

How Tucson Electric Power Benefits from the PI System

Presented by **Stan Hollowell**
Tucson Electric Power



Speaker Intro: Stan Hollowell

- 20+ years Electrical Utility Experience
 - Energy Services Manager
 - Operations Technology Manager: SCADA, EMS, OMS, Historian
 - Operations Programs and Project Manager
 - NERC Critical Infrastructure Protection, Cyber Security
 - Automation: Generation, Transmission, Distribution
- Educational Experience
 - Degree Earned: BS-Information Technology
 - In process: MBA



Agenda

- Who is Tucson Electric Power
- Challenges to TEP and the industry
- How PI System helps resolve the challenges



About TEP

- Began delivering power in **1880**
- The second-largest investor owned utility in Arizona
- Largest corporation in Southern Arizona



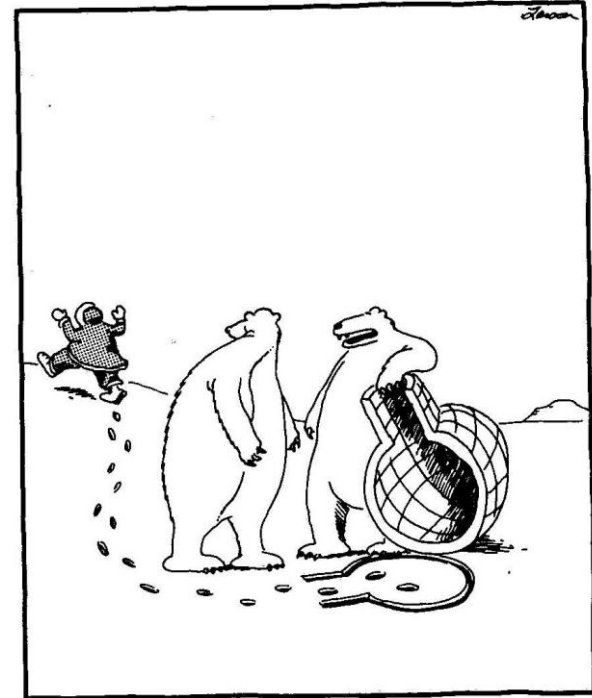
TEP System

- Over 450,000 Customers
- 3,300 MW Peak Load*
- 2,300 MW Generation**
- 300 MW Renewables***



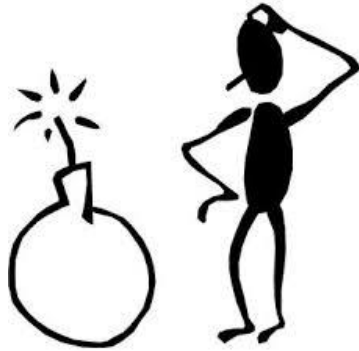
The Triple Challenge

- Meeting Customer Demand
- Maintaining System Reliability
- Improving Environmental Performance



"I lift, you grab. ... Was that concept just a little too complex, Carl?"

“It’s frustrating that companies have a better sense of the **value of their office furniture than their information assets.”**



- Doug Laney, Gartner

Meeting Customer Demand

Data collection and dissemination was a growing problem at TEP. To further complicate the issue, questions about the integrity of the data, essentially, rendered information useless.

*Consolidate multiple data sources in the PI Server and provide **One Version of the Truth.***



Business Challenge

- Transform the use of PI System from a Department Tool to an Enterprise Solution
- Provide information to internal and external customers

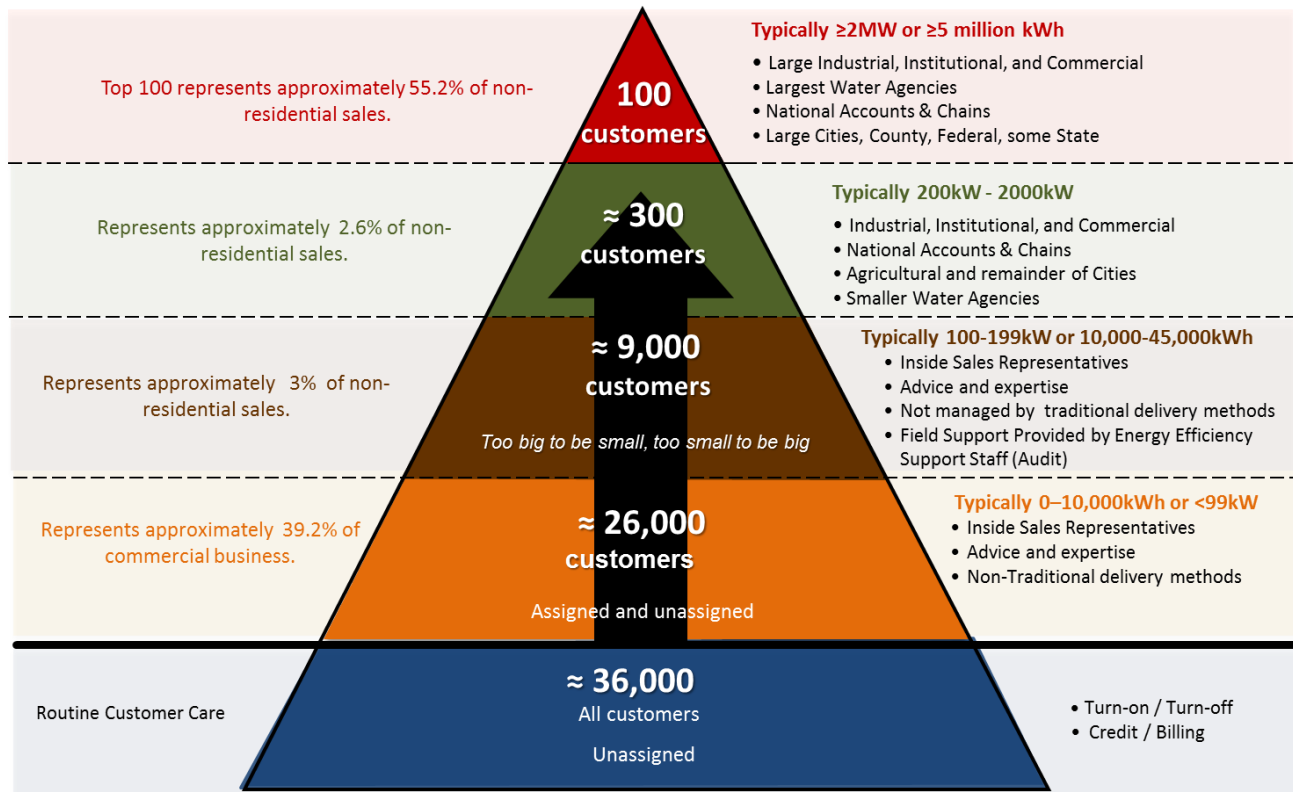
Solution

- Implement PI System at the Corporate level
- Implement PI System at the Generation level
- Develop organizational training program

