

Advanced Energy Analytics for Industrial and Manufacturing Companies

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Agenda

- Introduction to EFT Energy
- Industrial Metering / Measurement
 - Objectives
 - Strategies
 - Practical Considerations
 - Data Sources
- Analysis Tools
 - Basic Reporting / Dashboards
 - Energy Anomaly Detection
 - MVR Modelling
- Q&A



EFT Energy Inc. - Company Profile

MarketWatch (12/3/14) "As firms like Boston Scientific, Ford and Pfizer battle to keep down operating costs they have successfully reached out to industrial energy management software providers like EFT Energy"...."Buyers should include proven specialists like EFT Energy on their shortlists..."

- Leading Industrial Energy Management Software
 - Energy and Production KPI Management
 - Advanced Analytics
 - Real Time Alerts & Proactive Control
 - Cost Budgeting & Forecasting
- Founded in 1998 Dublin, Ireland; Opened US Operations in 2008 - New York City
- Serving Multiple Industry Segments
 - Industrial / Manufacturing & Processing
 - Technology, including Pharma and BioTech
 - Energy Service Companies / Utilities









Measurement Objectives

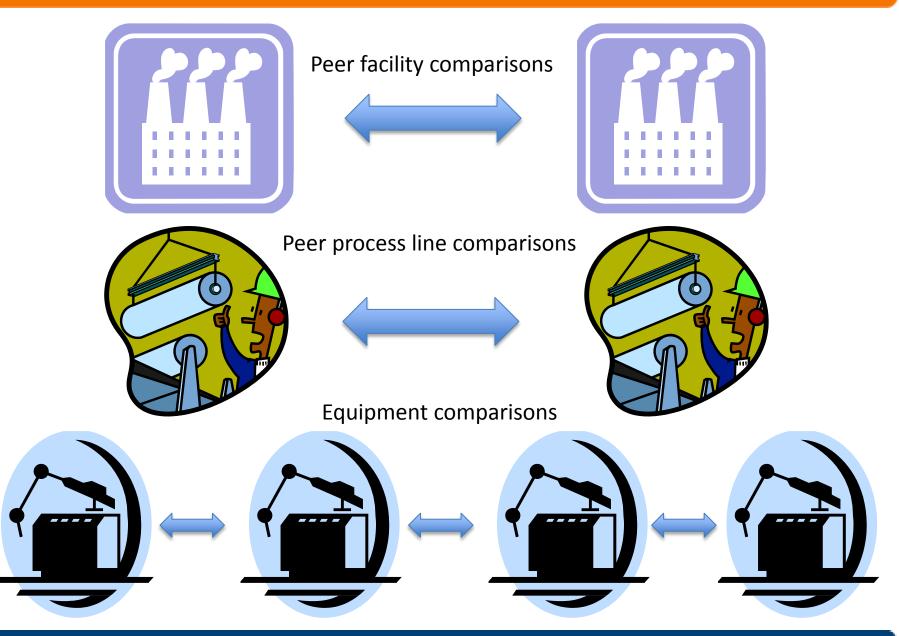


- No plant has all the metering they want or need!
- No plant has an unlimited budget!
- Some metering may exist, but is out of repair or calibration
- Some existing metering may not be connected to a network



- What business / technical problems are you trying to solve?
 - What outputs do you need to answer the questions?
 - What inputs do you need to provide the output?
- What is the intent of metering?
 - Time over time performance tracking?
 - Peer to peer performance comparison?
 - Benchmarking?
 - KPI tracking?
 - Cost allocation?
 - Best practices sharing?
 - Identify training opportunities?
 - Identify maintenance issues?
 - Efficiency measurement?

