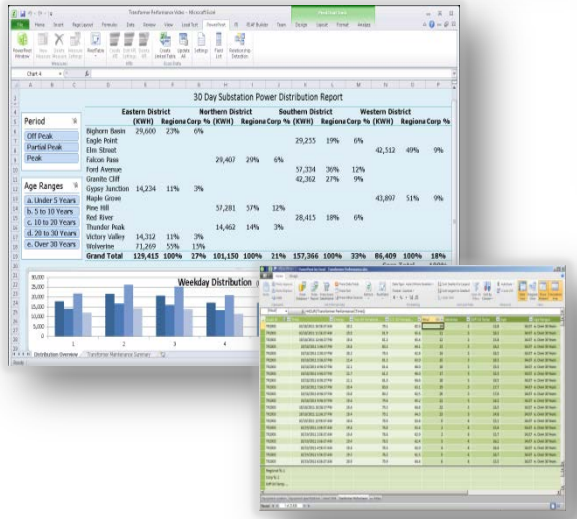
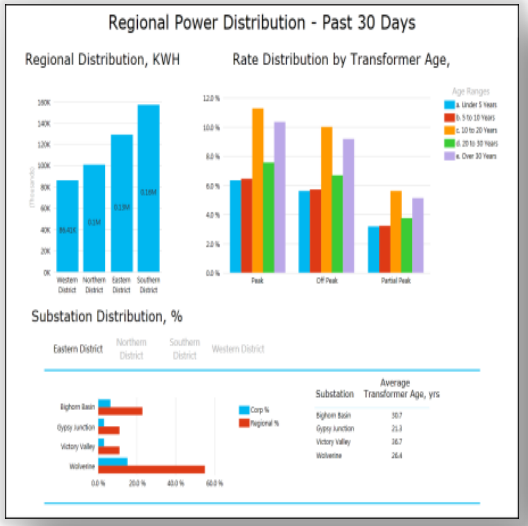
PI Server

