EFT ENERGY

optimizing energy efficiency

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

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Measurement Objectives

Basic Premises

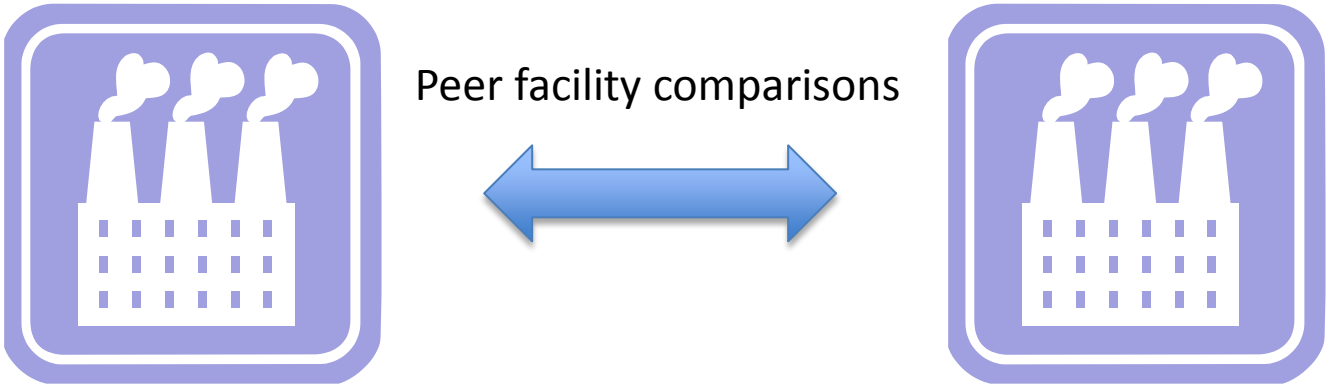
- No plant has all the metering they want or need!
- No plant has an unlimited budget!
- Some metering may exist, but is out of repair or calibration
- Some existing metering may not be connected to a network

Metering Objectives - Several Questions to Ask Yourself…

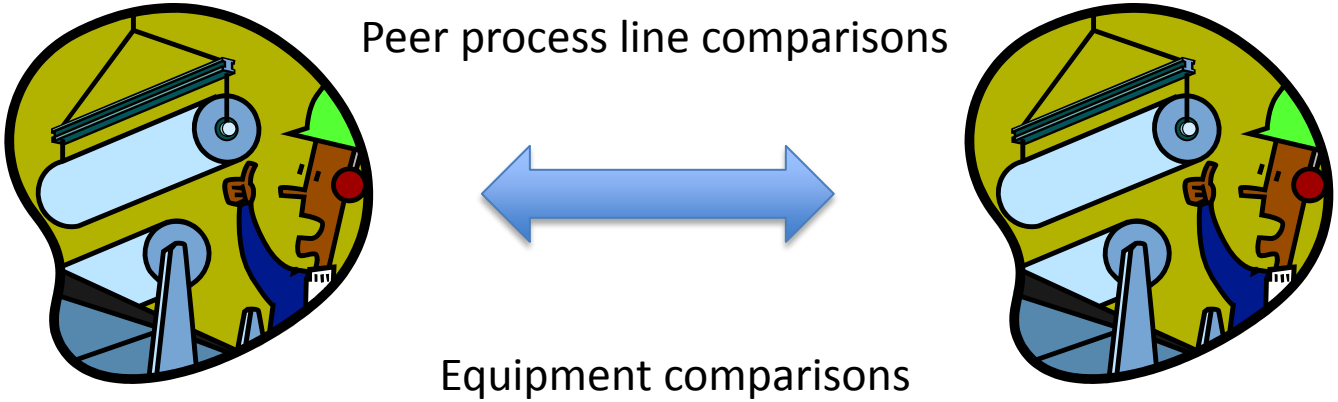
- What business / technical problems are you trying to solve?
  - What outputs do you need to answer the questions?
  - What inputs do you need to provide the output?