Results and Benefits

- Enhanced utilization of existing assets
- Improved leverage of Intellectual Capital
- Increased Data Value

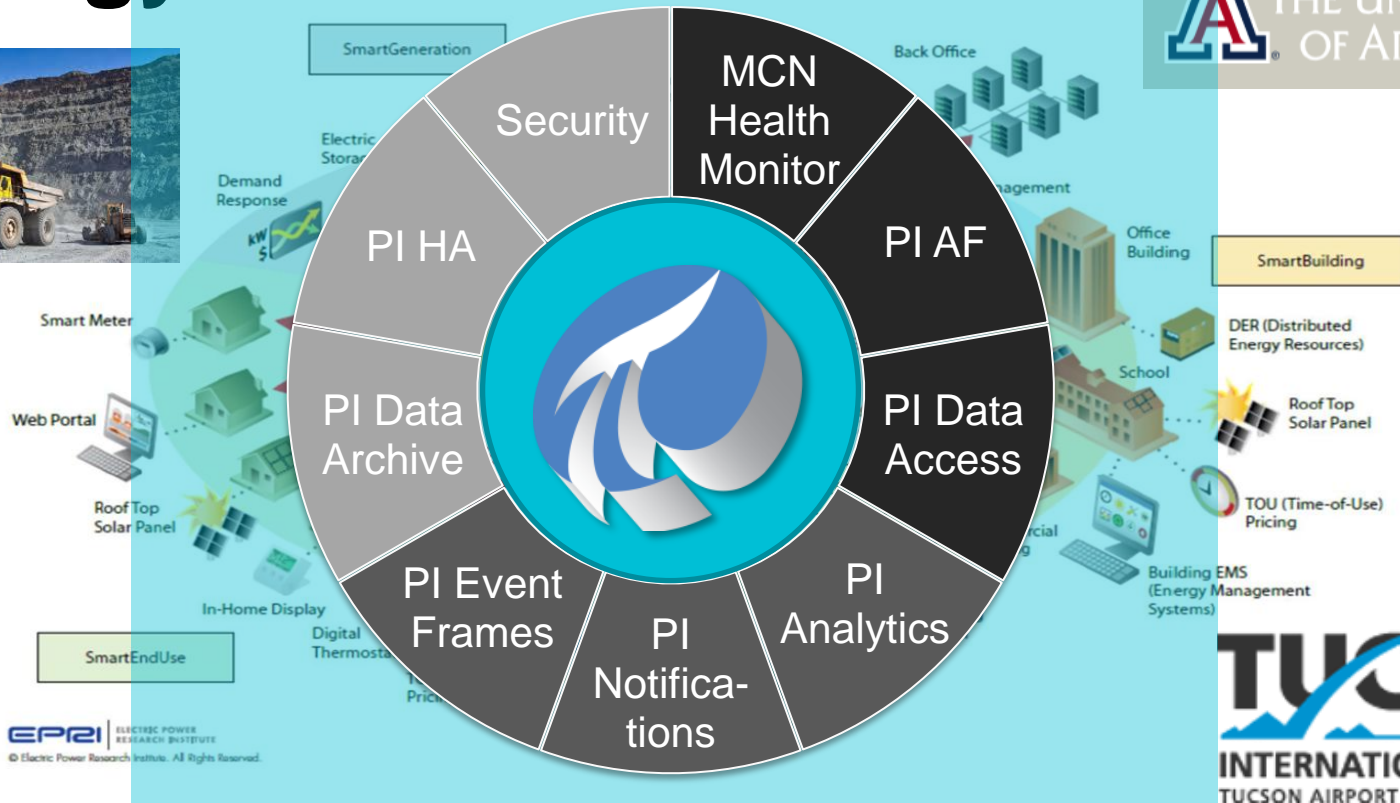
Customer Demand



Energy Solutions Provider



THE UNIVERSITY
OF ARIZONA



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RESEARCH INSTITUTE
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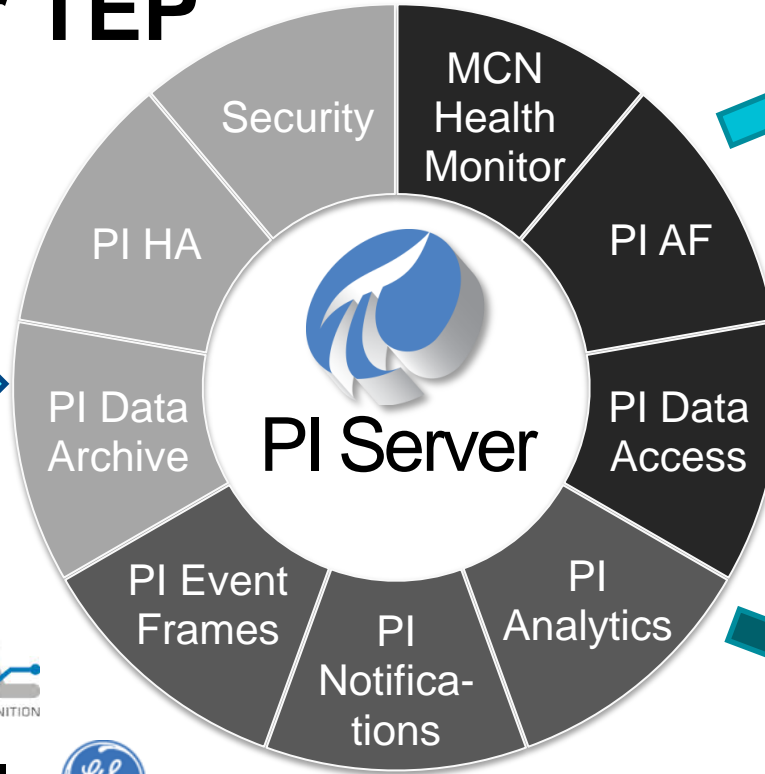
TUCSON
INTERNATIONAL AIRPORT
TUCSON AIRPORT AUTHORITY