PI OLEDB Enterprise



PowerPivot for Excel 2010

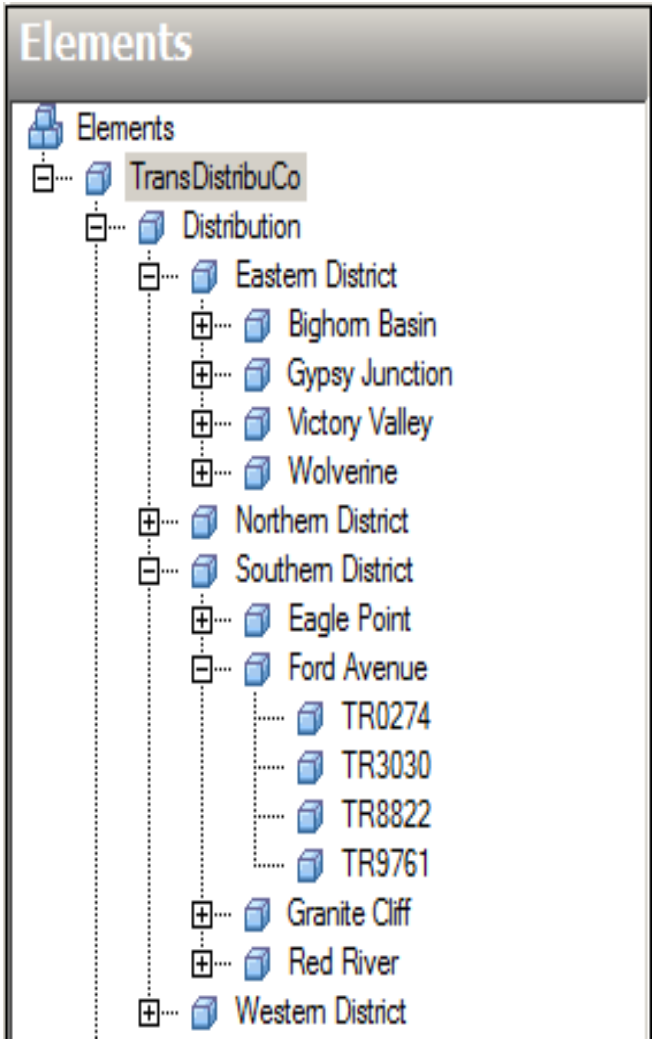


Power View

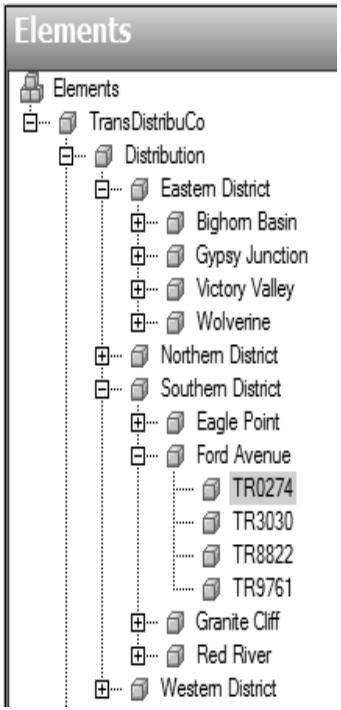
PI Server – *PI Asset Framework*

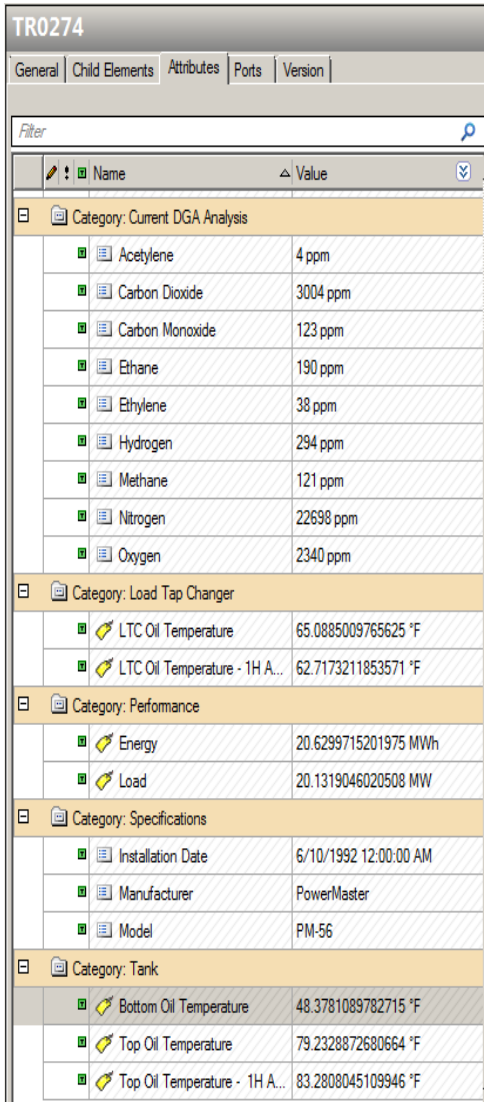
Asset Hierarchy

- District
- Substation
- Transformer



PI Server – *PI Asset Framework*





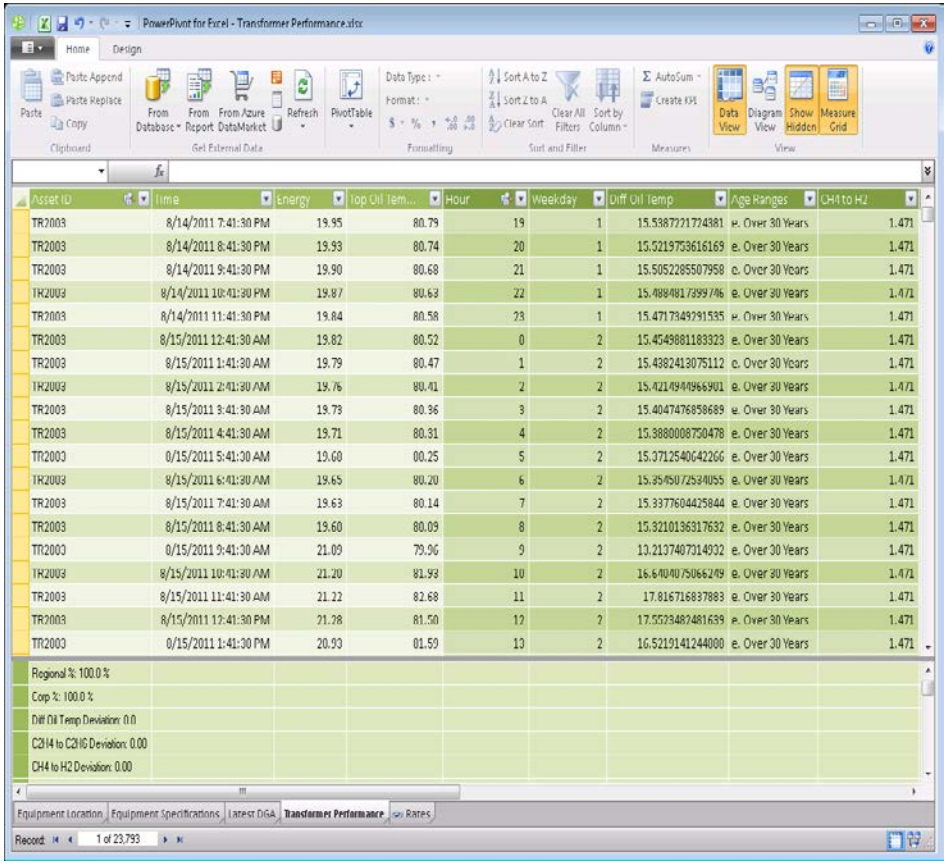
Transformer Attributes

- PI System Data
- Equipment Specifications
- DGA analysis

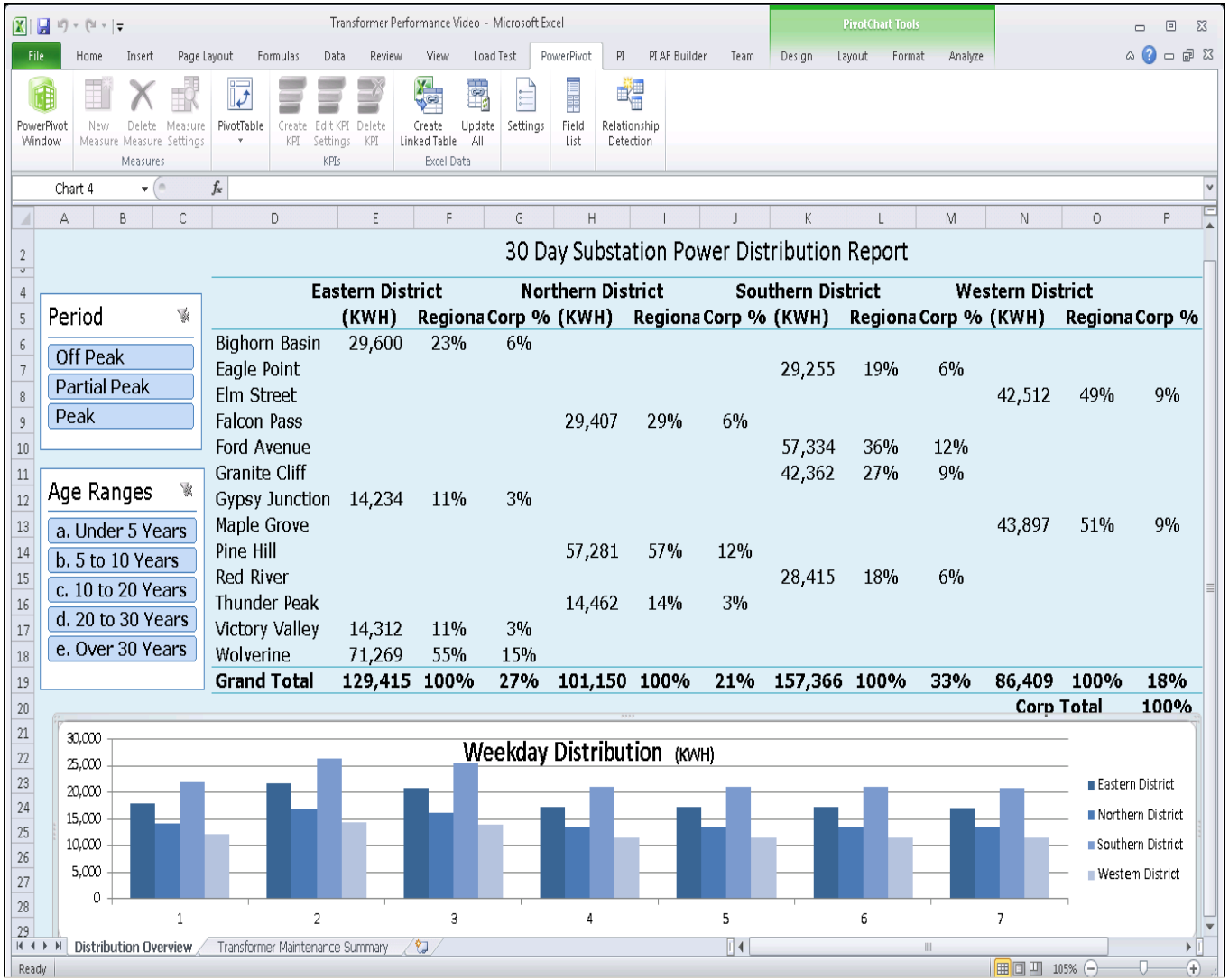
PI OLEDB Enterprise

Important Considerations

- Leverage structure used throughout your PI Infrastructure
- Insure accurate aggregation of real-time events
- Scale-up by adding PI AF Structure