- 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

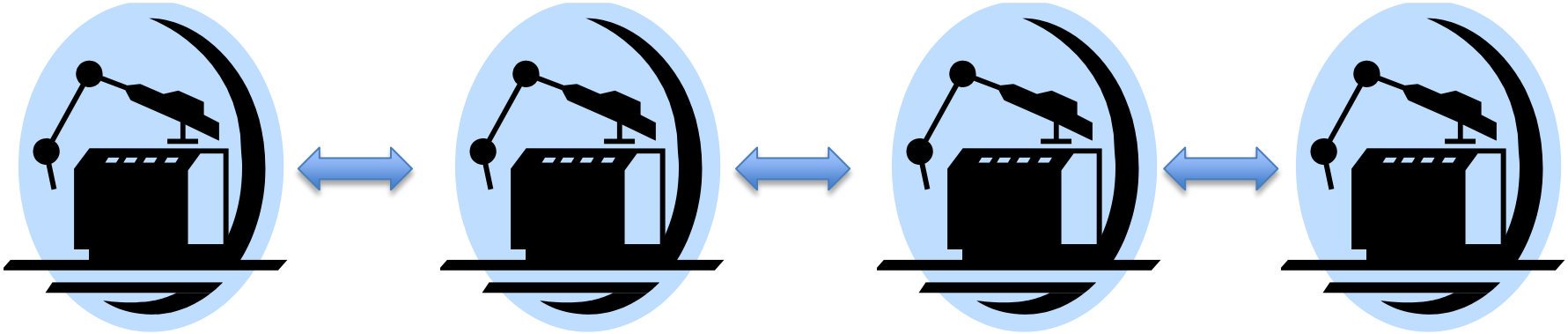


Peer facility comparisons



Peer process line comparisons

Equipment comparisons



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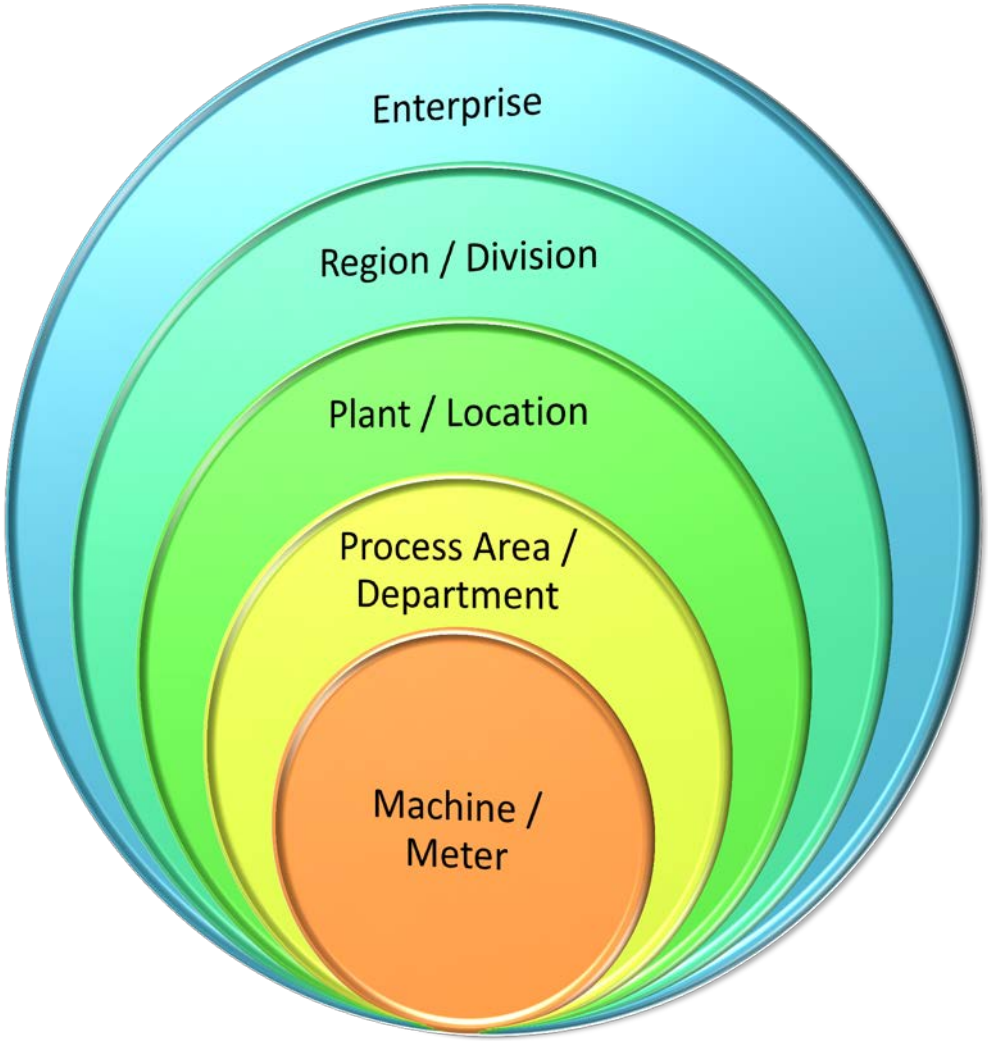
Measurement Strategy

