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REGIONAL SEMINARS 2012

The Power of Data

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Business Analytics with Microsoft SQL Server 2012 and the PI System

Presented by **Sam Pride**

Centre of Excellence Engineer, OSIsoft Australia

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Overview

- Business Analytics Toolkit
- Example: "*Substation Power Distribution Profile*"
  - ***Business Context*** - PI Asset Framework (PI AF)
  - ***Data Access*** - PI OLEDB Enterprise
  - ***Analytic Reporting*** - PowerPivot for Excel 2010
  - ***Ad Hoc Analytics and Reporting*** - Power View
- Power View Integration with PowerPoint
- Project Rubik
- Additional Resources

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Engineers

Self service access

Managers

Always up to date when I need it.

IT

Secure and easy to manage.

Analysts

In the applications that I use.

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Business Analytics Toolkit

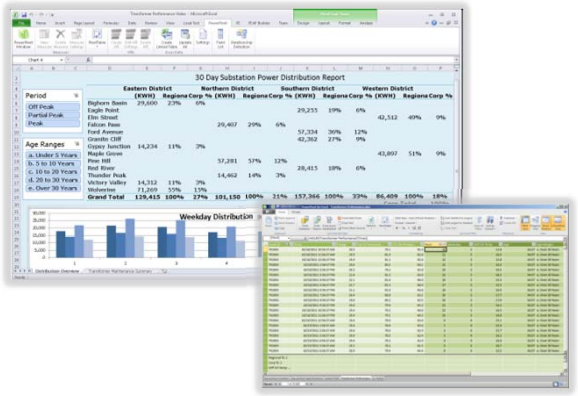
OSIsoft. | Microsoft

Microsoft® Excel® 2010

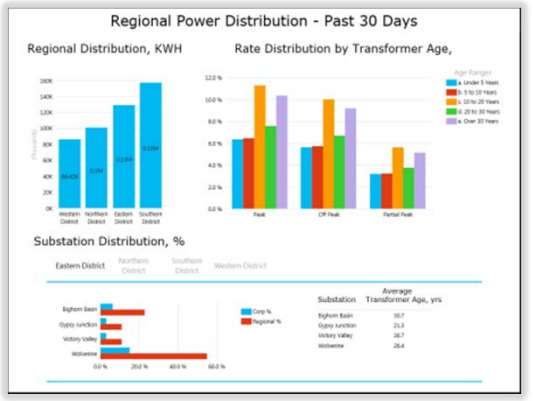
Microsoft® SQL Server® 2012 Business Intelligence

Microsoft® SharePoint® 2010 Enterprise

OSIsoft.
PI Server
PI OLEDB Enterprise



PowerPivot for Excel 2010



Power View

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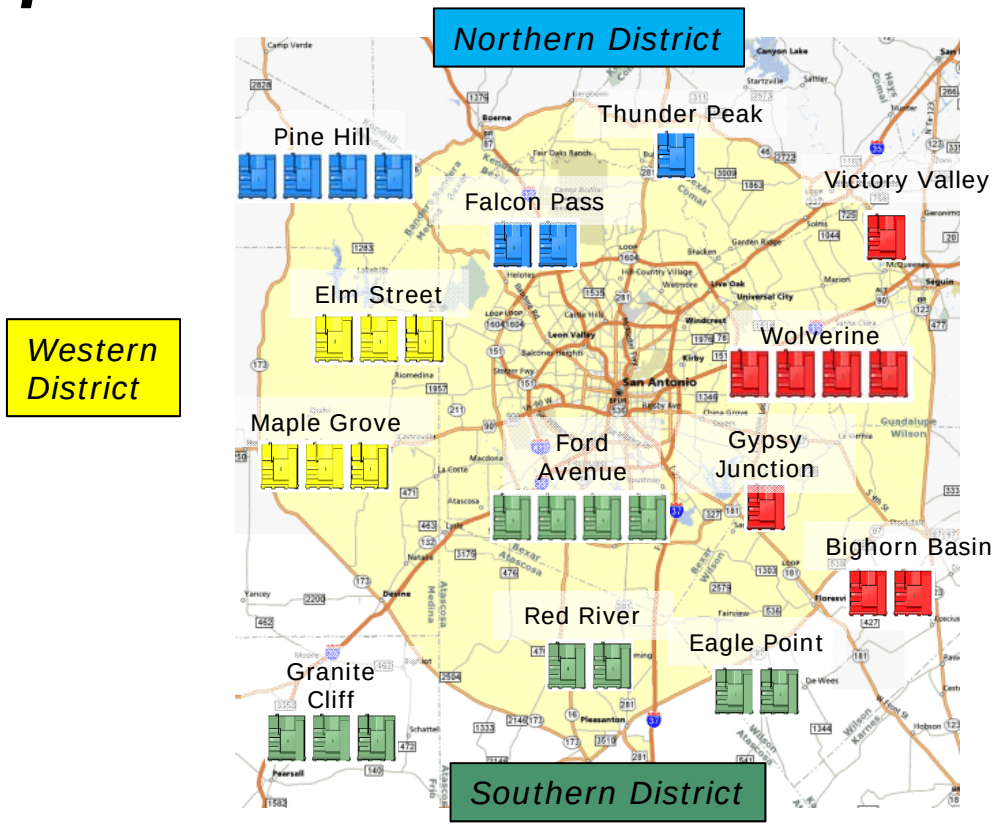
Example: Substation Power Distribution Profile



My Objectives

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

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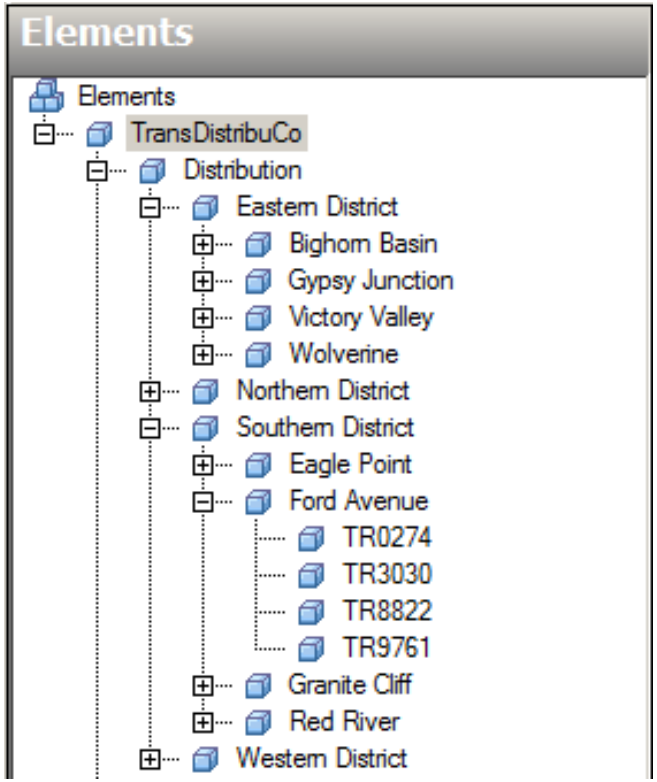
PI Server – *PI Asset Framework*

Asset Hierarchy

- District
- Substation
- Transformer



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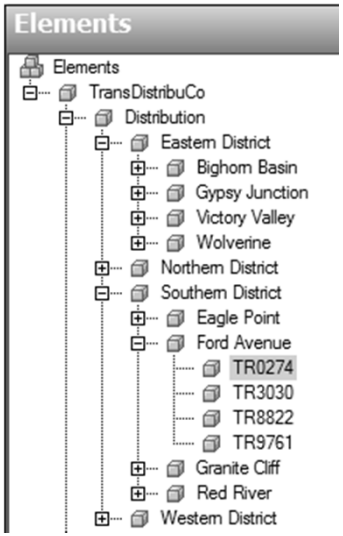
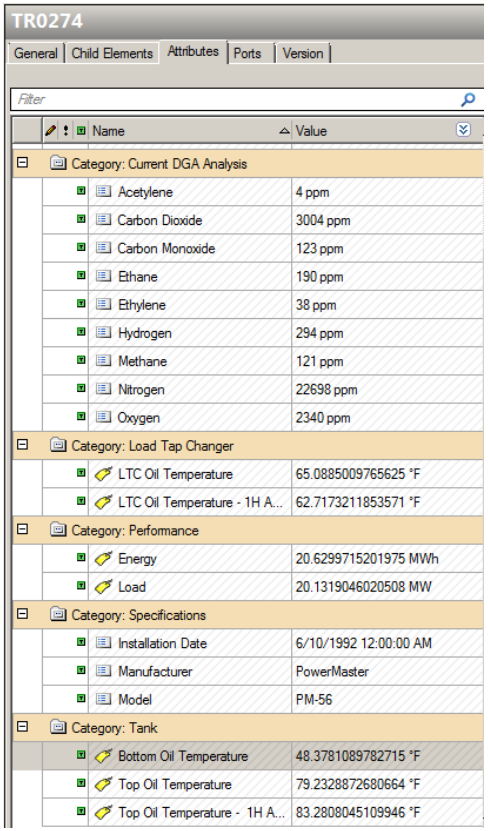
PI Server – *PI Asset Framework*