- Access Event Frames in next release



PowerPivot for Excel 2010



Power Distribution Report

Transformer Performance - Microsoft Excel

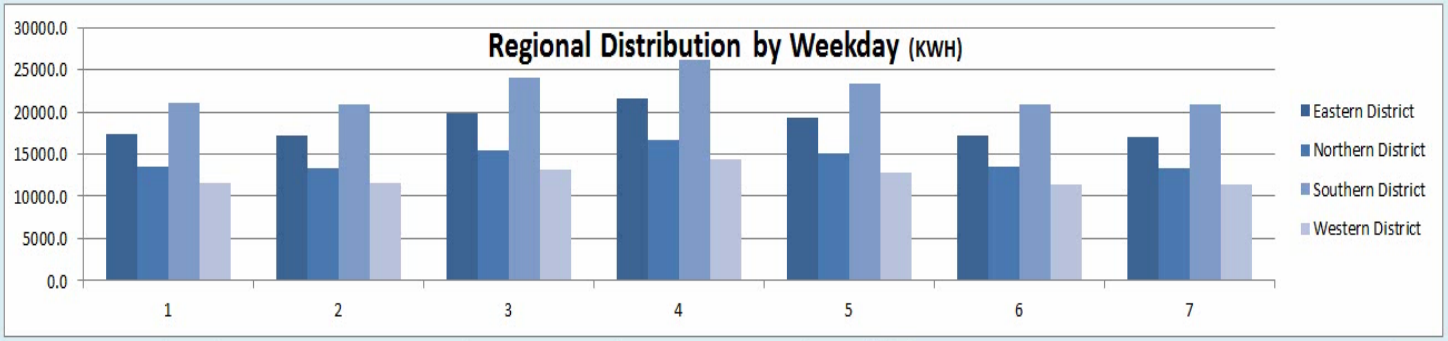
File | Home | Insert | Page Layout | Formulas | Data | Review | View | Add-Ins | PowerPivot | PI AF Builder

30 Day Substation Power Distribution Report

Period
- Off Peak
- Partial Peak
- Peak

Age Ranges
- a. Under 5 Years
- b. 5 to 10 Years
- c. 10 to 20 Years
- d. 20 to 30 Years
- e. Over 30 Years

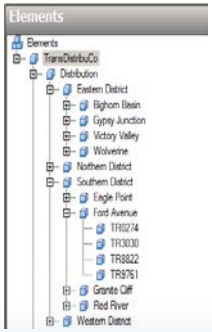
	Eastern District			Northern District			Southern District			Western District		
	(KWH)	Regional %	Corp %	(KWH)	Regional %	Corp %	(KWH)	Regional %	Corp %	(KWH)	Regional %	Corp %
Bighorn Basin	29,606	22.9%	6.2%									
Eagle Point							29,275	18.6%	6.2%			
Elm Street										42,377	49.2%	8.9%
Falcon Pass				29,263	28.9%	6.2%						
Ford Avenue							57,612	36.5%	12.1%			
Granite Cliff							42,389	26.9%	8.9%			
Gypsy Junction	14,135	10.9%	3.0%									
Maple Grove										43,763	50.8%	9.2%
Pine Hill				57,428	56.8%	12.1%						
Red River							28,365	18.0%	6.0%			
Thunder Peak				14,405	14.2%	3.0%						
Victory Valley	14,417	11.1%	3.0%									
Wolverine	71,315	55.1%	15.0%									
Grand Total	**129,473**	**100.0%**	**27.3%**	**101,097**	**100.0%**	**21.3%**	**157,641**	**100.0%**	**33.2%**	**86,140**	**100.0%**	**18.2%**
											Corp Total	**100.0%**