Determine the Scope of Comparison



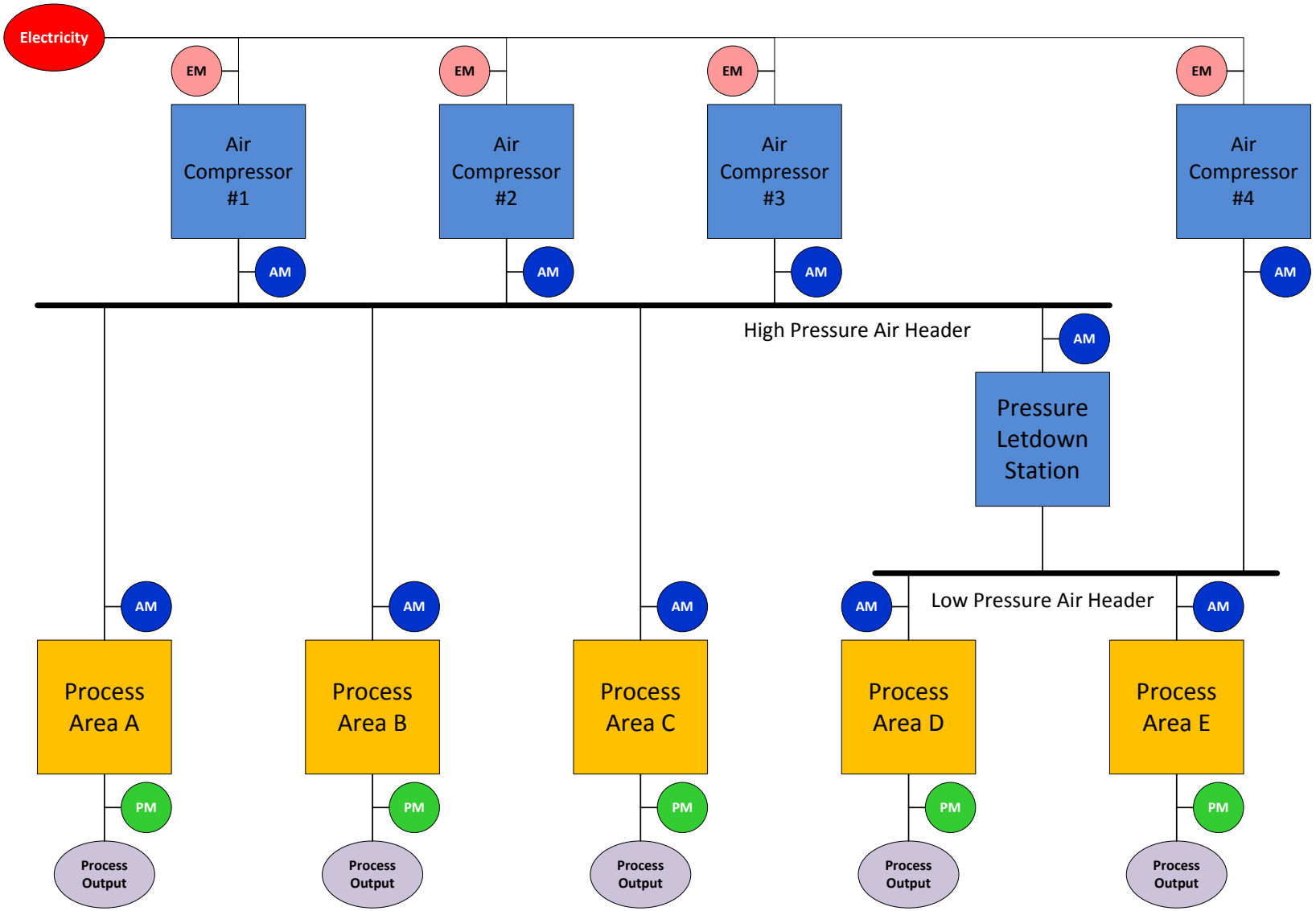
Drill Down

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



Factors Influencing Strategy

- 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

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Practical Considerations

Compromise: Cost vs. Results

Establishing Budget, Target Savings, and % ROI

- **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

Success Criteria – Measuring Improvement!