Common Objectives







Measurement Strategy



Determine the Scope of Comparison

	Enterprise Region / Division Plant / Location Process Area / Department Machine / Meter	
Drill Down		Roll Up



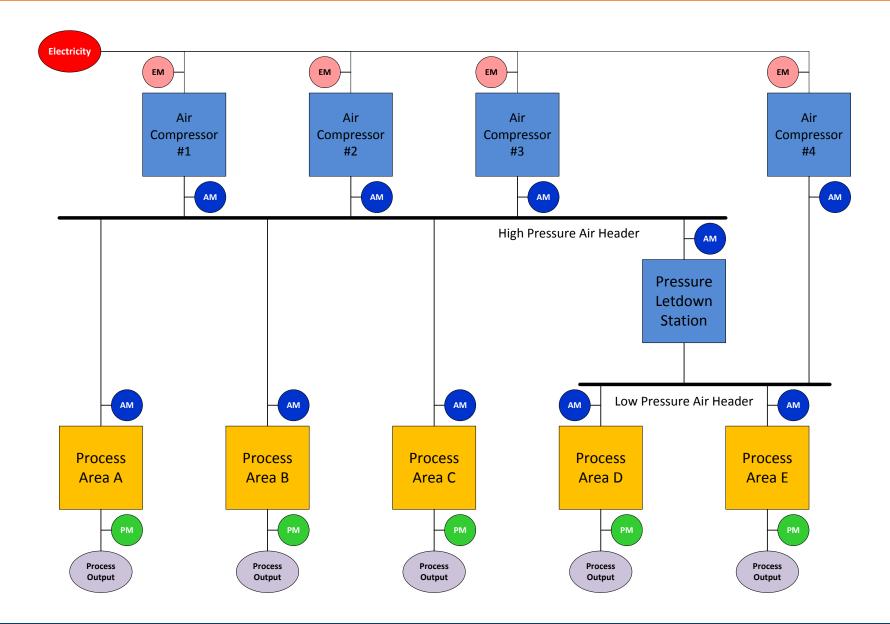
Factors Influencing Strategy

- Scope of Comparison
 - Determines metering "boundaries"
 - Determines metering types and quantities needed
- Top down vs. bottom up
 - Primary & Secondary utilities
 - Loads, distribution system points, conversion equipment
 - Energy Balance (Calculate unmetered quantities)
 - System Loses
 - Unmetered loads
 - Error checking
- Factors of Production
 - Used in Modeling and Advanced Analysis
 - Used to normalize KPI's
- Reliability Improvement
 - Improved sequencing / equipment utilization
 - Reduction of maintenance issues
- Process Improvement
 - It is not just about energy efficiency
 - Goal is to improve operational efficiency





Example – Compressed Air System





- Consistent Units
 - Localized engineering unit are more meaningful
 - Must choose consistent global units to roll data up
- Consistent Measurements
 - Measurements should be made in consistent locations (metering points)
 - Measurements should be made under similar conditions and normalized
 - i.e. different air compressor operating at different pressures
- Consistent KPI's
 - All KPI's should be calculated in a consistent way to facilitate peer to peer comparisons
 - Example KPI = Energy In / Production Out
 - Multiply by \$ / energy unit for total cost



Practical Considerations

Compromise: Cost vs. Results





- Energy Savings Targets Depend on Starting Point (Savings in % of energy spend)
 - Just starting out: 7-15%
 - Mid maturity: 5-10%
 - Mature program: 2-6%
- Internal Hurdle Rate (% ROI) will set budget
 - Calculate target savings
 - Use Hurdle Rate to back into your budget
 - Most customers seek simple payback within 2 years
- Work within Budget to maximize early returns
 - Use early savings to "prime the pump"
 - Success breeds success

- Time series measurements
 - "Directionally Correct" lower cost, "good enough"
 - "Theoretically Accurate" higher cost, less important
- Peer to peer measurements
 - Similar scopes of comparison
 - Theoretical accuracy is more important
 - Normalized data necessary
- Cost allocation
 - Higher metering and theoretical accuracy necessary
 - Need to consider upstream / downstream energy flows