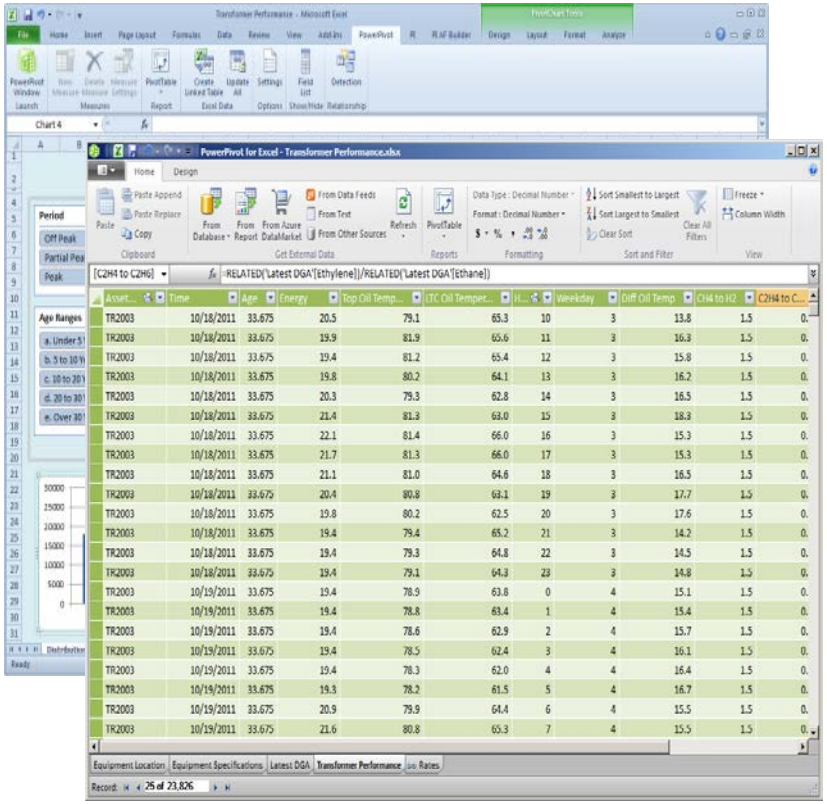


Distribution Overview | Rates | Transformer Maintenance Summary | Measures Illustration | Data for Distribution Overvi | Sheet2

Ready

PowerPivot Enables Data Integration





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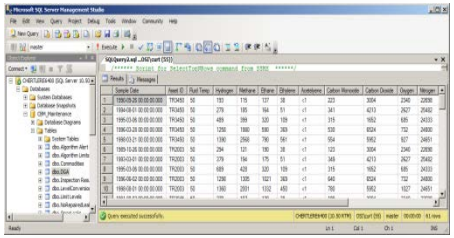
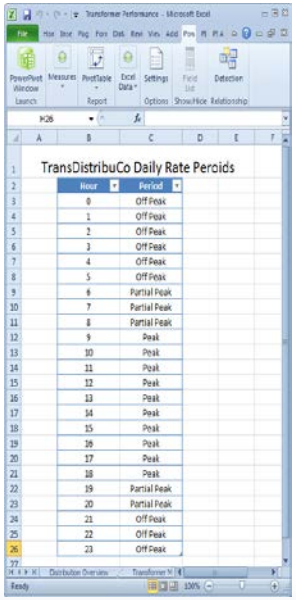
PI Server
PI OLEDB Enterprise