- 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

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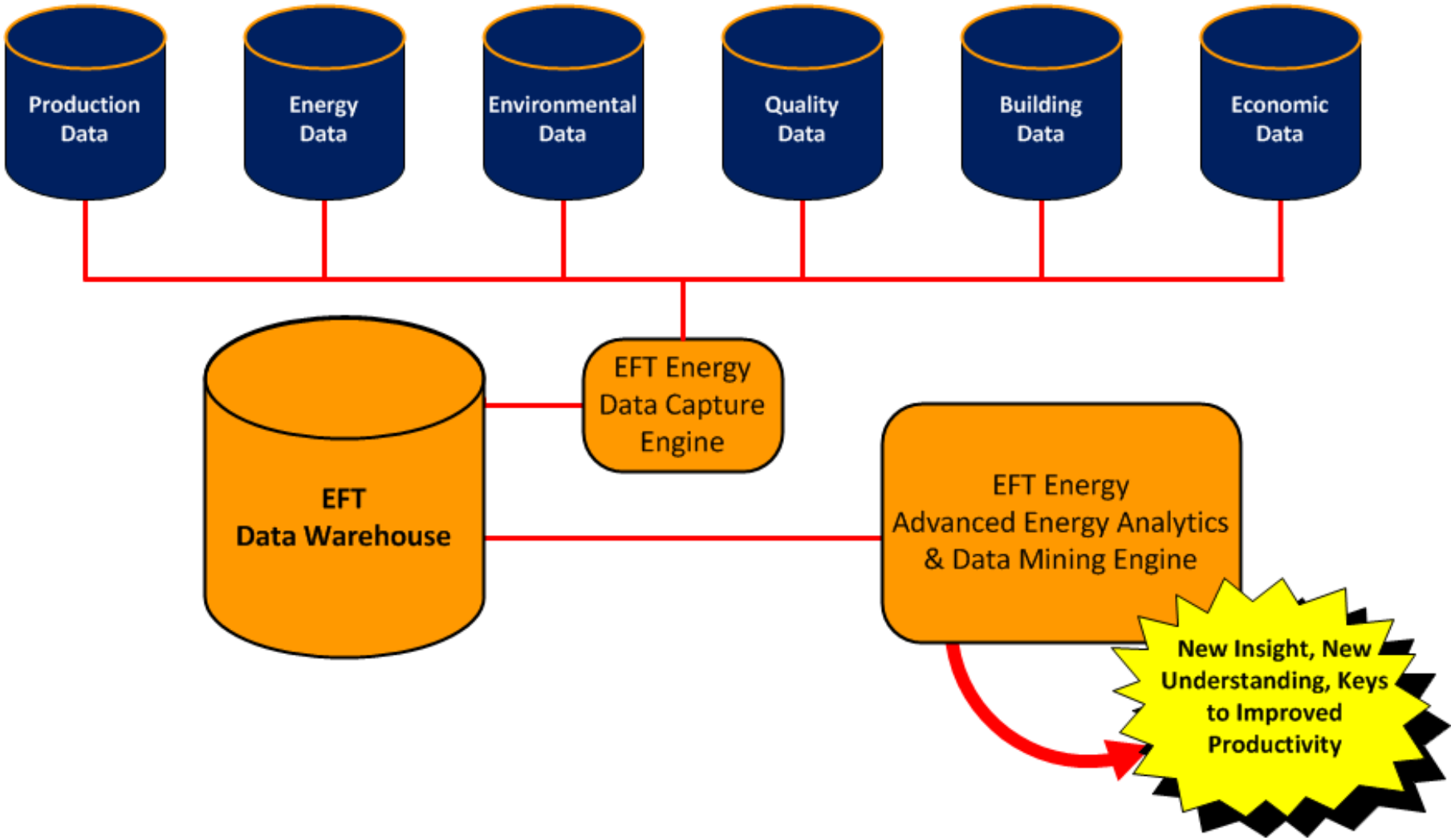
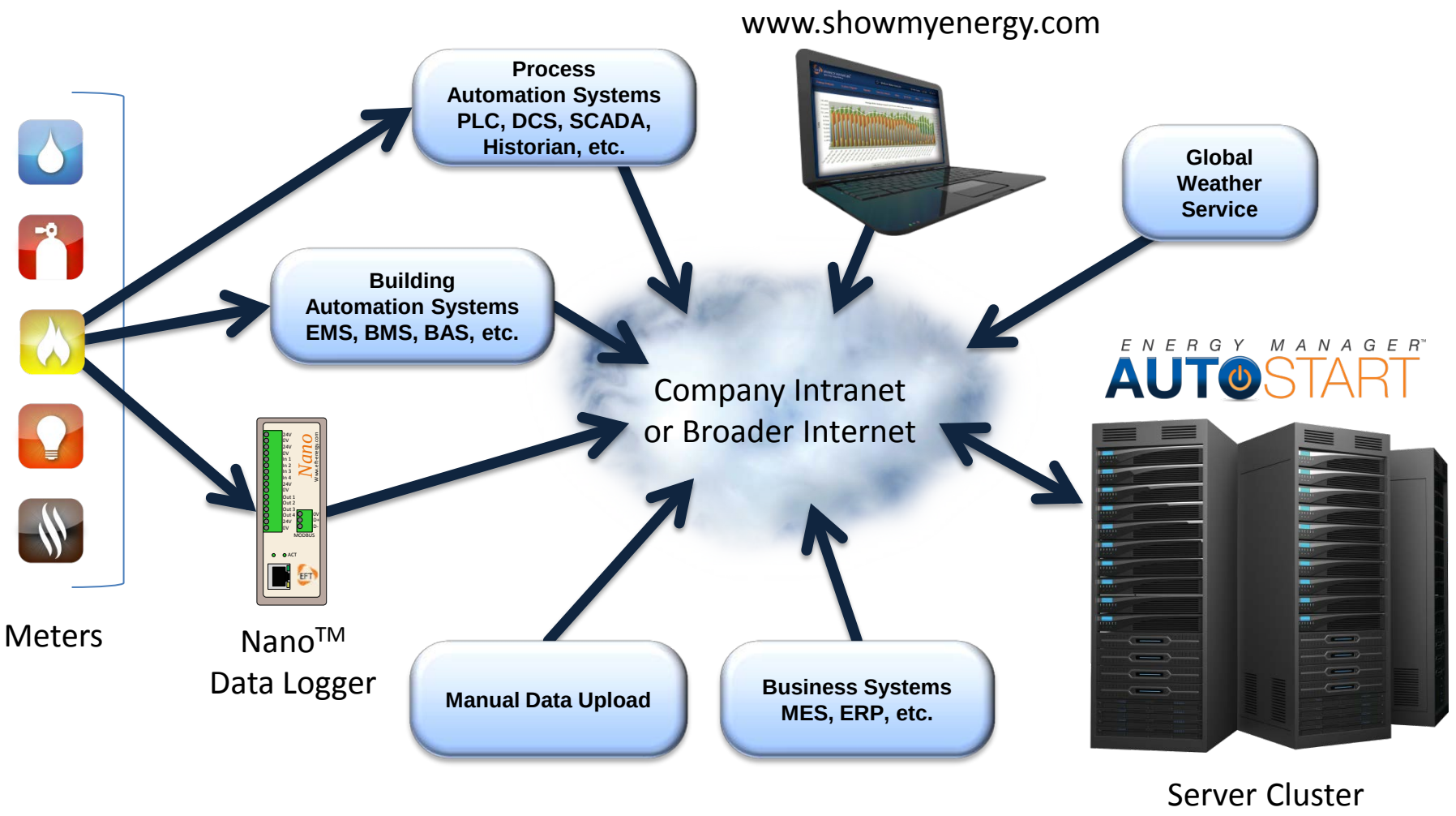
Data Sources / System Integration