Synergy for TEP



COLLECT

PI Interfaces



PI Clients

PI ProcessBook
PI DataLink
PI WebParts
PI Coresight

3rd Party



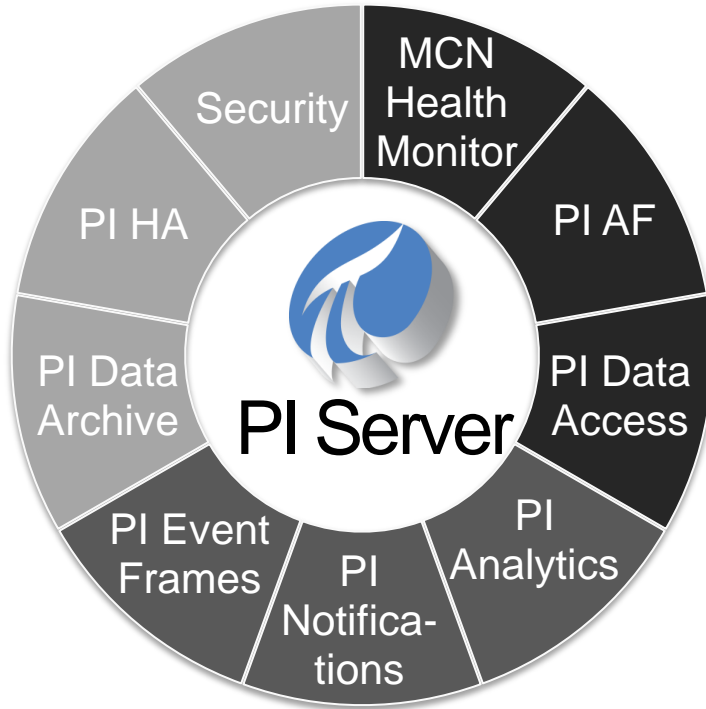
Microsoft®
SQL Server® 2012



Customs



Collecting more than data...



Delivering Solutions



Growing at the Speed of Value

Field Service



Sales Team



Training



Tech Support

Balancing Reliability and Economics

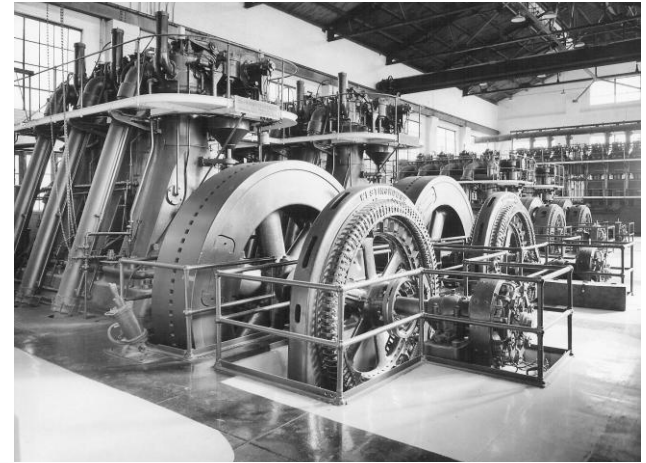
Raising awareness of the cost of doing business. The utility business is changing and so is the way its operated.

“People don’t want to buy a quarter-inch drill. They want a quarter-inch hole!”

- Theodore Levitt



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Business Challenge

- To provide system Reliability and Grid Resiliency at an affordable price
- Balance the cost of generation by fuel type

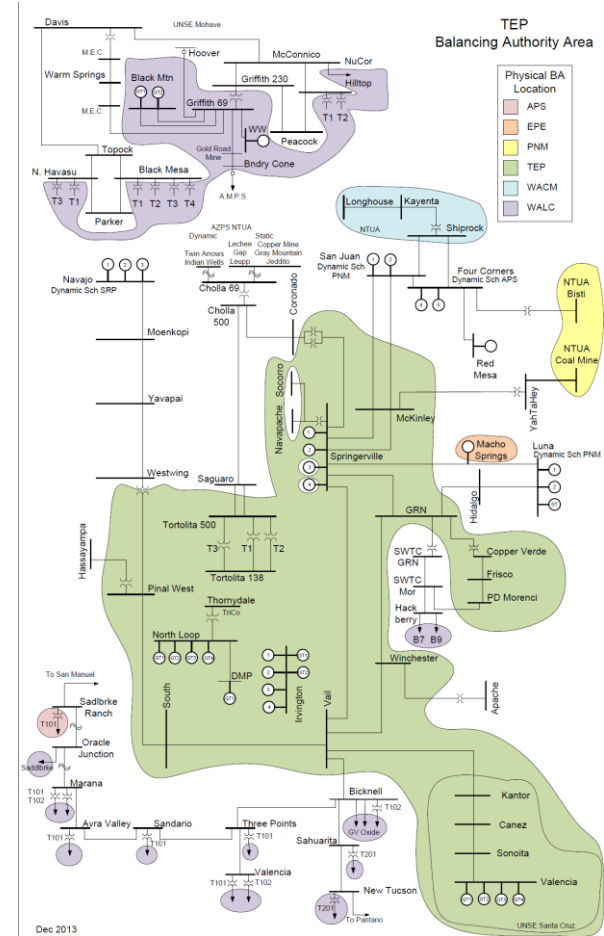
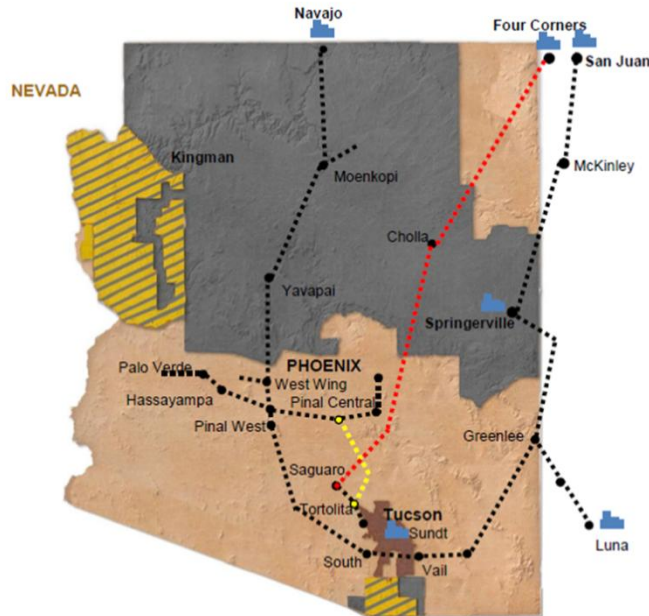
Solution