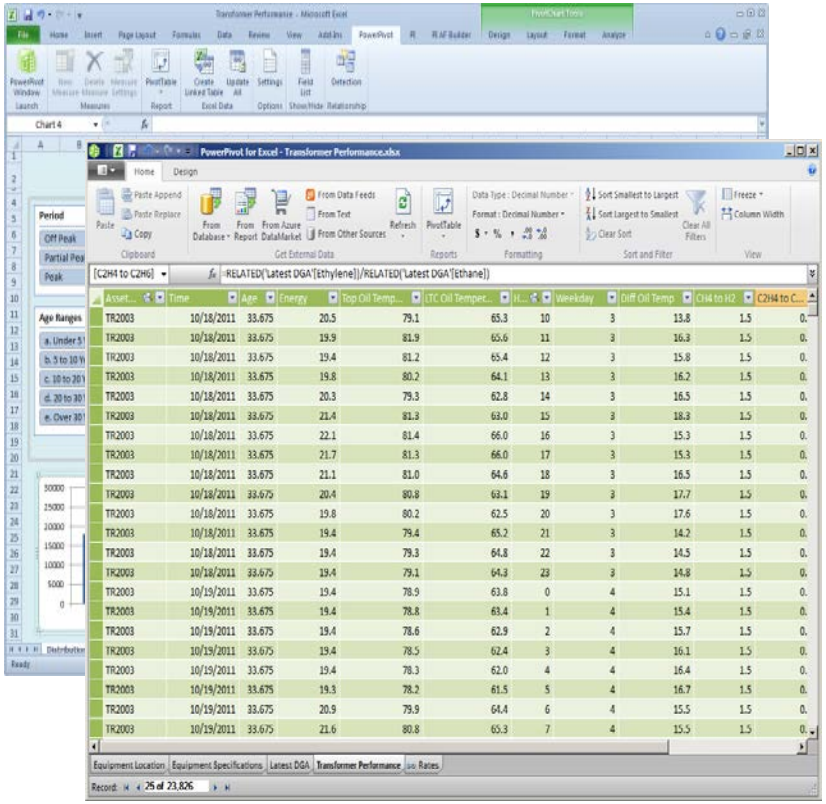




Microsoft SQL Server 2012 Business Intelligence

Microsoft Excel 2010

PowerPivot Enables Data Integration



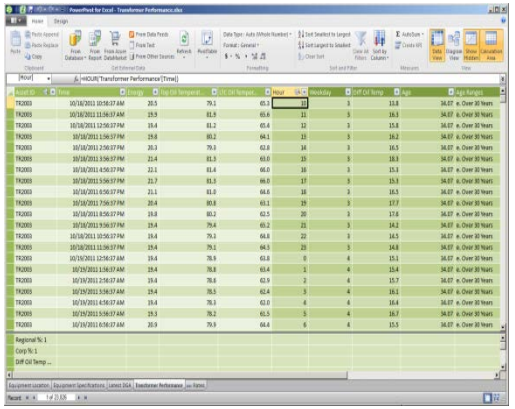
Can I use DataLink?

- Manual refresh step required to copy and paste values
- Limited to ~1 million rows
- No support for upsizing to SQL Analysis Services 2012