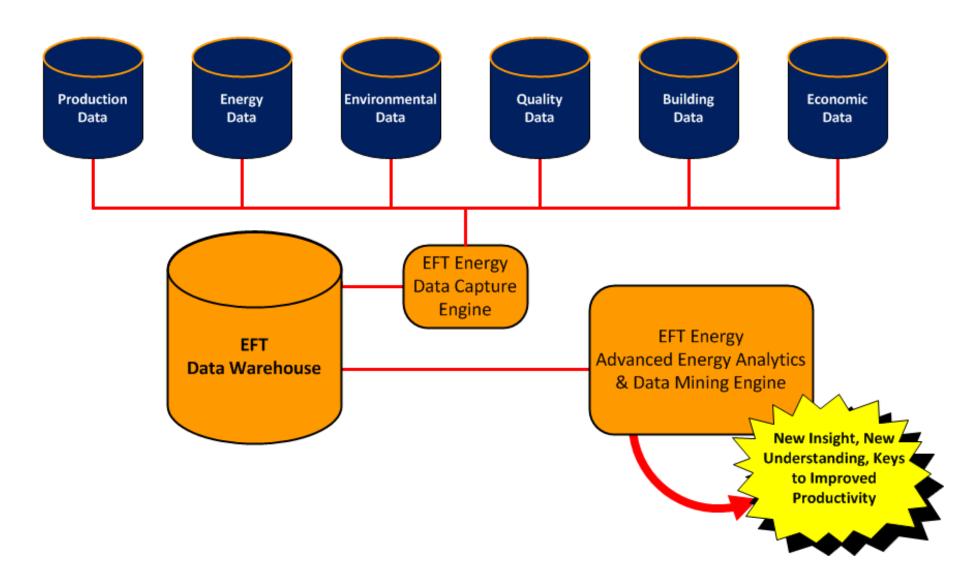
- Reuse existing (process) instrumentation to the greatest extent possible
 - Reduces metering expense
 - Greater correlation being different reporting systems Same source data
- Utilize existing data collection systems
 - Process historians
 - Building automation systems
 - Business systems