Transformer Attributes

- PI System Data
- Equipment Specifications
- DGA analysis

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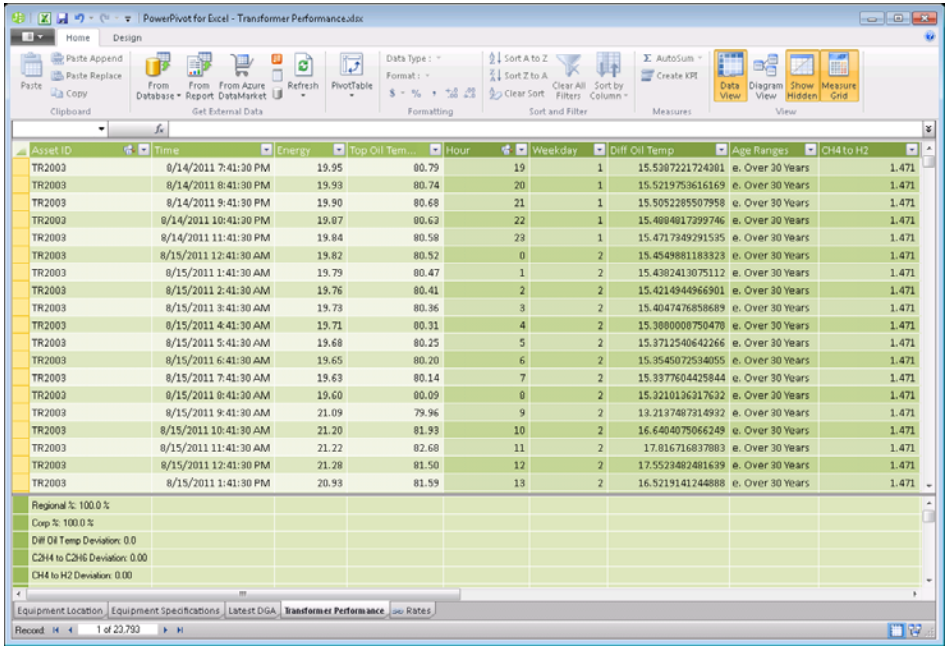
PI OLEDB Enterprise

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



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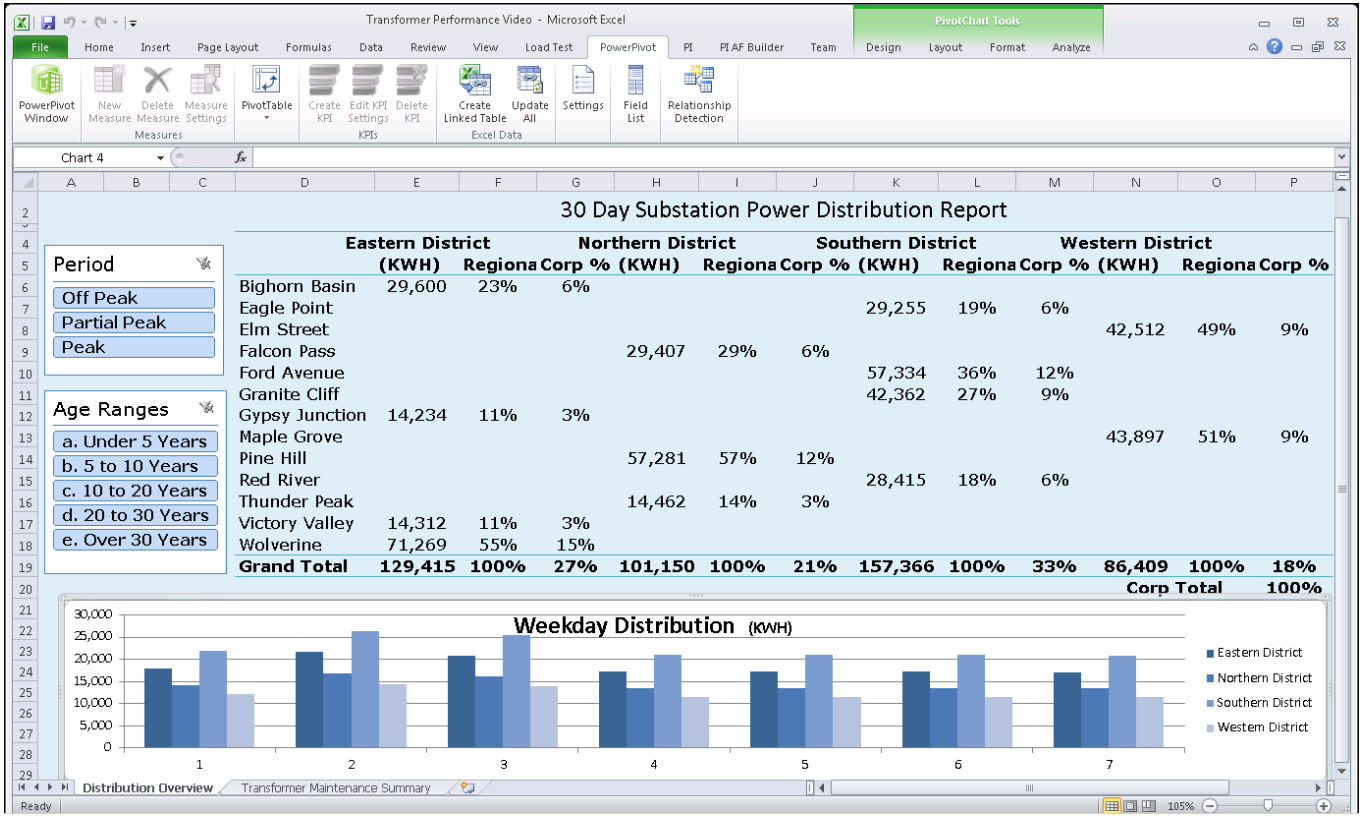
PowerPivot for Excel 2010



	Eastern District			Northern District			Southern District			Western District		
	(KWH)	Regiona	Corp %	(KWH)	Regiona	Corp %	(KWH)	Regiona	Corp %	(KWH)	Regiona	Corp %
Bighorn Basin	29,600	23%	6%									
Eagle Point							29,255	19%	6%			
Elm Street										42,512	49%	9%
Falcon Pass				29,407	29%	6%						
Ford Avenue							57,334	36%	12%			
Granite Cliff							42,362	27%	9%			
Gypsy Junction	14,234	11%	3%									
Maple Grove										43,897	51%	9%
Pine Hill				57,281	57%	12%						
Red River							28,415	18%	6%			
Thunder Peak				14,462	14%	3%						
Victory Valley	14,312	11%	3%									
Wolverine	71,269	55%	15%									
Grand Total	**129,415**	**100%**	**27%**	**101,150**	**100%**	**21%**	**157,366**	**100%**	**33%**	**86,409**	**100%**	**18%**
											Corp Total	**100%**

Power Distribution Report

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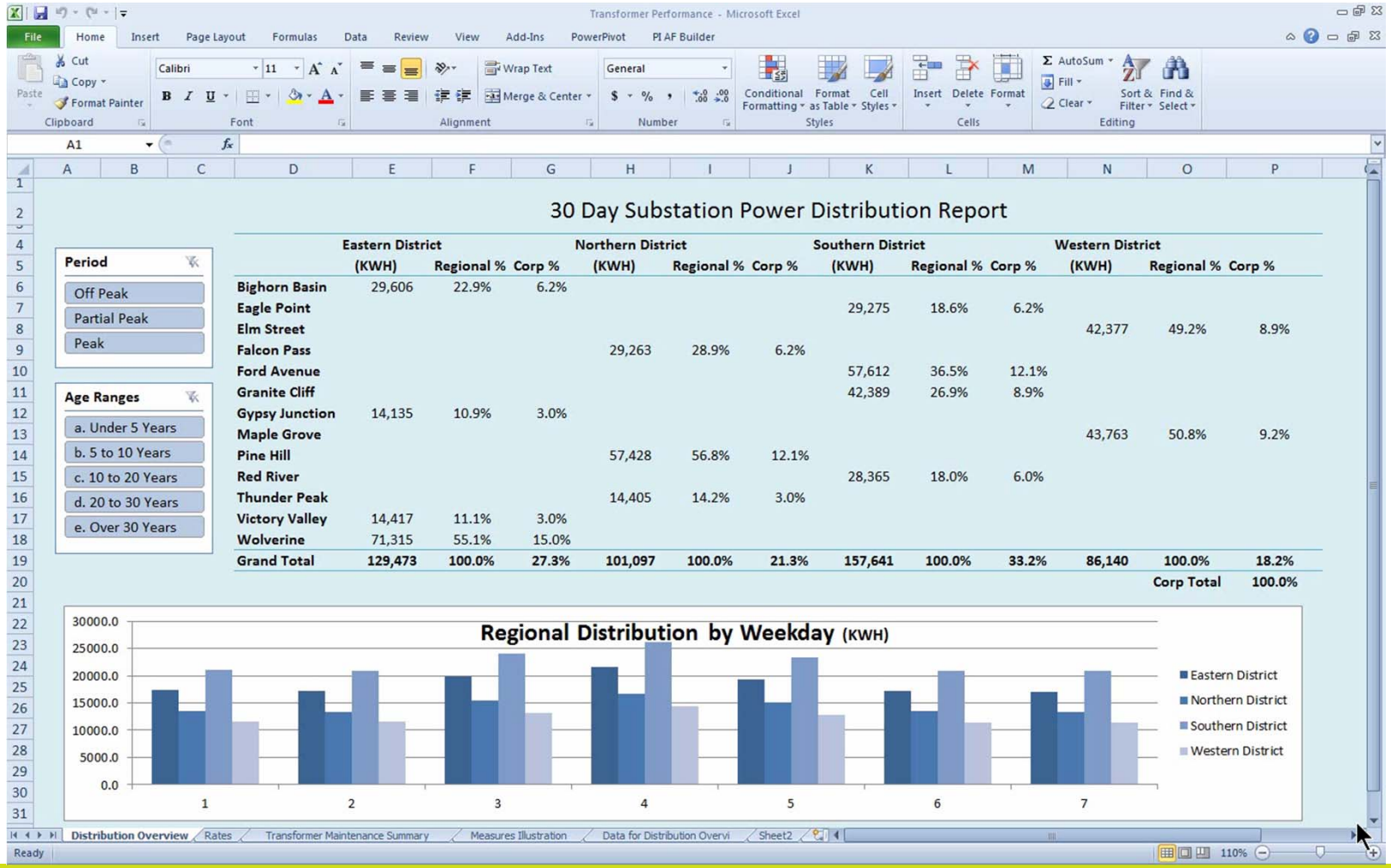