Microsoft® Excel 2010

PowerPivot Enables Extended Analysis

DAX – Data Analysis Expression Language



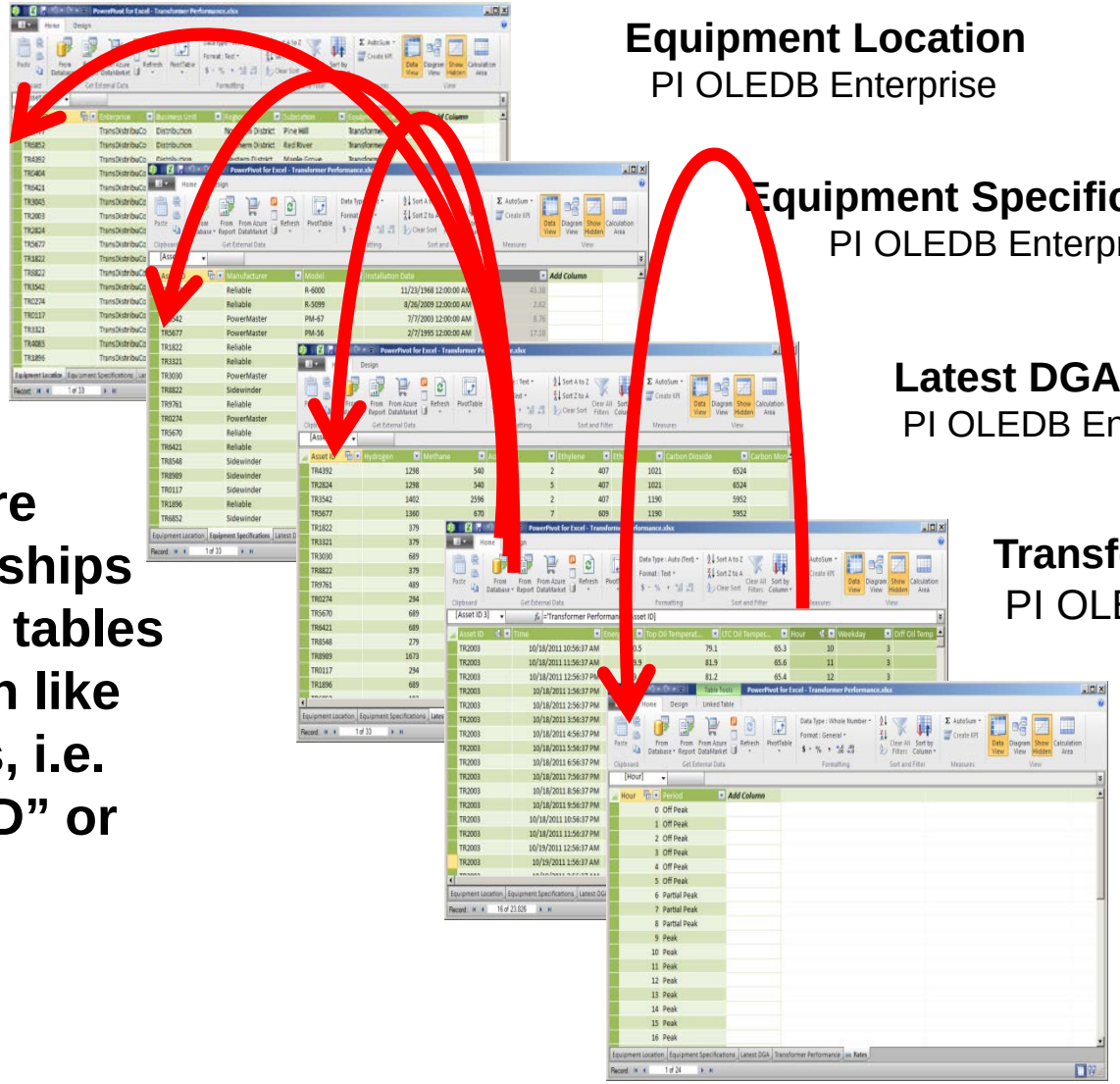
Transformer Age Column

=YEARFRAC('Equipment Specifications'[Installation Date],NOW())

Transformer Age Ranges Column

=IF('Transformer Performance'[Age]>30,"e. Over 30 Years", IF('Transformer Performance'[Age]>20,"d. 20 to 30 Years",IF('Transformer Performance'[Age]>10,"c. 10 to 20 Years",IF('Transformer Performance'[Age]>5,"b. 5 to 10 Years","a. Under 5 Years"))))

PowerPivot Creates the “Cube”