Most Data Typically Resides in Isolated Systems



Integrated Data Provides a Comprehensive View of the Enterprise



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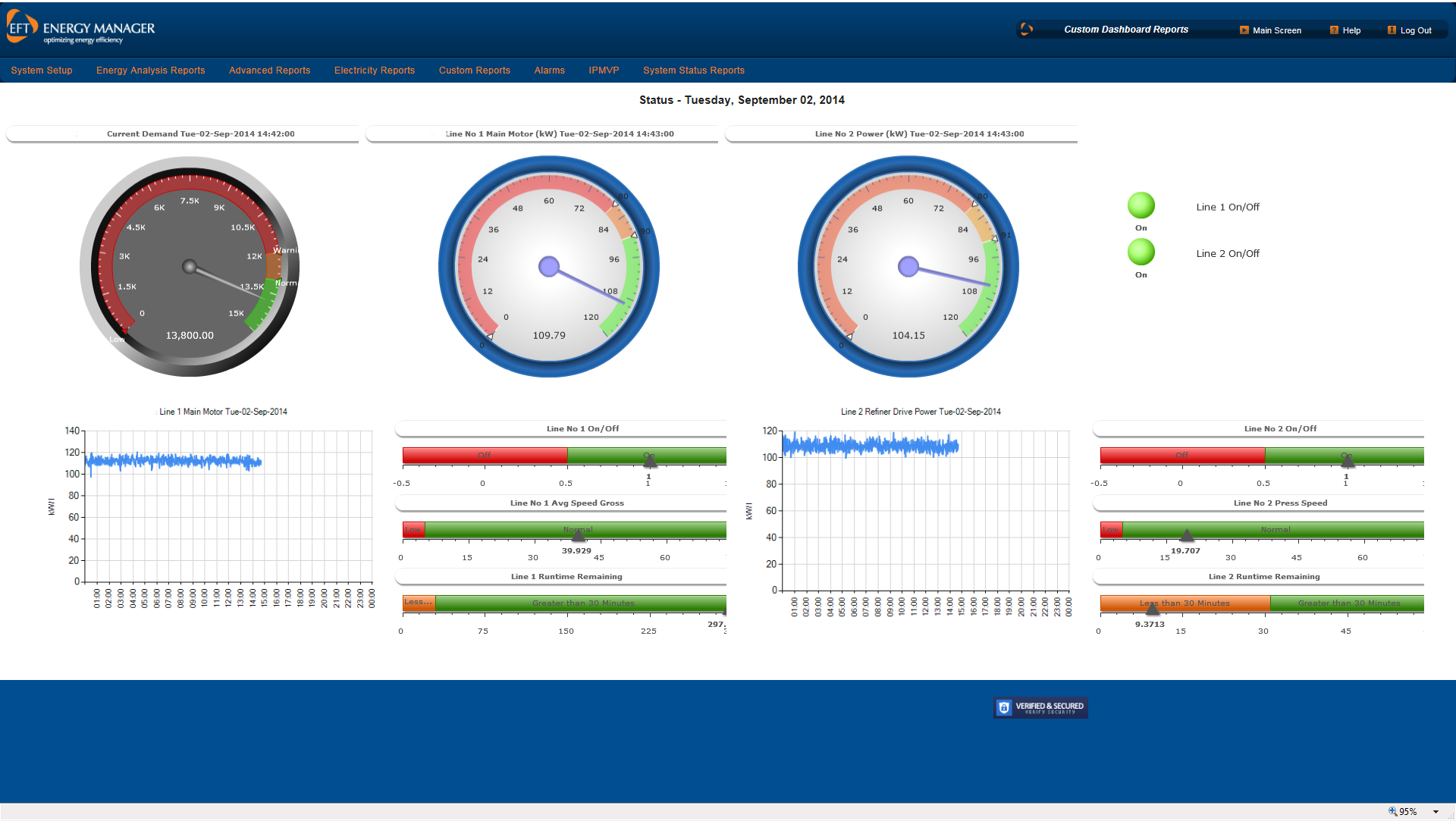
Analysis Tools