- Reduce the number of “clicks”
- Consolidate displays and provide information that makes it easier for the operators to perform critical tasks

Results and Benefits

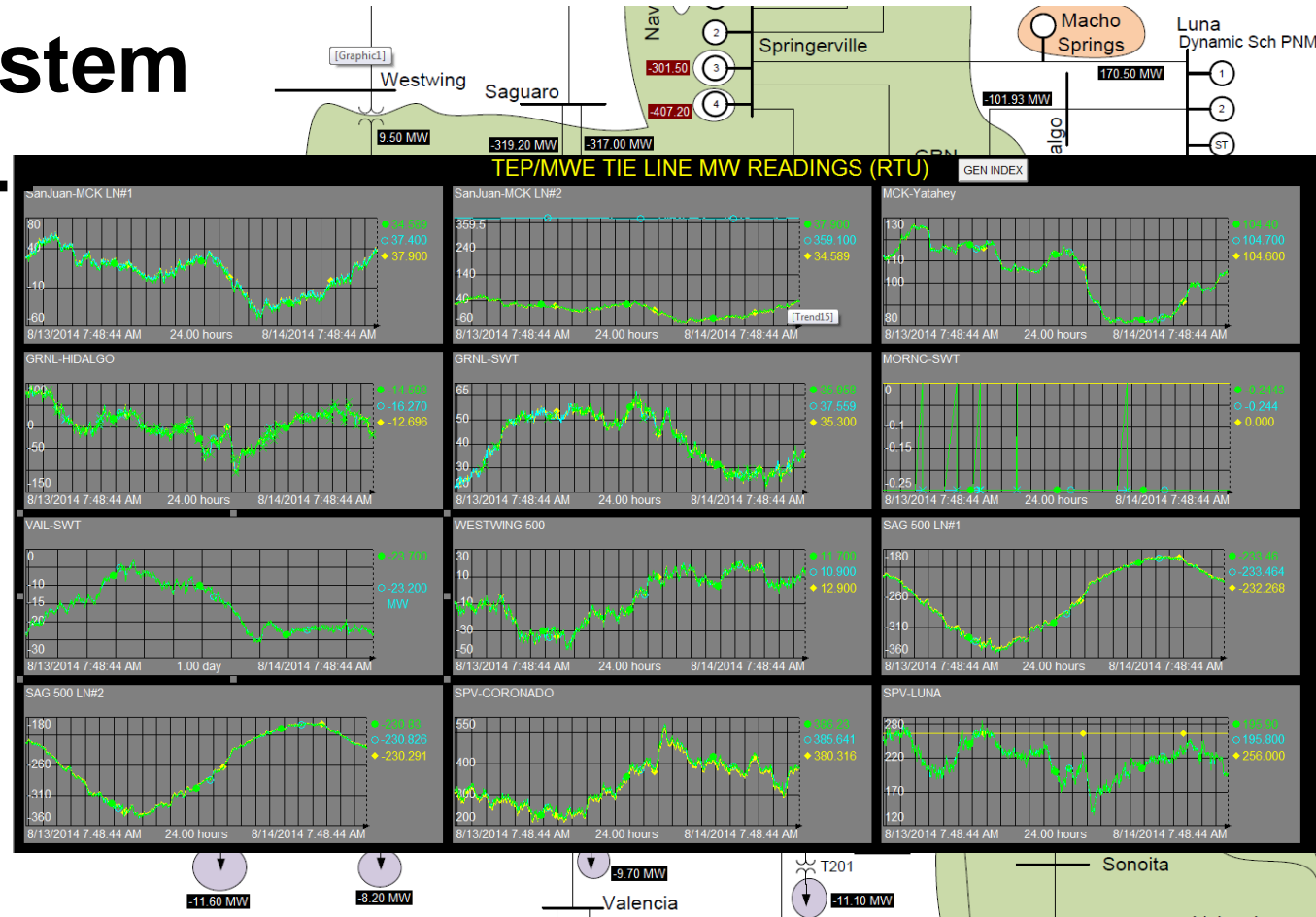
- Enhanced displays with consistent look and feel
- Less confusion
- Improved efficiencies and response times