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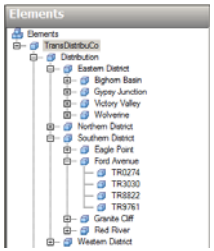
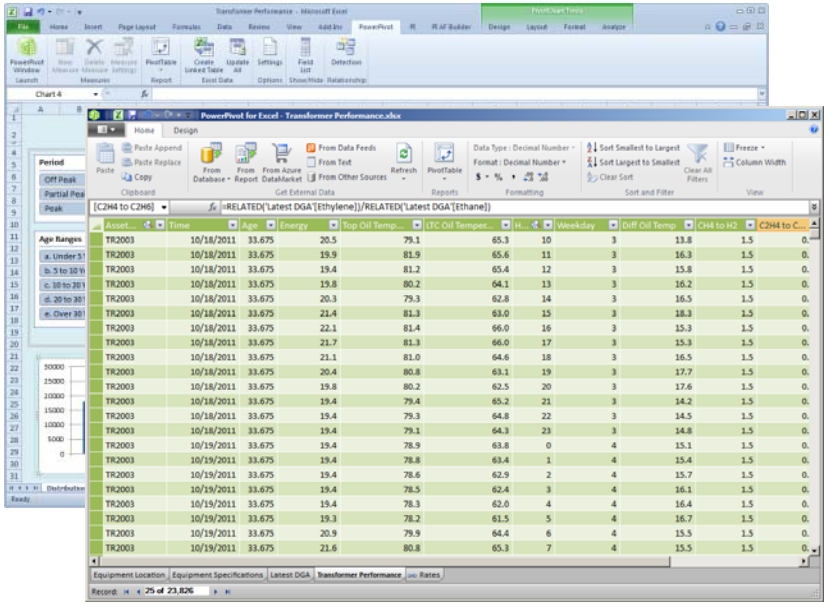
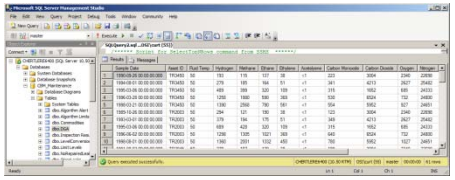
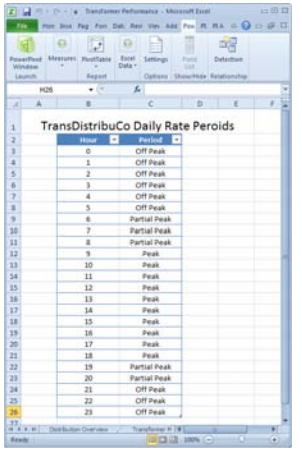
PowerPivot Enables Data Integration









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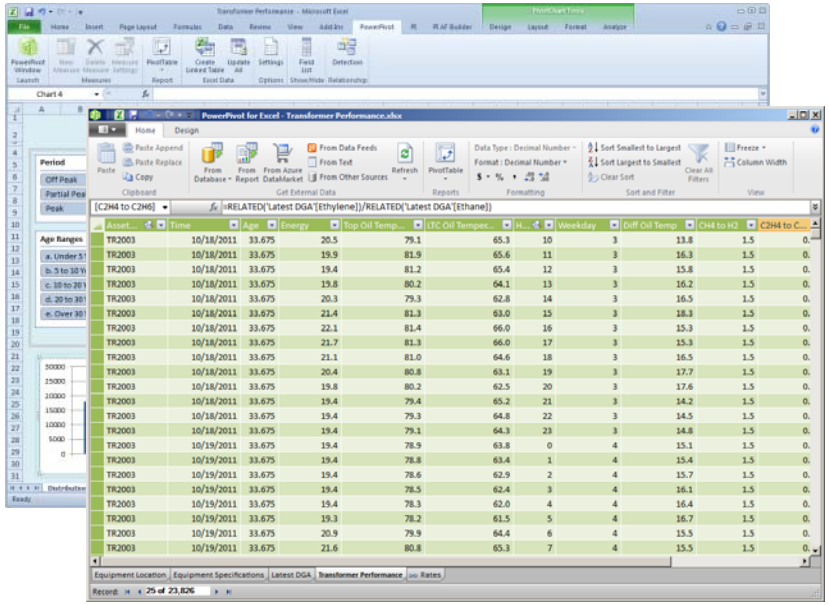
PowerPivot Enables Data Integration



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

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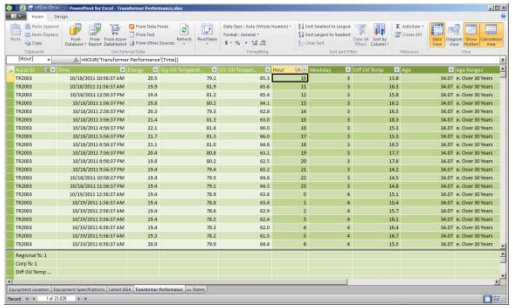
PowerPivot Enables Extended Analysis

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"))))

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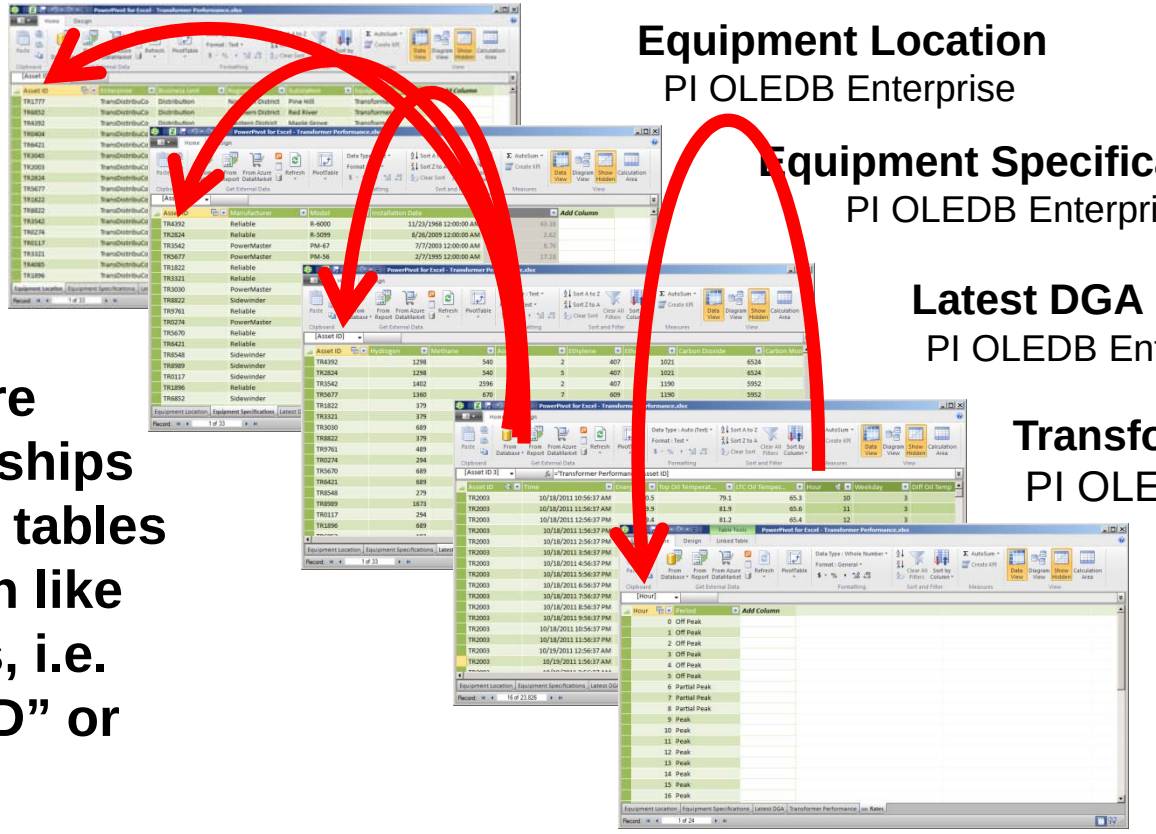
PowerPivot Creates the “Cube”



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”