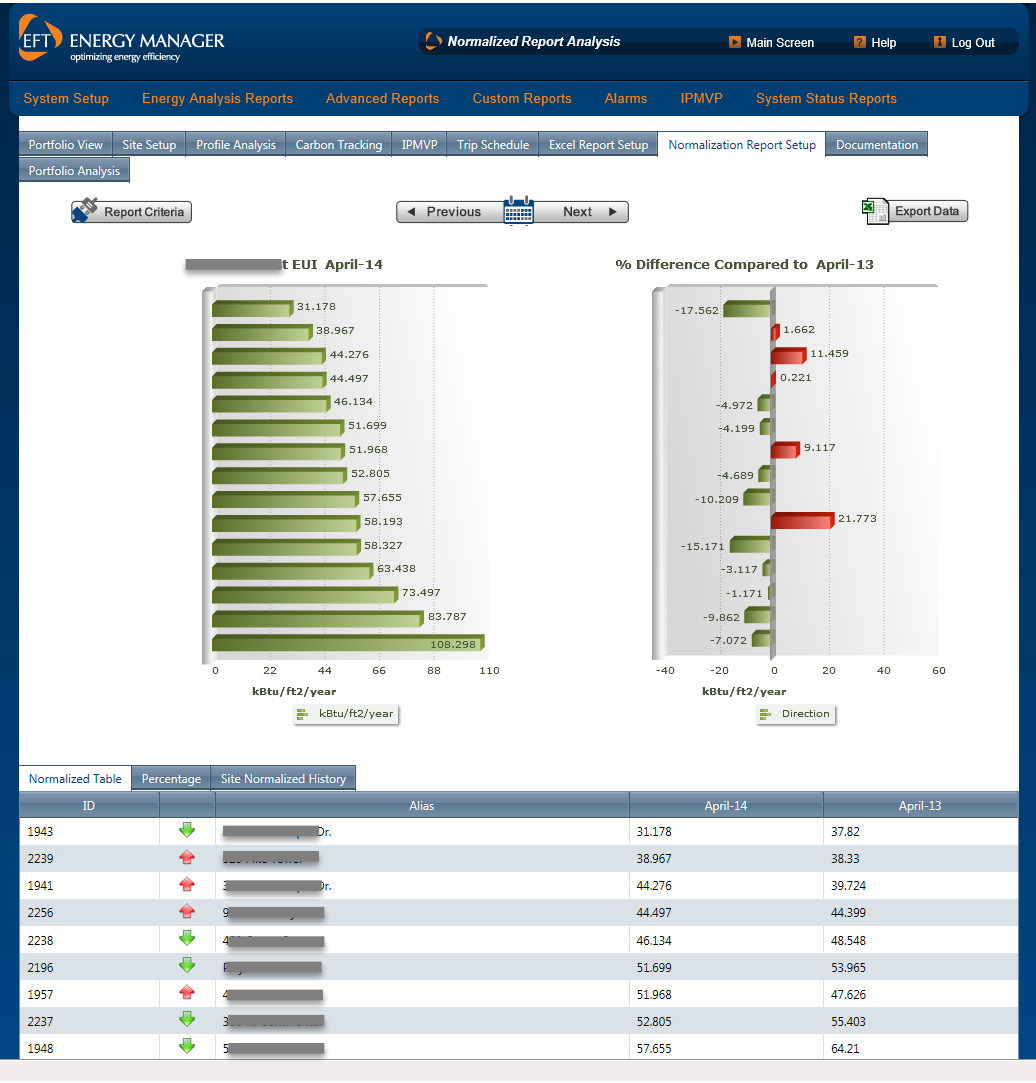
Real-time KPI's & Production / Energy Tracking