Reliability - Previous

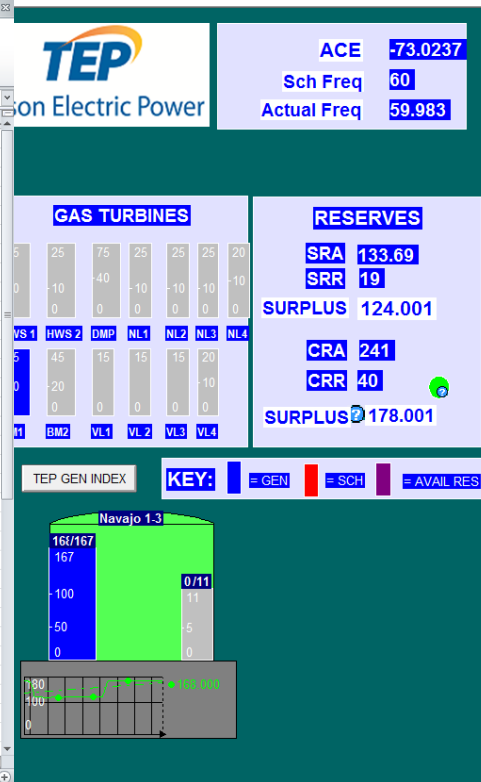
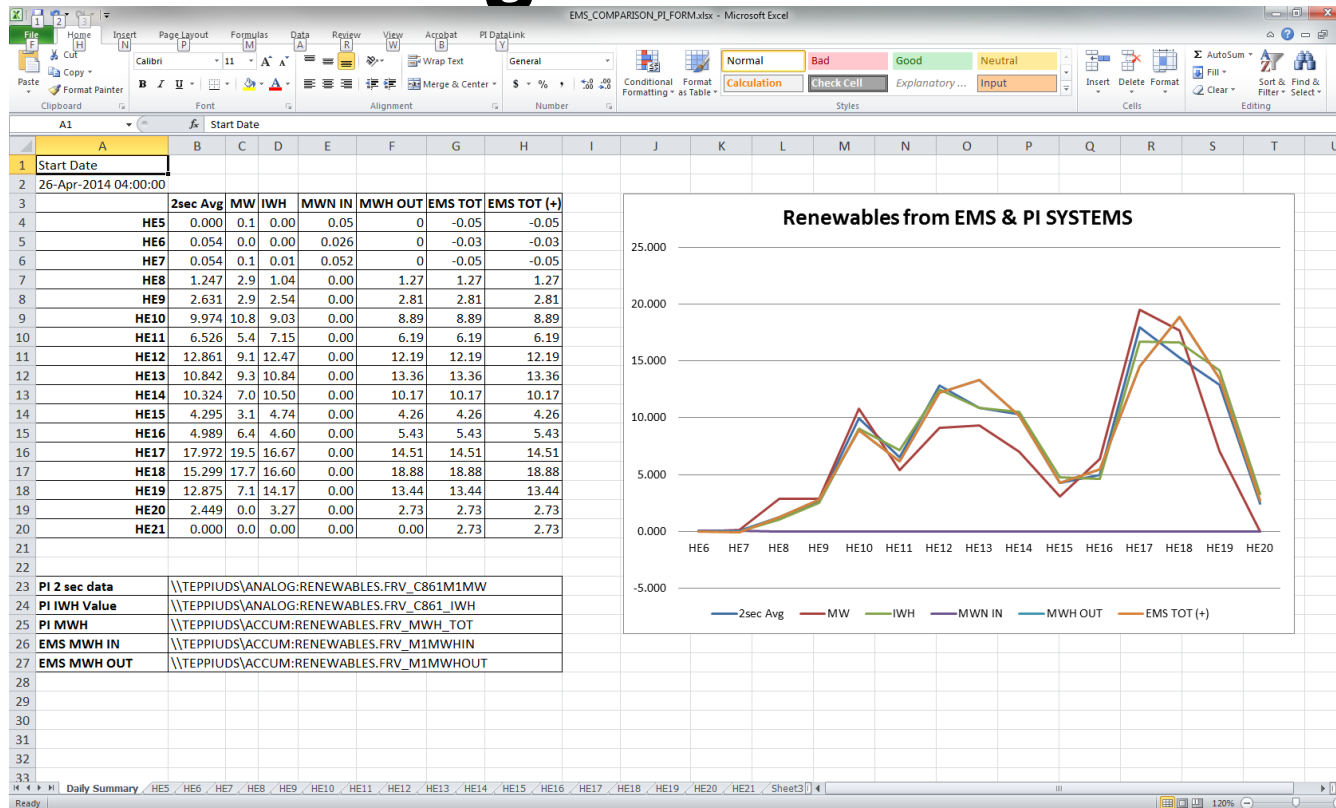


Using PI System to change...

Latitude
and
Attitude



Balancing Resources with Demand



Enhanced Reports & Dashboards

REPORT DATE	8/17/2014		
From 00:00	8/17/2014	To 00:00	
PI tag name	Sample Point	Units	Low Paramet
AI412WT	Boiler pH	pH	9.10
AI411WT	Boiler Conductivity	umho	2.00
AI409WT	Boiler Silica	ppb	
AI410WT	Cond Sodium	ppb	
AI402WT	Condensate pH	pH	8.80
AI1401WT	Condensate Cat Conductivity	umho	0.220
AI406WT	Condensate Dissolved O2	ppb	
AI473WT	Condensate @TORP	mV	-400
AI403WT	FW O2 Scavanger	ppb	5.0
AI405WT	FW pH	pH	8.80
AI404WT	FW Conductivity	umho	2.30
AI407WT	FW Dissolved O2	ppb	
AI438WT	CW pH	pH	7.70
AI450WT	CW Makeup Conductivity	umho	400
AI417WT	CW Conductivity	umho	3500
AI439WT	CW ORP	mV	100
AI419WT	CW Trasar-a, 3DT230	ppm	60
AI420WT	CW Trasar-i, 3DT230	ppm	70
AI449WT	CW Trasar 3DT156	ppm	25
AI440WT	CW Mild Steel Corrosion	mil/yr	0.0
AI441WT	CW Copper Corrosion	mil/yr	0.00
LI424WT	Tower Basin Level	inches	19.0



PI Notifications and Alerts



From: ☐ PINotAdmin
To: ☒ Mariana Sandin
Cc:
Subject: Transformer TR0842 Load is in

[Instant PI WebParts Trend](#)
[Acknowledge With Comment](#)
[Acknowledge](#)

Name:	Transformer Load -
States:	High
Trigger Time:	7/29/2012 9:07:01
Start Time:	7/29/2012 9:07:01
End Time:	1/1/1970 12:00:00
Triggering Conditions:	Load > 22
Targets:	TR0842

Wind Farm availability is under 70%

DF PI Notifications - Offline

pinotifications@osidf.test.net 2:45 PM

Wind Farm availability is under 70%

Name: Wild River Wind Farm
Servers: DFPIAF
Database: Windtopia
Start Time: 8/1/2012 2:30:00 PM Pacific Daylight Time (GMT-07:00:00)
Trigger Time: 8/1/2012 2:45:00 PM Pacific Daylight Time (GMT-07:00:00)
Target: Wind Power Generation Fleet/Wild River Wind Farm
State: OutsideControl
Priority: Normal
Link:
[Wind Farm Overview](#)
Actions:
[Acknowledge](#)
Last message received

DF PI Notifications
Wind Farm availability is under 70%

Redirect Ignore



Improving Environmental Performance

TEP is required to supply increasing amounts of renewable energy, with a target of 15 percent of total power sales by 2025.

How do we develop Energy Efficiency programs that benefit everyone?



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Business Challenge

- How are the customers using electricity differently than in the past?
- The difference between Integrated Resource Planning and Integrated Distribution Planning.