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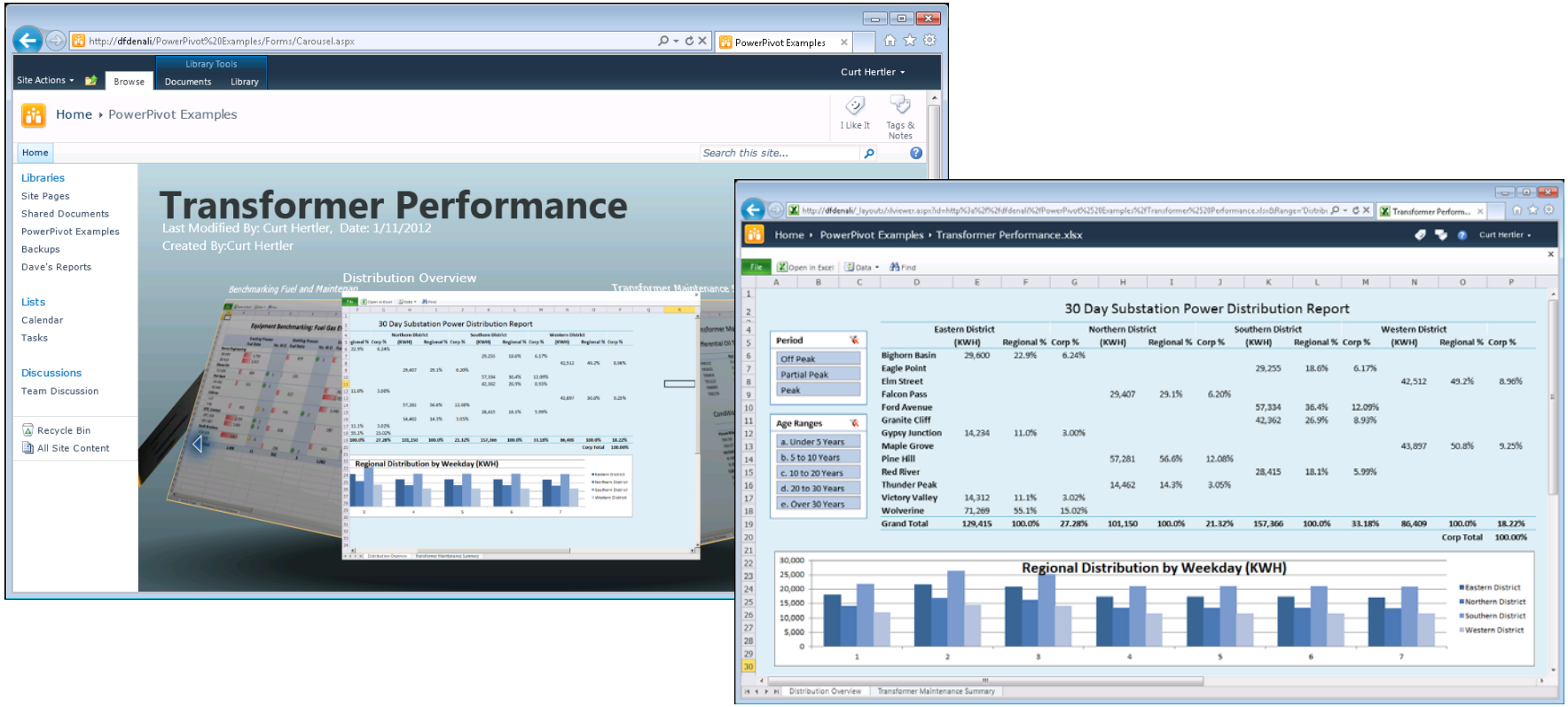
SharePoint 2010 Enterprise – *PowerPivot Gallery*



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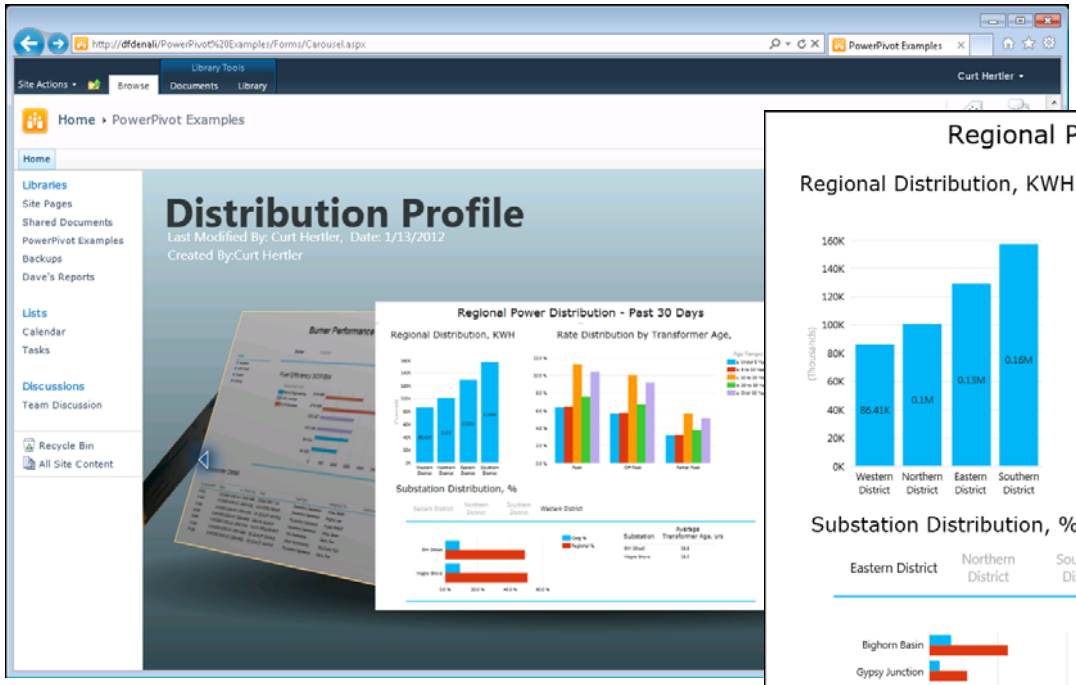
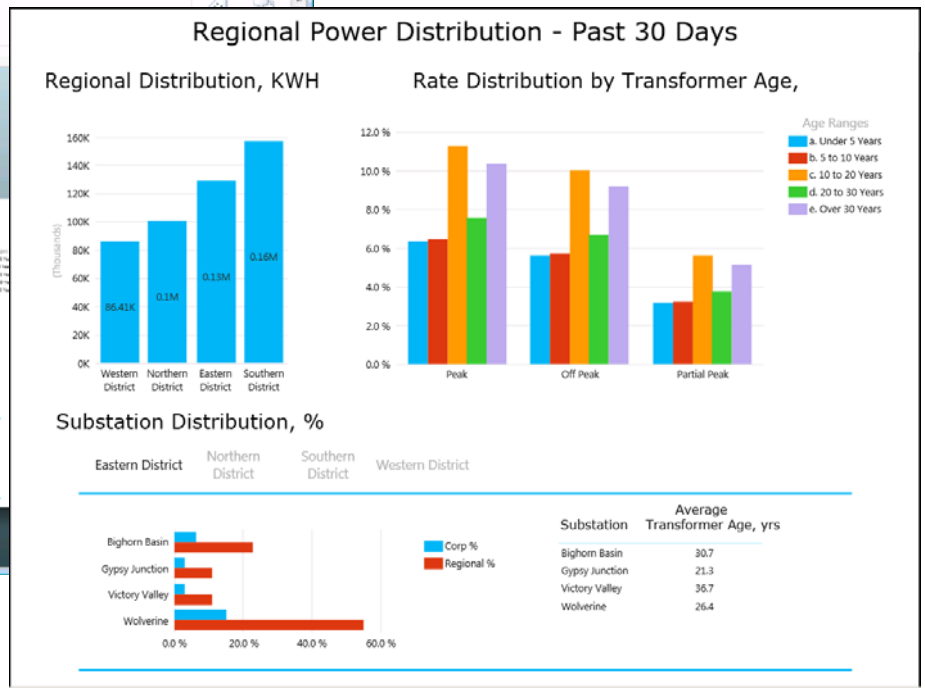
SharePoint 2010 Enterprise – *Power View*





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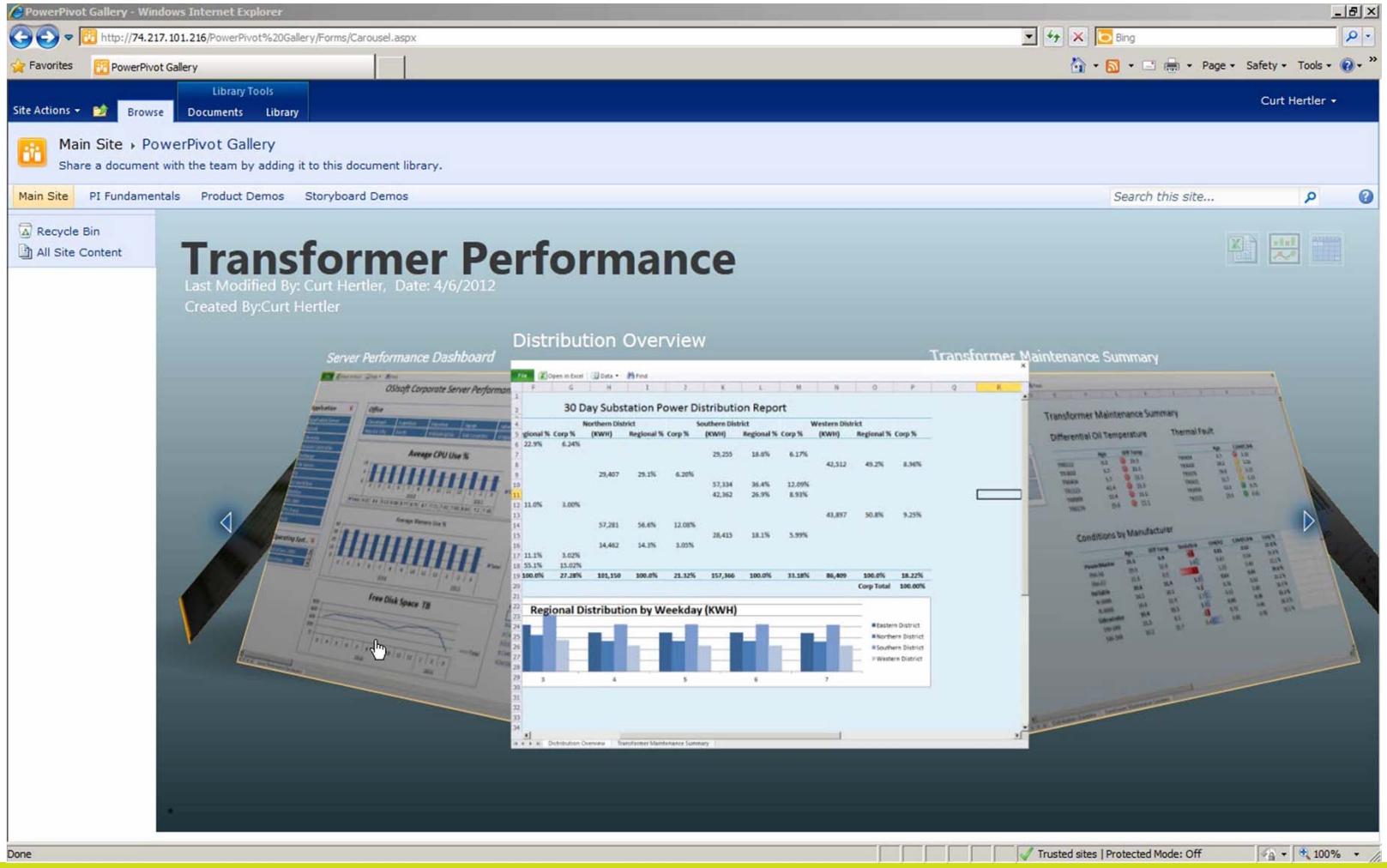