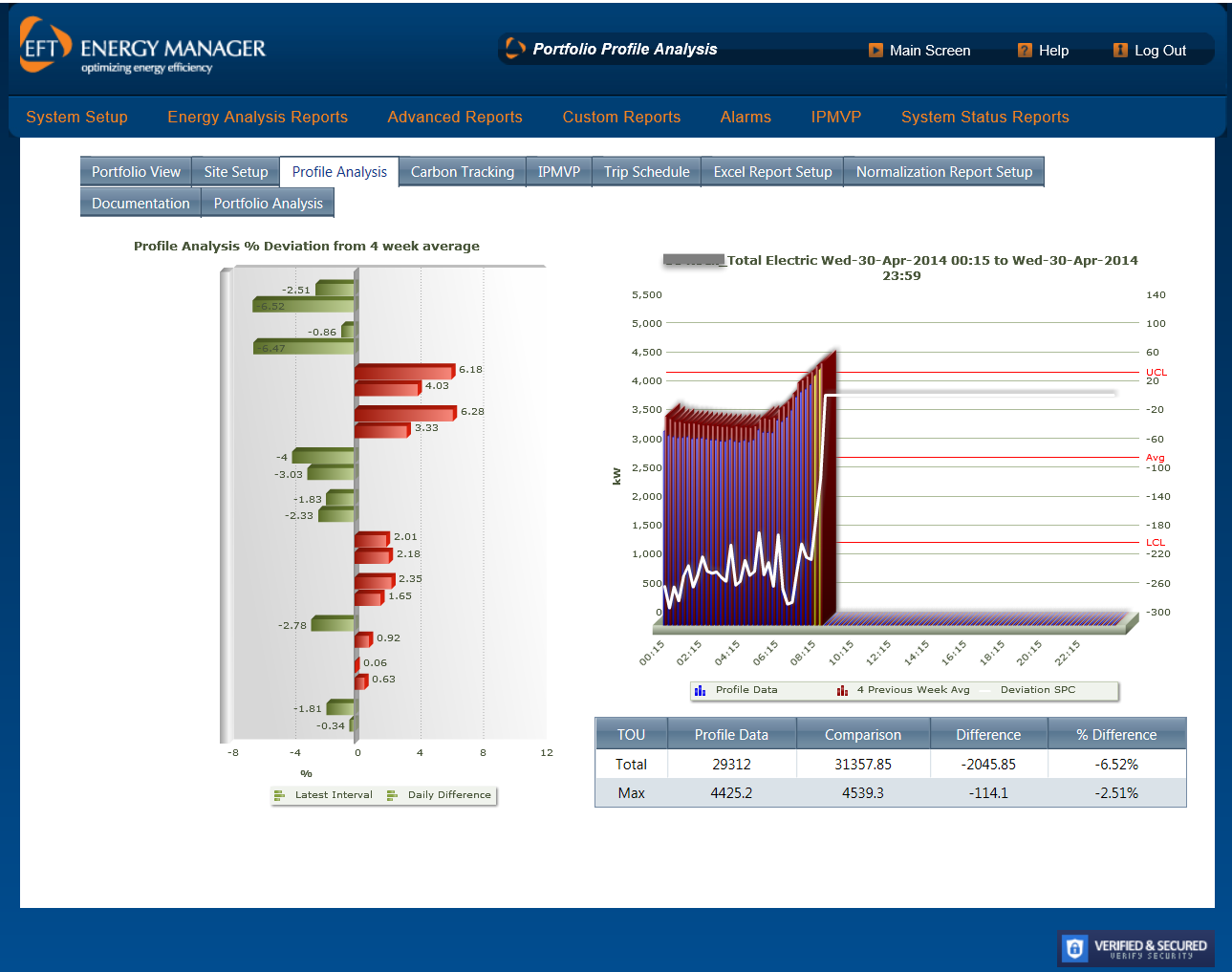
Line Operator Dashboard – Direct Feedback to Plant Floor