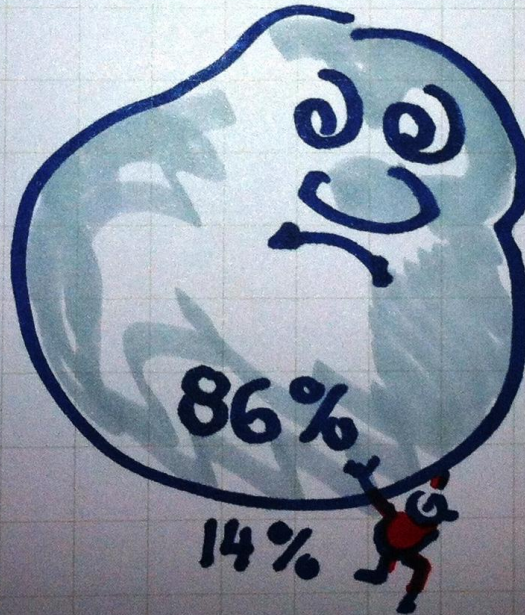
Solution

- Enhanced load profiles from Conservation Voltage Reduction [CVR] Pilots
- Development of Economic Displays
- Solar Forecasting

Results and Benefits

- Ability to make quicker decisions
- Ability to make “smarter” decisions
- Transition from “I think” to “I know”.

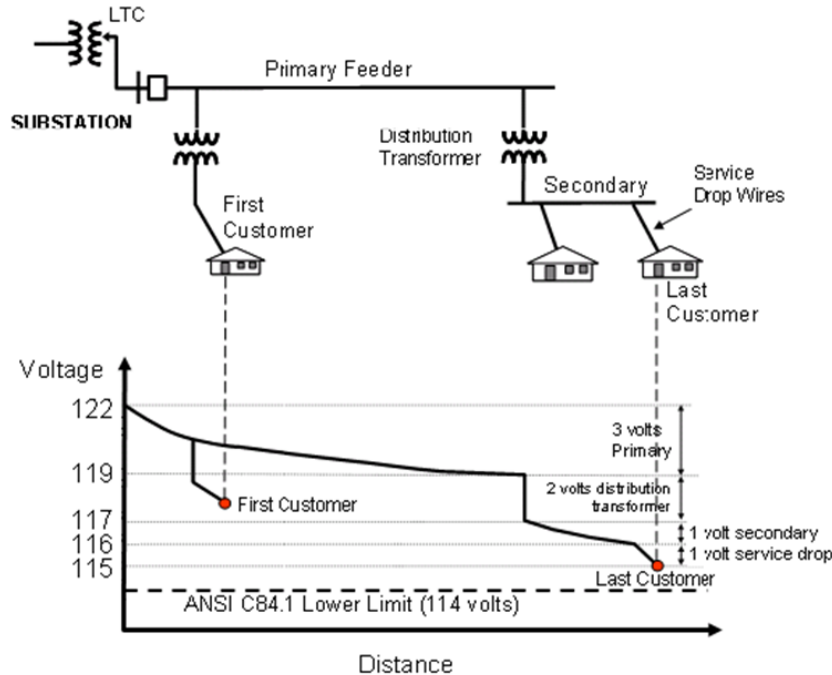
86% OF ENERGY IS WASTED
IN US



Source: Laitner
<http://www.aceee.org/blog/2013/08/thinking-big-about-energy-efficiency>

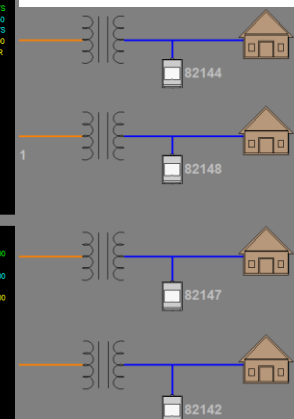
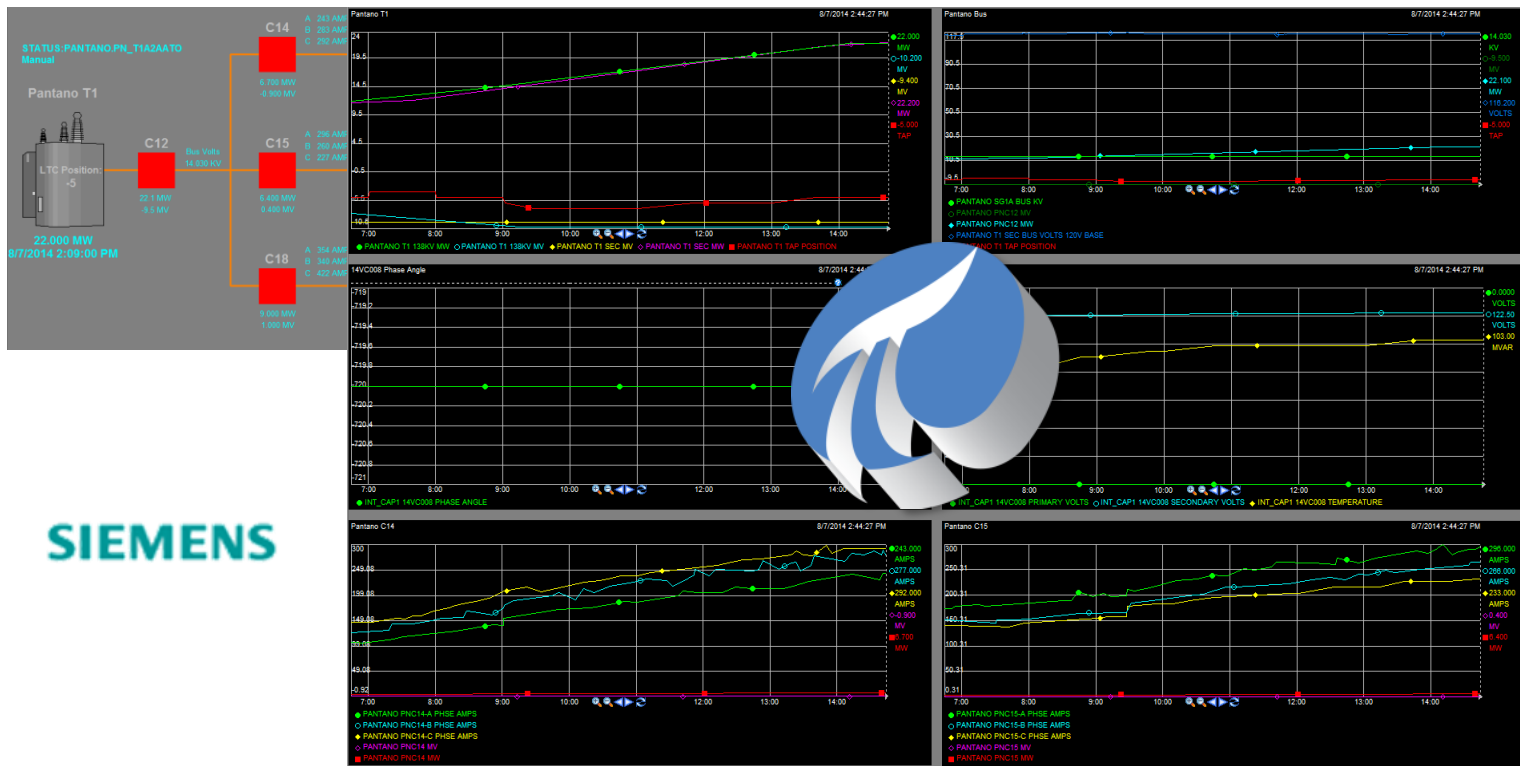
WWW.VISUELLE-PROTOKOLLE.DE