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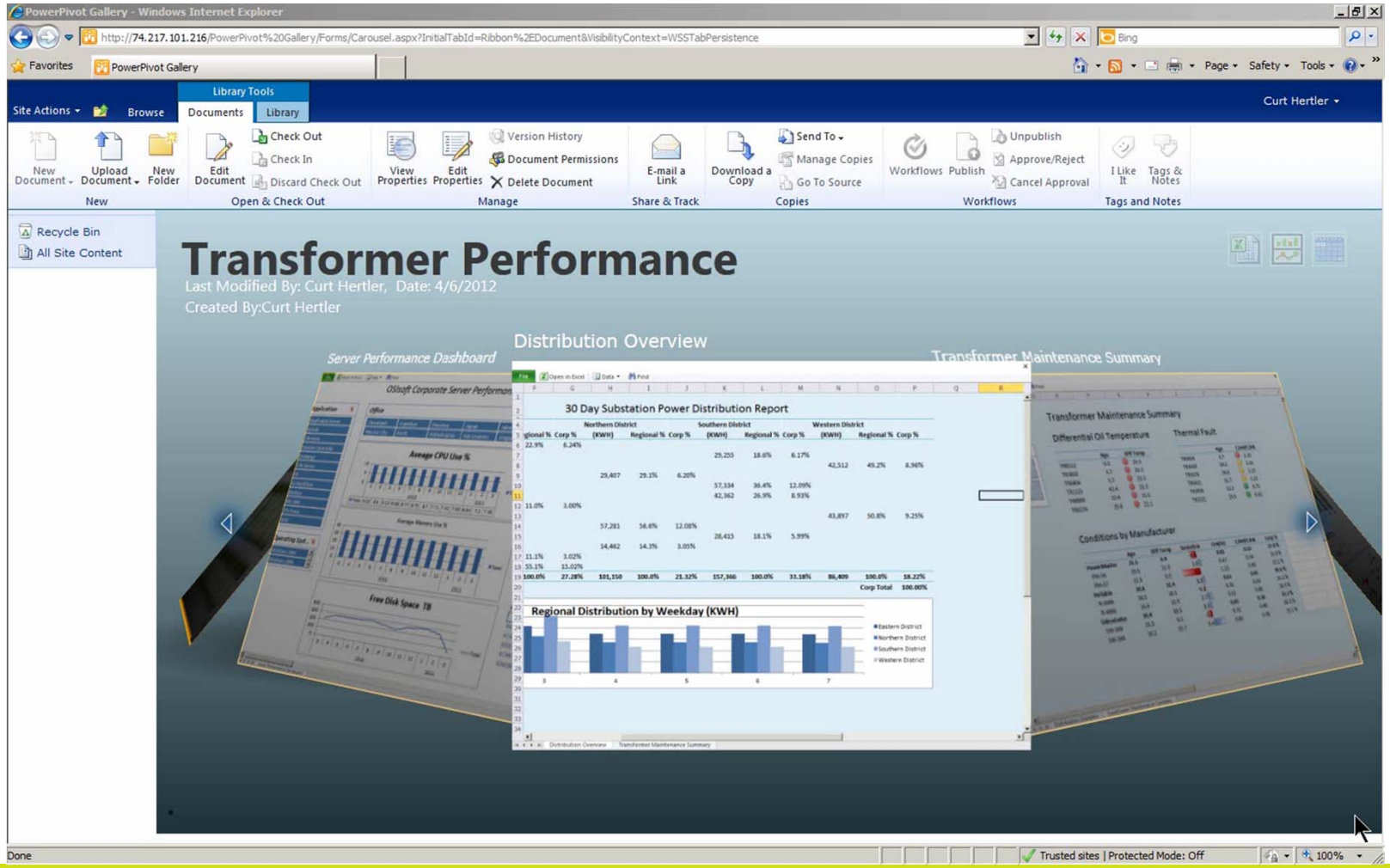

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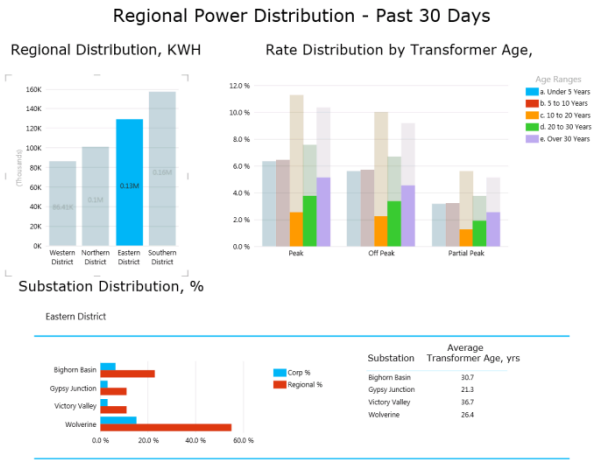
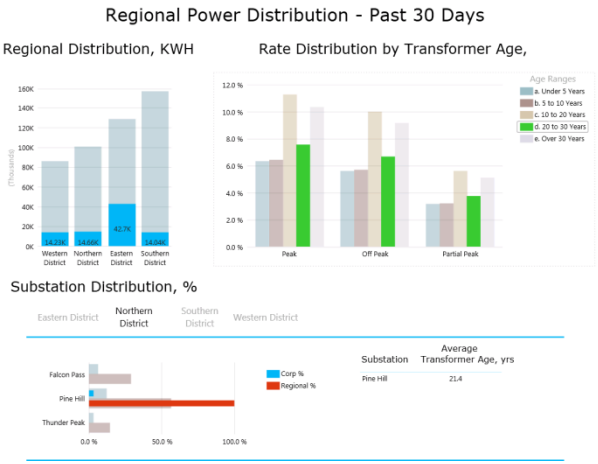
Microsoft SQL 2012 Power View

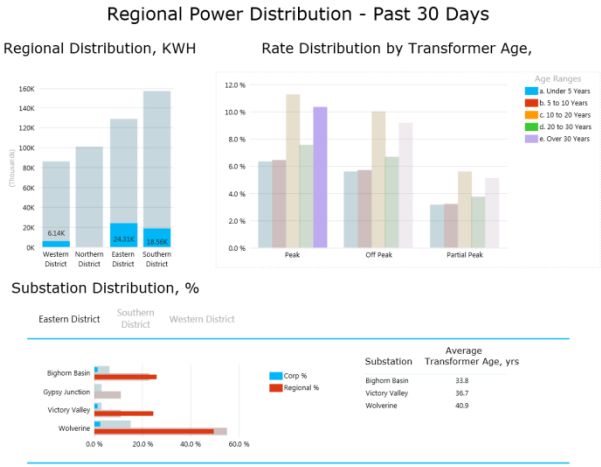
Interactive Analysis



Distribution by District



Distribution by Transformer Age



Distribution by Age and Rate

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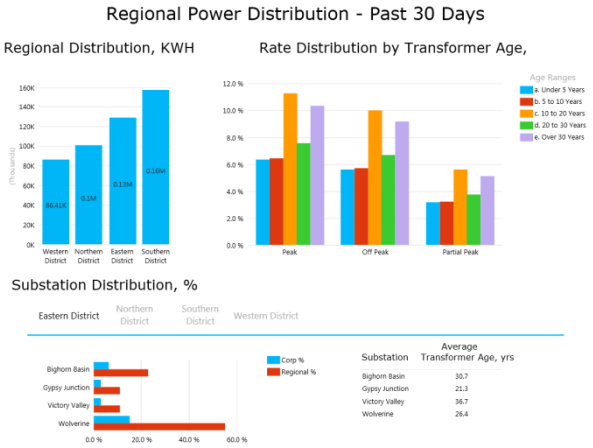
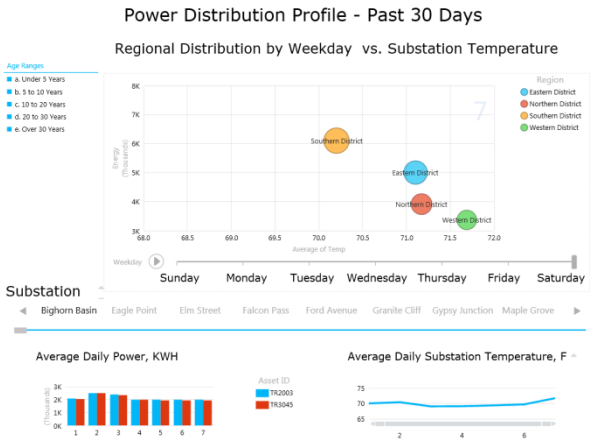
Microsoft SQL 2012 Power View