Equipment Location
PI OLEDB Enterprise

Equipment Specifications
PI OLEDB Enterprise

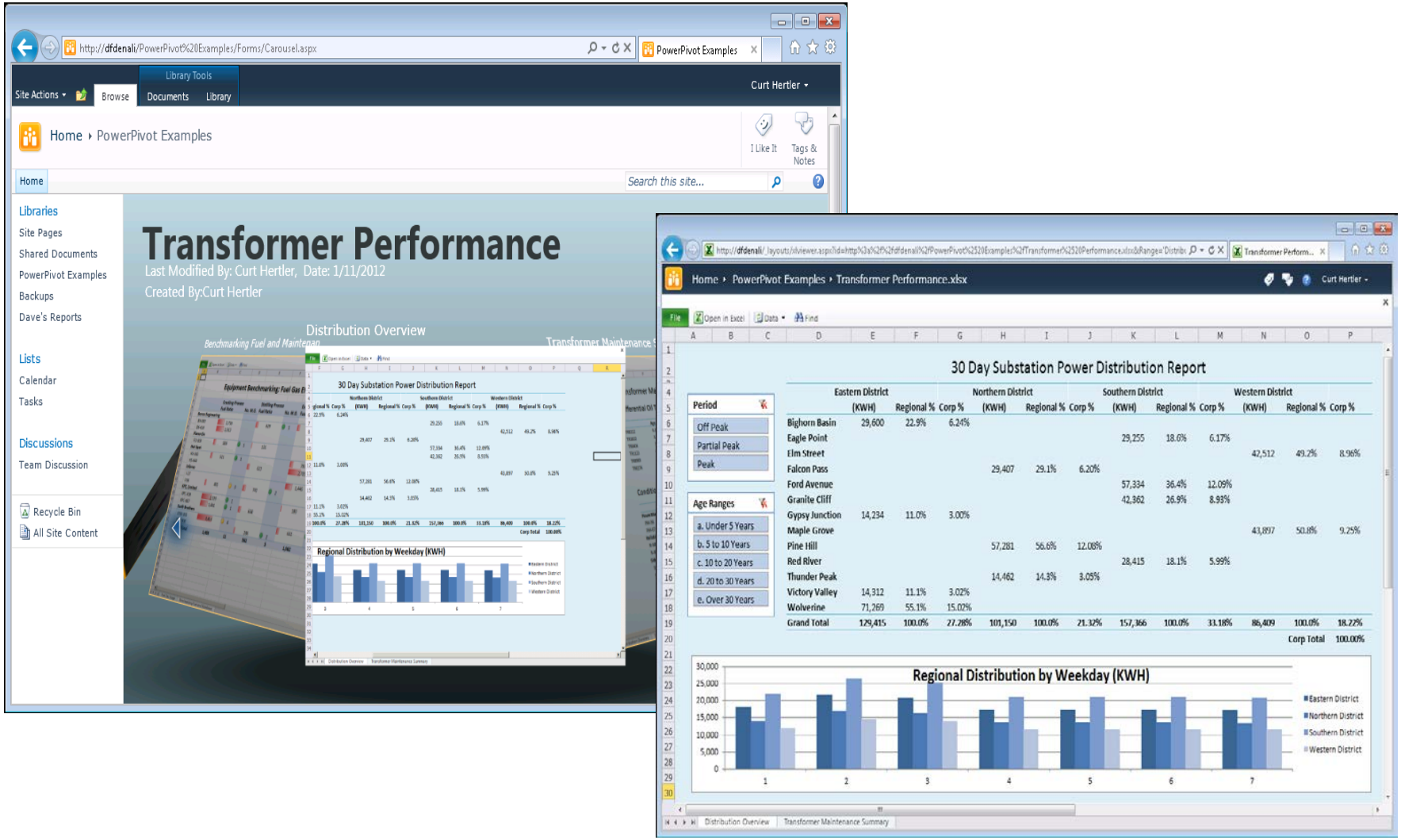
Latest DGA
PI OLEDB Enterprise

Transformer Performance
PI OLEDB Enterprise

Rates
Excel Linked Table

Configure Relationships between tables based on like columns, i.e. “Asset ID” or “Hour”

SharePoint 2010 Enterprise – *PowerPivot Gallery*



Additional Information

OSIsoft Resources

- "Business Analytics with your PI System Data using Microsoft PowerPivot"
- PI T&D Users Group Site extranet.osisoft.com
- OSIsoft vCampus vcampus.osisoft.com

Microsoft Resources

- www.microsoft.com/en-us/bi/powerpivot.aspx

Helpful Books

- "PowerPivot for the Data Analyst", Bill Jelen
- "Practical PowerPivot & DAX Formulas for Excel 201 Art Tennick

How to get PI Data Access

- products *it all)*
- **time** licenses *l)*

```
AFTimeRange tr = new AFTimeRange(new AFTime(tex
AFValues vals = _afDB.Elements["Pump123"].Attri

lstValues.Items.Clear();
foreach(AFValue val in vals)
{
    lstValues.Items.Add(val.Value.ToString() +
}
```

=

=

PI System Access (PSA)

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

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vCampus Live! 2012

Week of November 26th

Grand Hyatt Union Square, San Francisco

Han Yong Lee

hanyong@osisoft.com
vCampus Support Engineer
OSIsoft, LLC

Website: http://vCampus.osisoft.com
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