Normalized Comparisons – Corporate Rollup

Normalized Comparisons – Peer to Peer – KPI's



Profile Analysis – Time Series Analysis

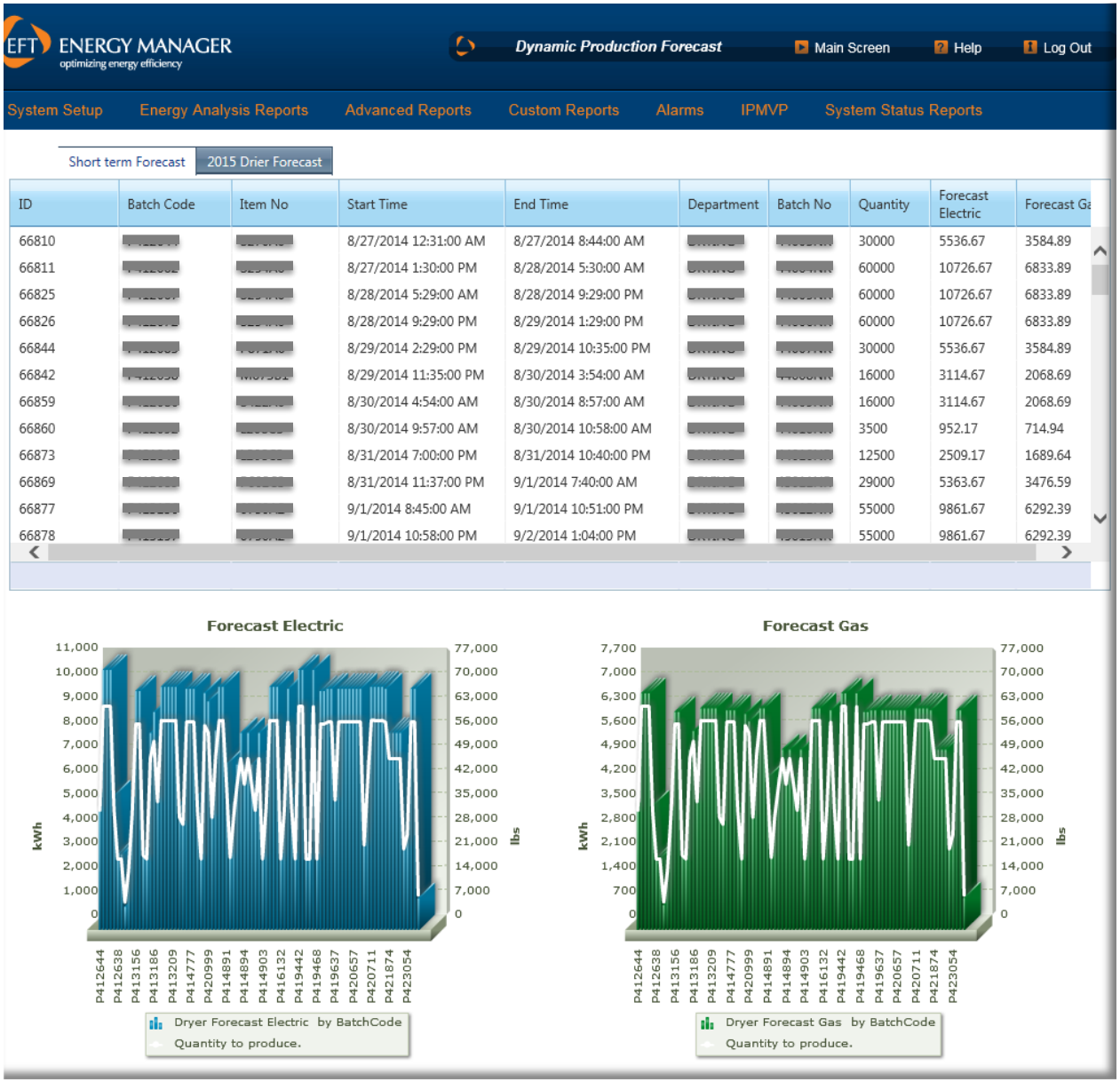


TOU	Profile Data	Comparison	Difference	% Difference
Total	29312	31357.85	-2045.85	-6.52%
Max	4425.2	4539.3	-114.1	-2.51%

Multi Variable Regression – M&V of Energy Conservation Measures

Multi Variable Regression – Forecasting

Dynamic Modeling / Forecasting



Energy Anomaly Detection

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Energy Anomaly Detection | Main Screen | Help | Log Out

System Setup | Energy Analysis Reports | Advanced Reports | Custom Reports | Automated Reports | Alarms | IPMVP | System Status Reports

Portfolio View | Profile Analysis | Building Performance | Carbon Tracking | Energy Anomaly Detection | IPMVP | Energy Forecasting | Trip Schedule

Calculations

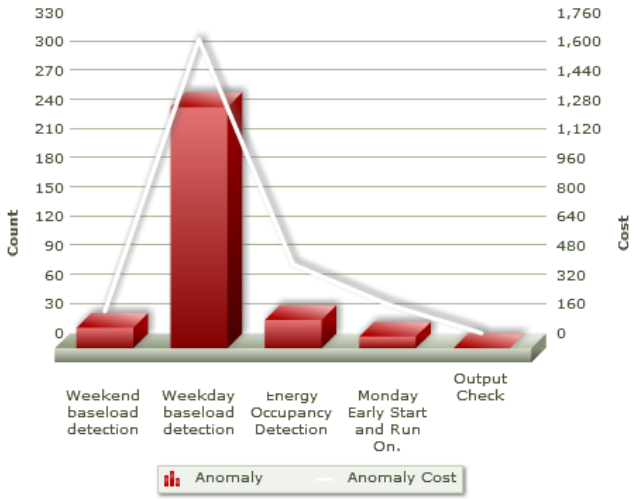
Export Data

Date	Site ID	Site	Anomaly Count	Time	Value	Cost Impact
November 12	885		269	2 Days, 19 Hrs, 15 Mins	43280.12	$1731.2048
November 12	945		41	0 Days, 10 Hrs, 15 Mins	13427.87	$537.1148

Date	Site ID	EAD	Energy Anomaly	Anomaly Count	Time	Value	Cost Impact
November 12	885	10	Weekend baseload detection	21	0 Days, 5 Hrs, 15 Mins	2977.87	$119.1148
November 12	885	19	Weekday baseload detection	248	2 Days, 14 Hrs, 0 Mins	40302.25	$1612.09
November 12	945	20	Energy Occupancy Detection	29	0 Days, 7 Hrs, 15 Mins	9437.62	$377.5048
November 12	945	26	Monday Early Start and Run On.	12	0 Days, 3 Hrs, 0 Mins	3990.25	$159.61
November 12	945	35	Output Check	0	0 Days, 0 Hrs, 0 Mins	0	$0

Enterprise Site Anomaly Count Mon-05-Nov-12

All Enterprise Site Anomalies



Questions

Contact Data

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