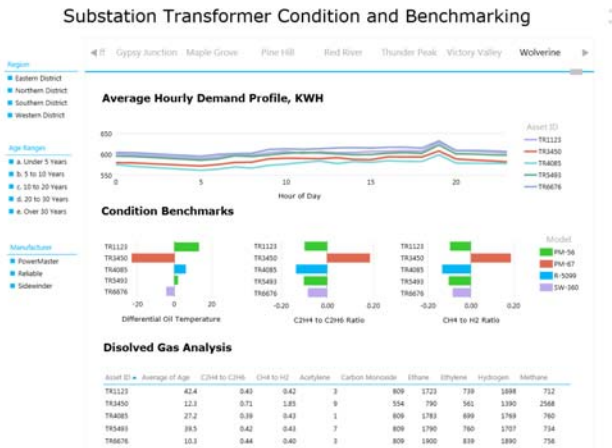
Multiple Views \ Pages



Aging Asset Risk Assessment



Weekday Distribution Profile



Equipment Condition Benchmarking

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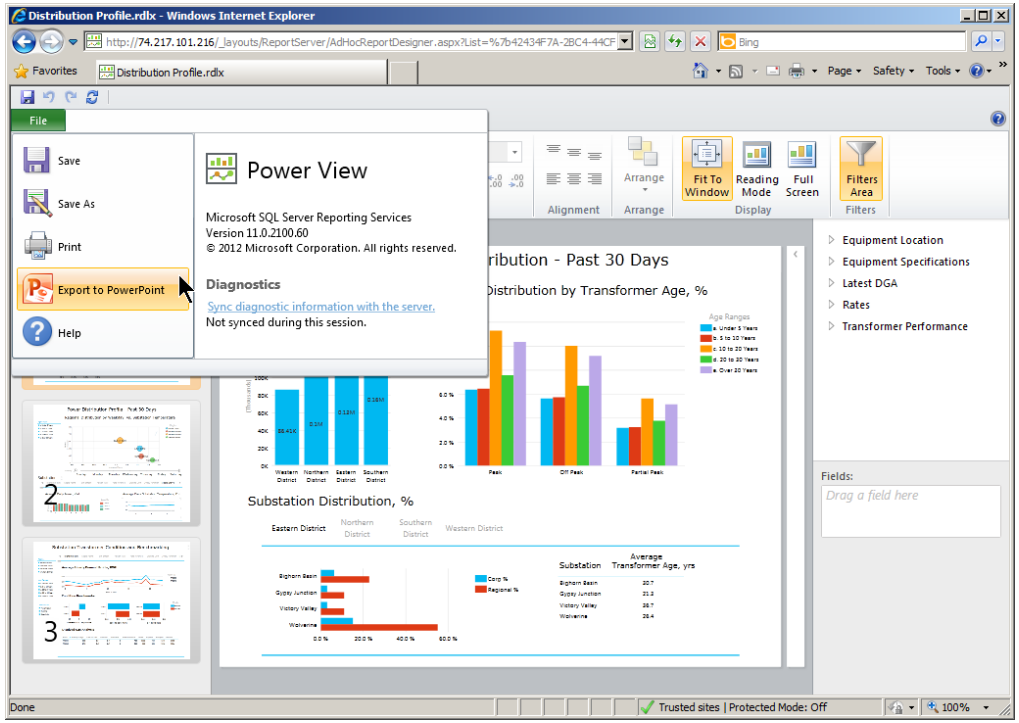
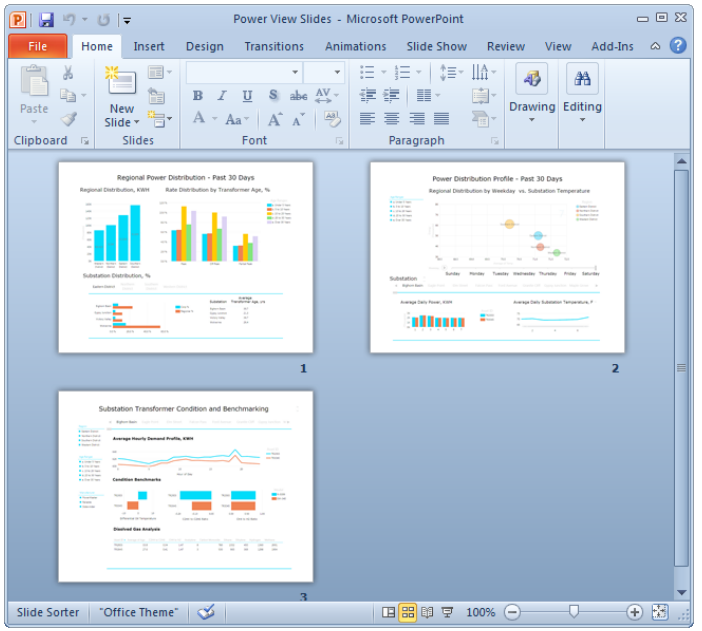
Power View Reports in *PowerPoint*





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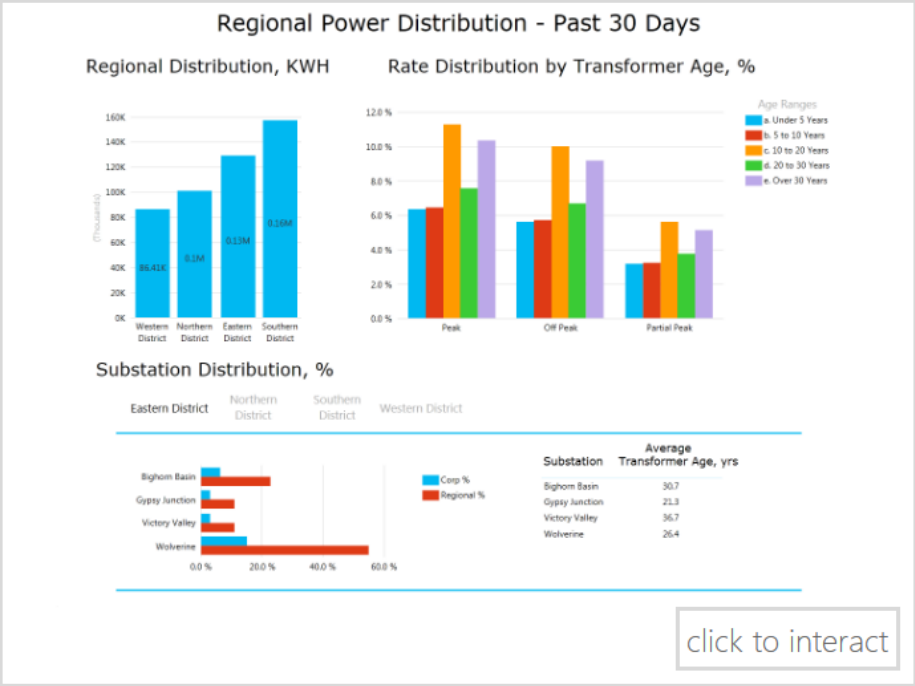
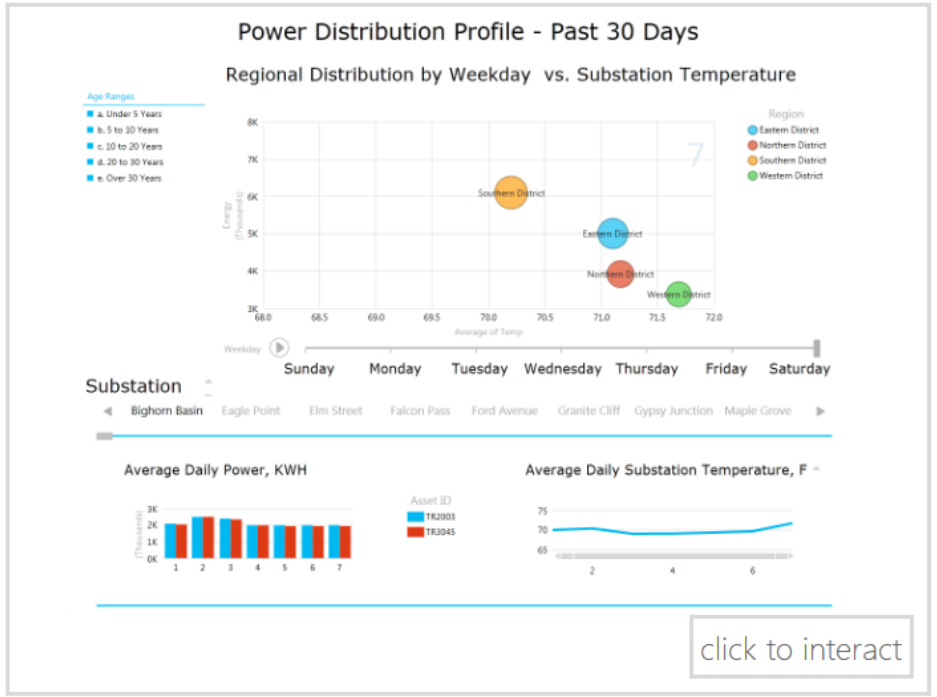
Power View Reports in *PowerPoint*