Energy Reduction of 1.3% to 3%



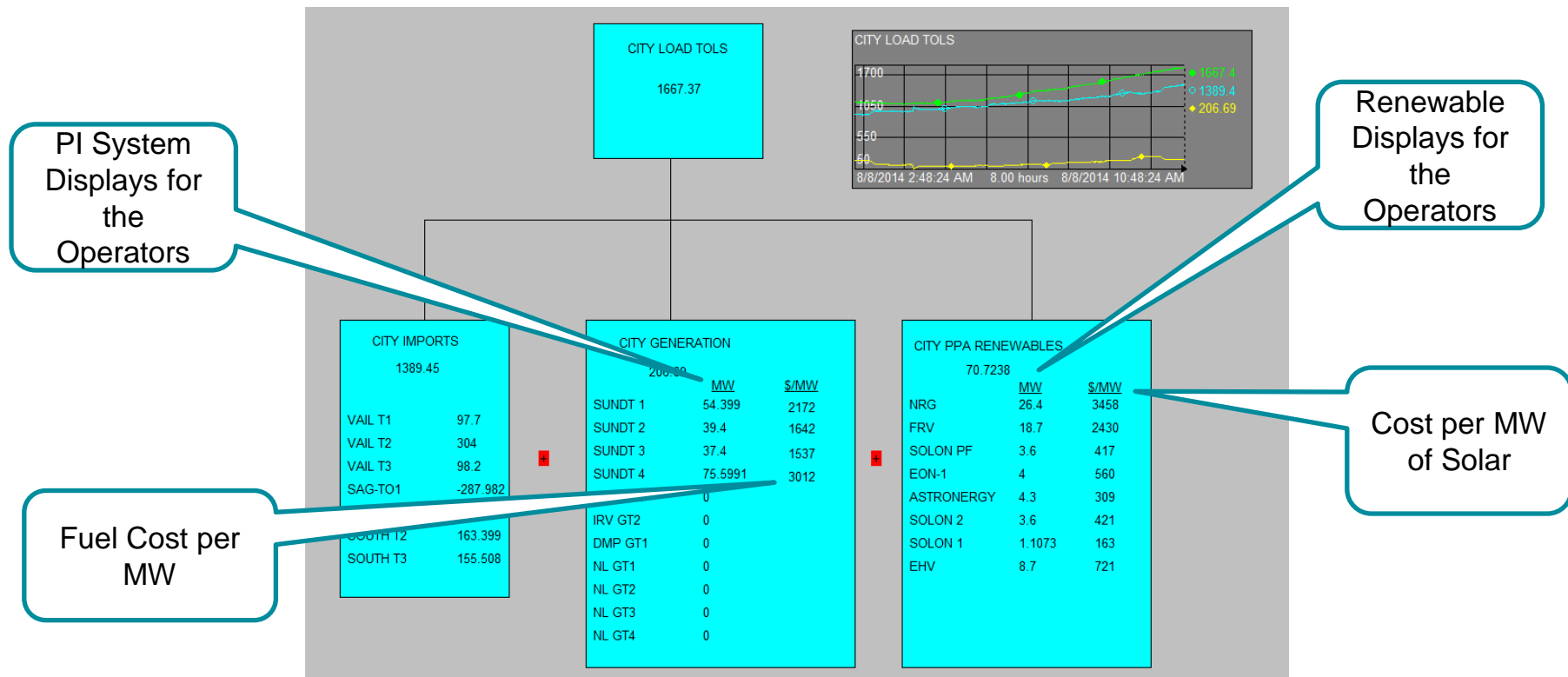
- Volt-VAR Optimization [VVO] is a fundamental operating requirement of all electric distribution systems
- The purpose of VVO is to maintain acceptable voltage at all points along the distribution feeder under all loading conditions, **thus reducing losses**