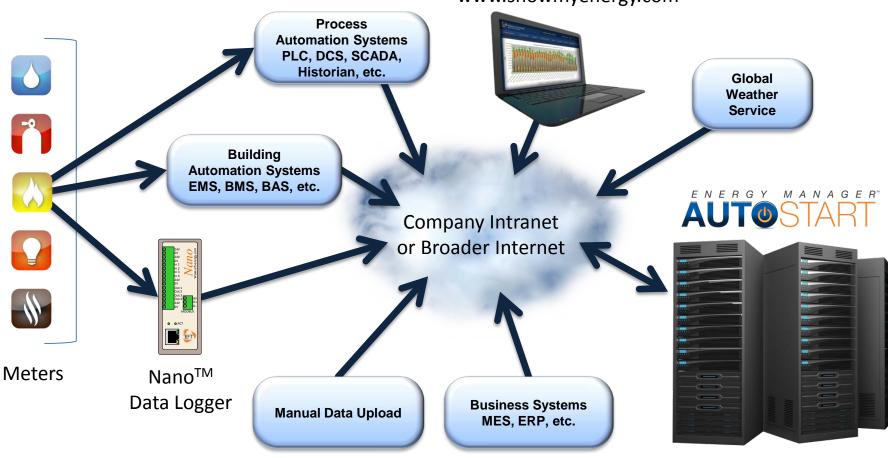
Data Sources / System Integration



Most Data Typically Resides in Isolated Systems







www.eft-energy.com

www.showmyenergy.com

Server Cluster





Analysis Tools



Real-time KPI's & Production / Energy Tracking



VERIFIED & SECURED

🔍 95% 👻



Line Operator Dashboard – Direct Feedback to Plant Floor



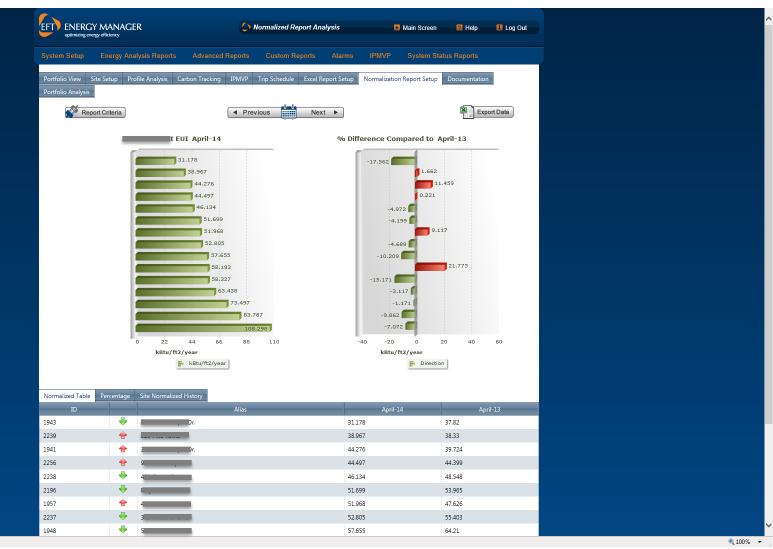


Normalized Comparisons – Corporate Rollup



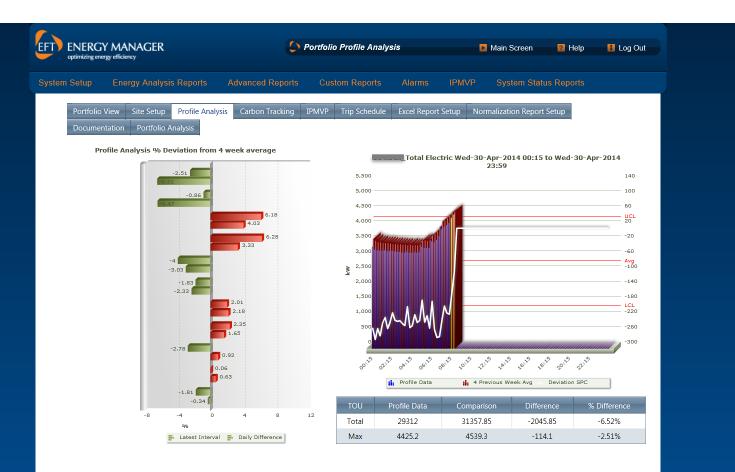


Normalized Comparisons – Peer to Peer – KPI's





Profile Analysis – Time Series Analysis



TO VERIFIED & SECURED

🔍 125% 👻



Multi Variable Regression – M&V of Energy Conservation Measures





Multi Variable Regression – Forecasting



Sun-Jan-01-2012 to Tue-Dec-31-2013



January Februar March- April- May-12 June- July-12 August- Septem October Novem Decem January Februar March- April- May-13 June- July-13 August- Septem October Novem Decem -12 y-12 12 12 12 12 12 12 12 ber-12 -12 ber-12 -13 y-13 13 13 13 13 13 ber-13 -13 ber-13 ber-14 ber-14

Difference



Dynamic Modeling / Forecasting

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Energy Anomaly Detection

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Portfolio Viev	-	Analysis	Building Performance	Carbon Tracking	Energy Ano	maly Detection	IPMVP Energy For	ecasting	Trip Schec	dule xport Data
Date	Site	ID	Site	Anomaly (Count		Time	Valu	e	Cost Impact
November 12	885			269		2 Days, 19 Hrs, 15 Mins		43280.	12	\$1731.2048
	945		41			0 Days, 10 Hrs, 15 Mins				
November 12	945	5		41		0 Days,	10 Hrs, 15 Mins	13427.	87	\$537.1148
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Enterprise Site Anomaly Count Mon-05-Nov-12



All Enterprise Site Anomalies





Questions





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