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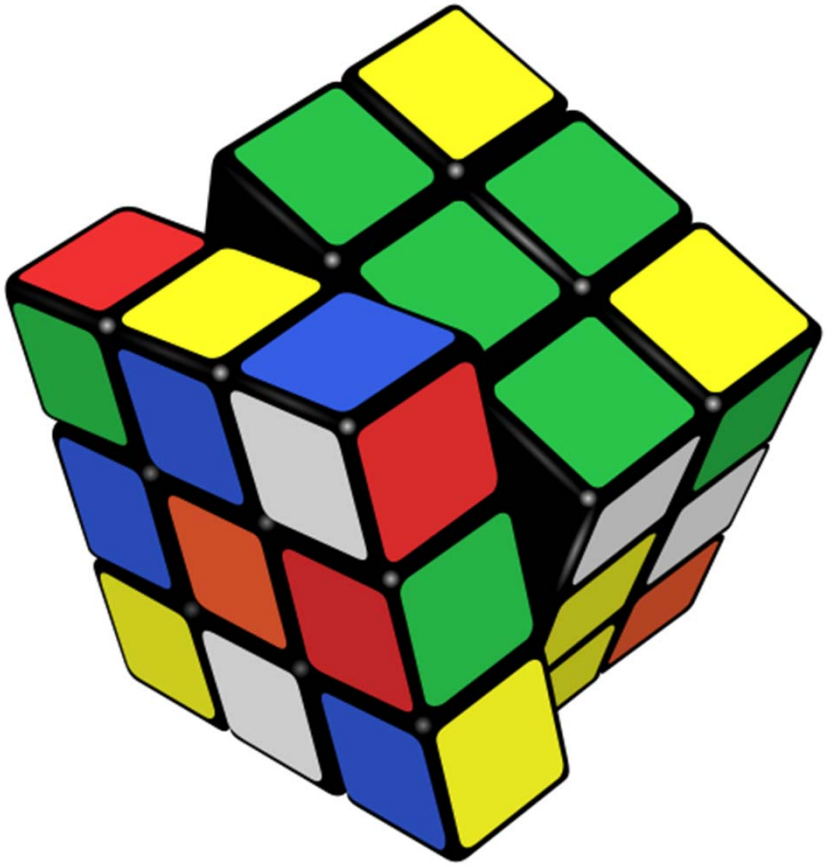

Project Rubik

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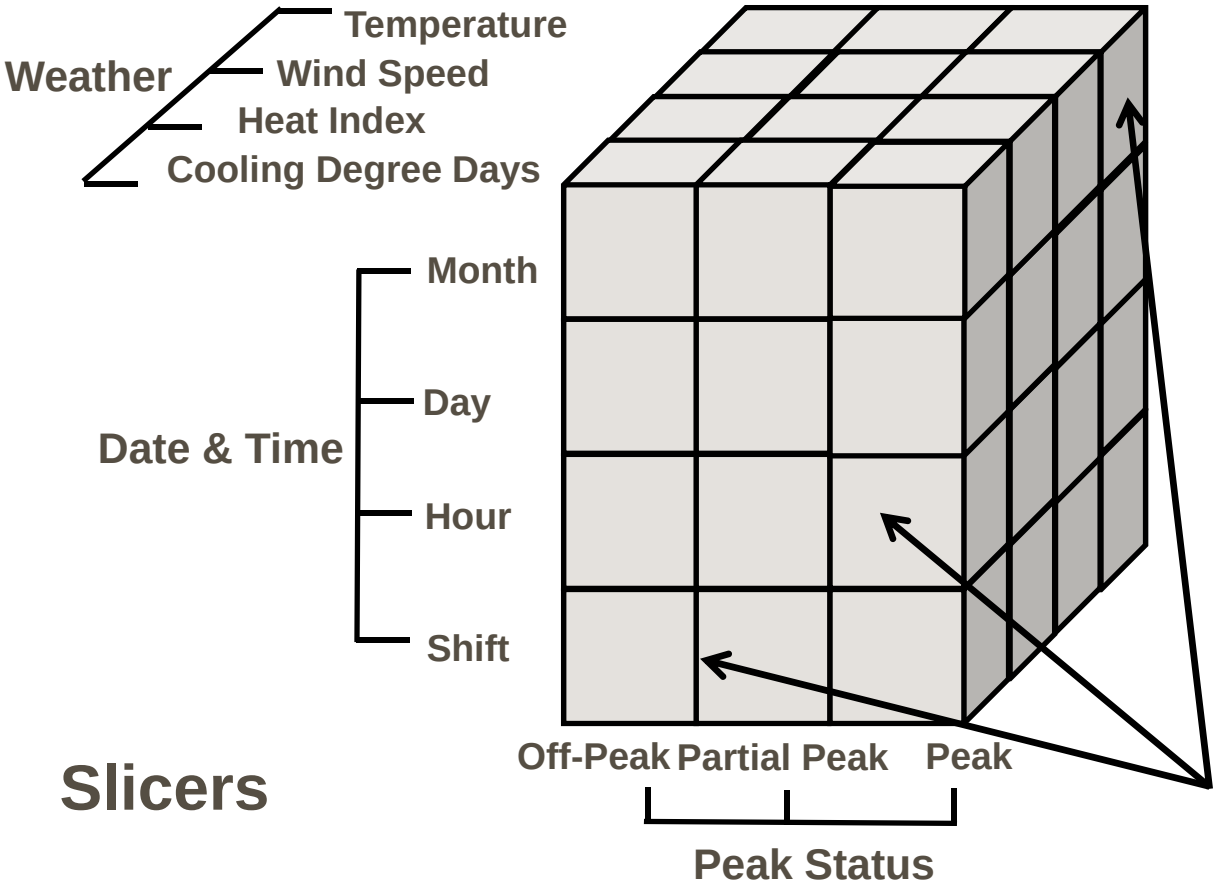

Slicers

Show me the total energy cost

For the first shift

During Peak Status

Facts (Energy Cost)

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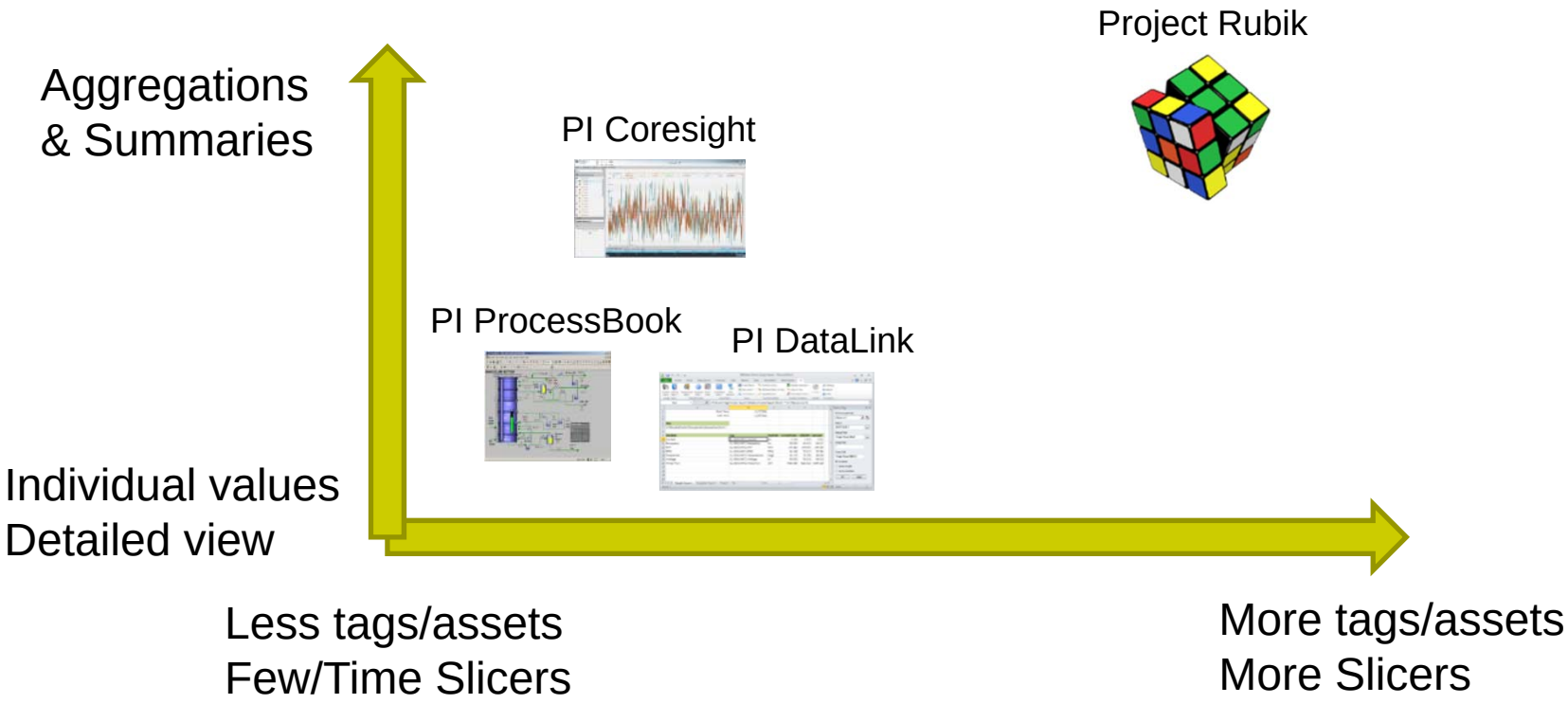
Right Data, Right Detail