CVR Pilots: Testing Energy Reductions

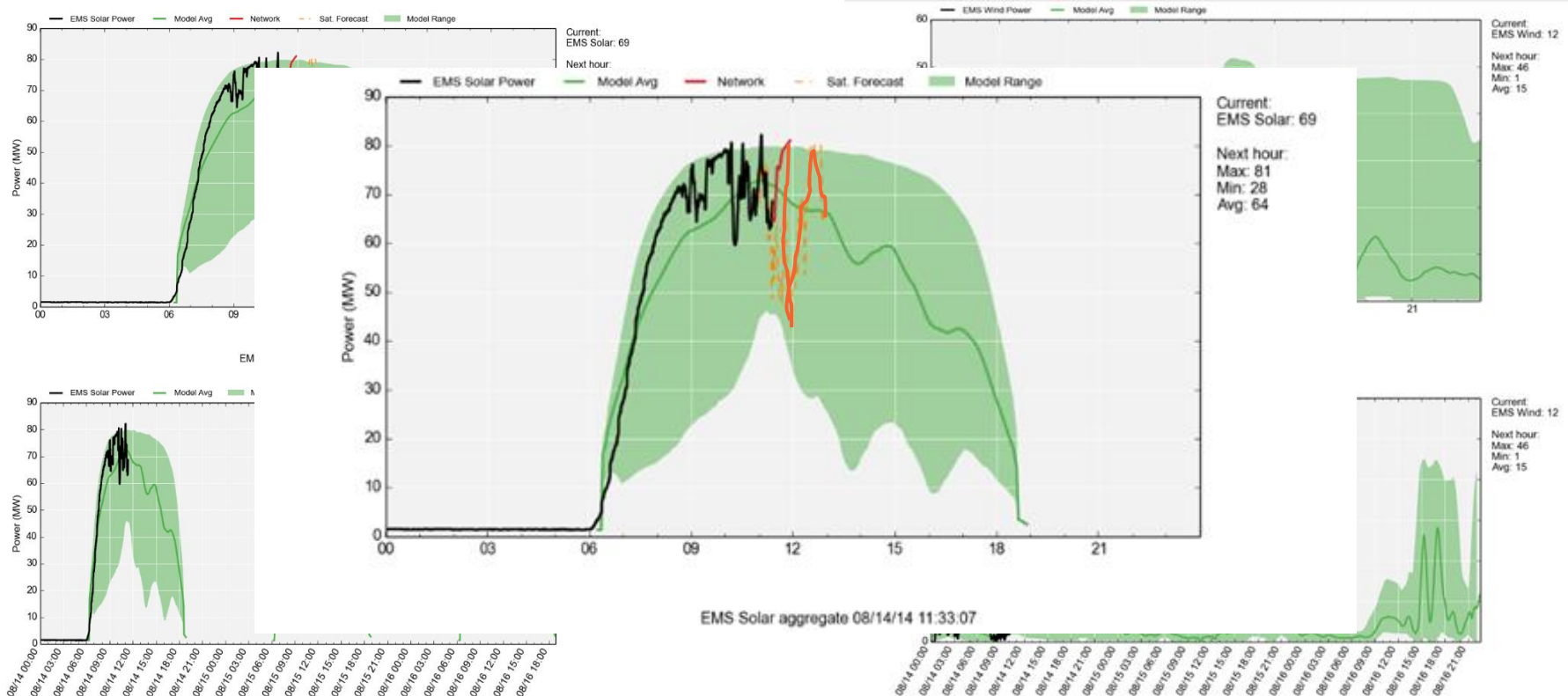


SIEMENS

Economic vs. Reliability



Solar and Wind Forecasting



PI System is Critical Path for a number of 2014 – 2017 Projects

- **Several already approved projects will rely on PI System as an enabling technology:**

- Operations PI System
- Generation PI System
- Corporate PI System
- Demand Response
- Volt/VAR Optimization
- Solar Forecasting
- Distribution Generation
- Conservation Voltage Reduction

Other tentative projects will also rely on PI System:

- ✓ Distribution Automation
- ✓ Existing Generation Units
- ✓ Additional Generation Units
- ✓ AMI/AMR Integration
- ✓ Asset Management and Condition Based Maintenance
- ✓ Environmental Data Collection
- ✓ Testing Battery and Storage Capacity

Benefits - going from a **Cost Center(\$)** to **Profit Center(\$)**

- Consolidation of server farms – saved over \$200,000 in hardware savings in a single year
- Consolidate numerous “apps” – saved \$100,000 in licensing fees alone
- Enhanced reporting process – saving over 4,000 hours a year

Intangible Benefits

**Improved
Collaboration**

**Enhanced
Information
Exchange**



**Better
Quality of
Life**

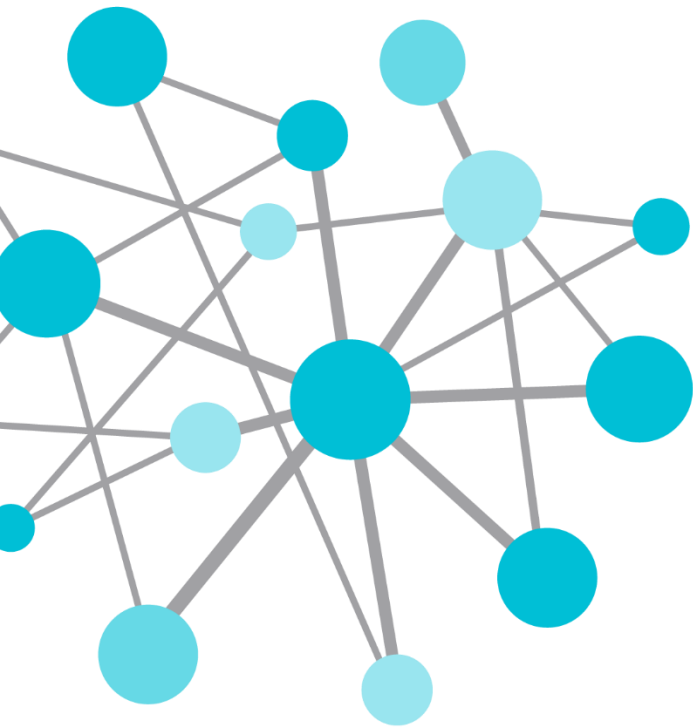
**Quicker
Decision
Making**

Stan Hollowell

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- Energy Services Manager
- Advisory Council Member to the CEO and Board of Directors
- Tucson Electric Power



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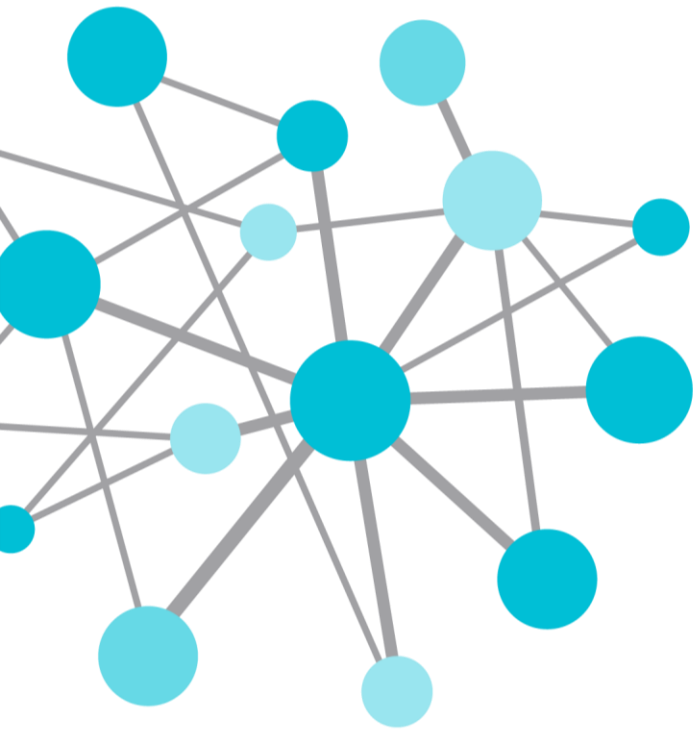


Questions

Please wait for
the **microphone**
before asking
your questions



State your
**name &
company**



THANK
YOU

Brought to you by  **OSI**soft.

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this session

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