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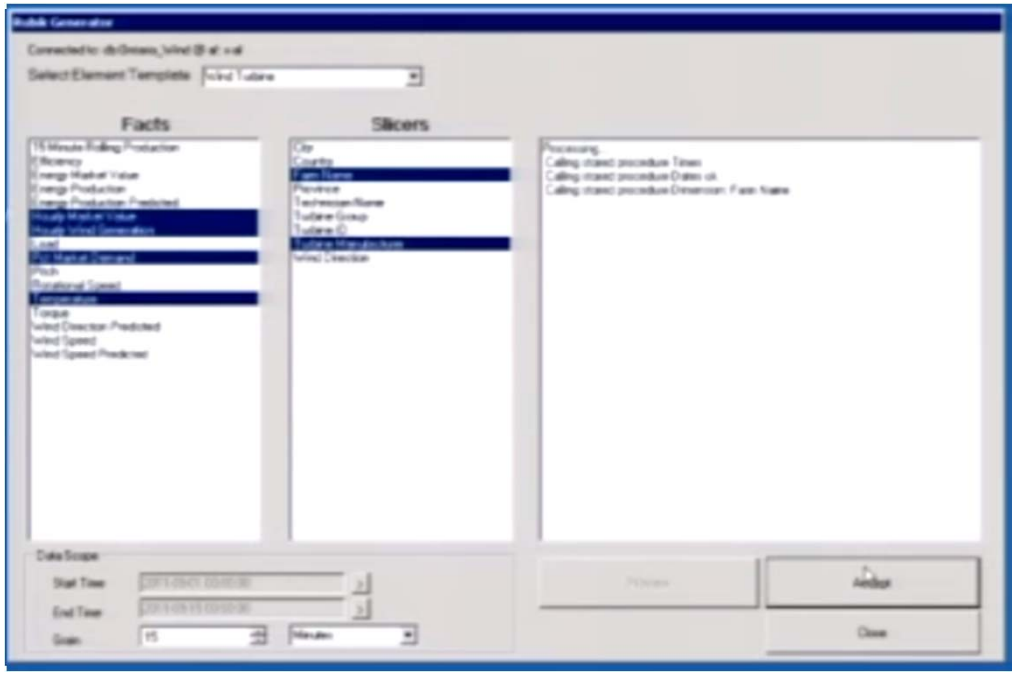
Simple process and Easy to Use



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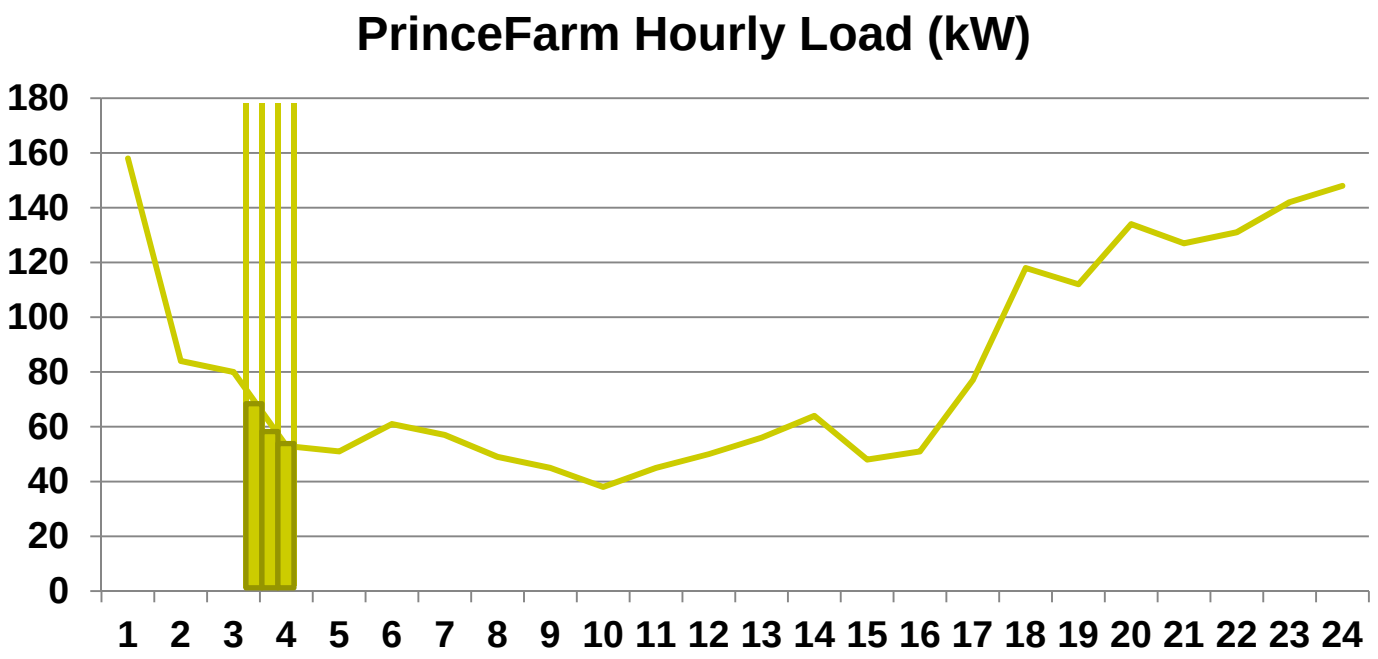

Time Interval	kWh
3:15	17.5
3:30	15
3:45	11.3

Rubik makes it ready

Support all types of PI System data … rates, strings, enumerations, non-summables … to build the right model

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Additional Information

OSIsoft Resources

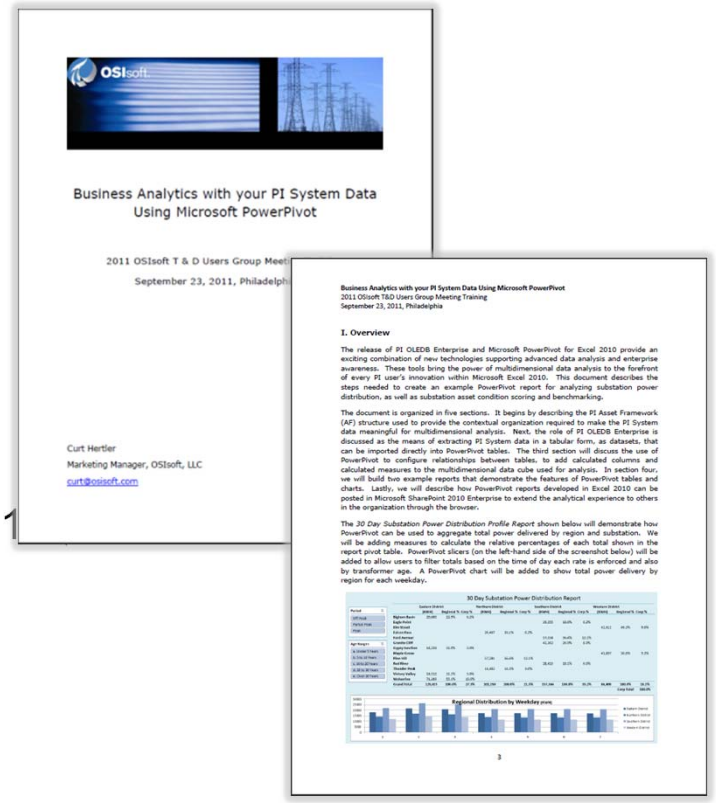
- "Business Analytics with your PI System Data using Microsoft PowerPivot"
- PI T&D Users Group Site extranet.osisoft.com
- OSIsoft vCampus vcampus.osisoft.com

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



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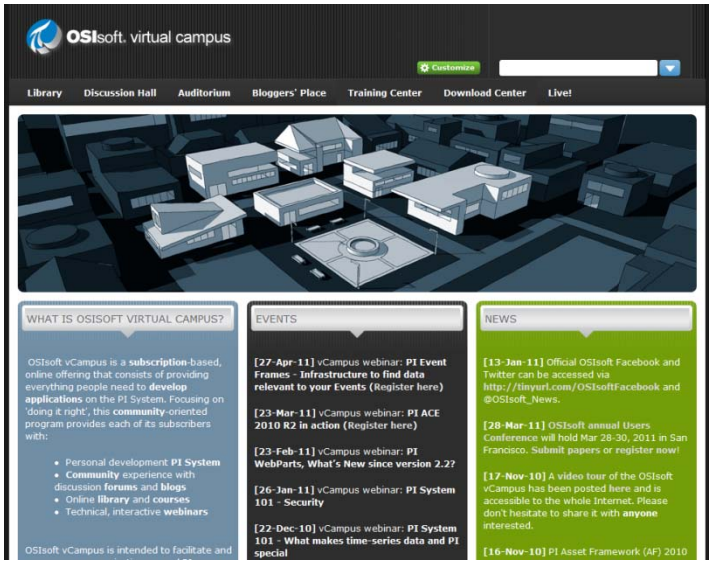
OSIsoft Virtual Campus (vCampus)

- **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)



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Week of November 26th

Grand Hyatt Union Square, San Francisco

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Sam Pride

- **Centre of Excellence Engineer,**

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