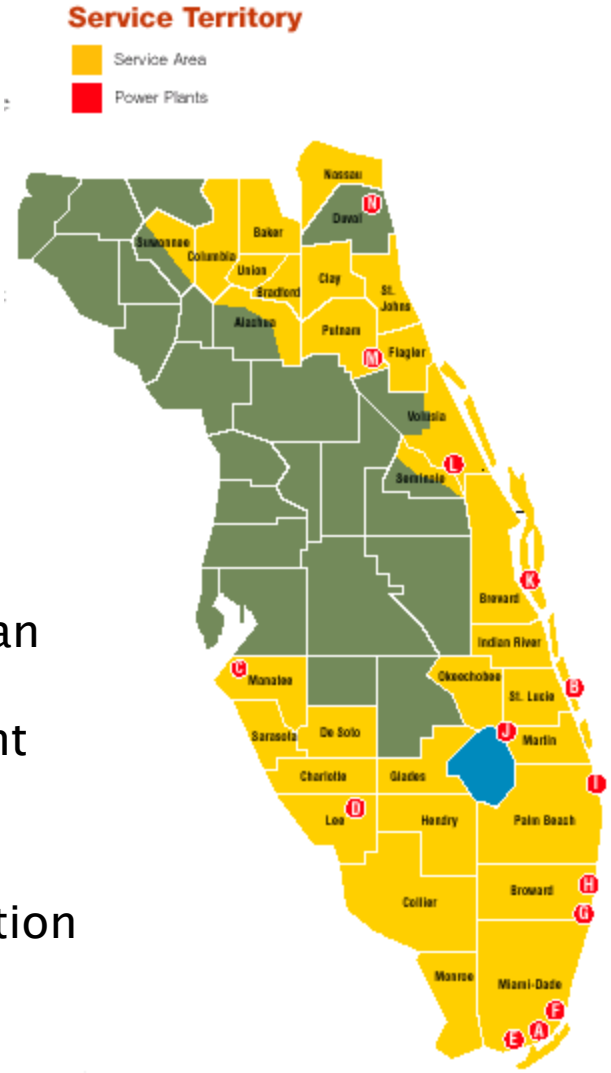
Designing and Implementing Effective Performance Assurance Plans

October 16, 2012
Ed Anderson, PE CEM
FPL Federal Sales Manager

FPL Fun Facts

- Part of the NextEra Energy family
  - NextEra Energy Resources
  - FPL Energy Solutions
  - GEXA
  - FPL (Utility)
- 3rd largest investor-owned utility
  - Typically #1 or 2 in Energy Efficiency (DSM programs)
  - Lowest Electric Rates in the State (25% lower than National Average)
  - In 2010, commissioned Nation's largest PV plant and the first solar preheat fossil plant.
- Completed 50 UESC projects since 1995
  - First Basic Ordering Agreement (BOA) in the Nation
  - Seven different agencies



Term Confusion

Measurement and Verification

Baseline

Performance Based Contract

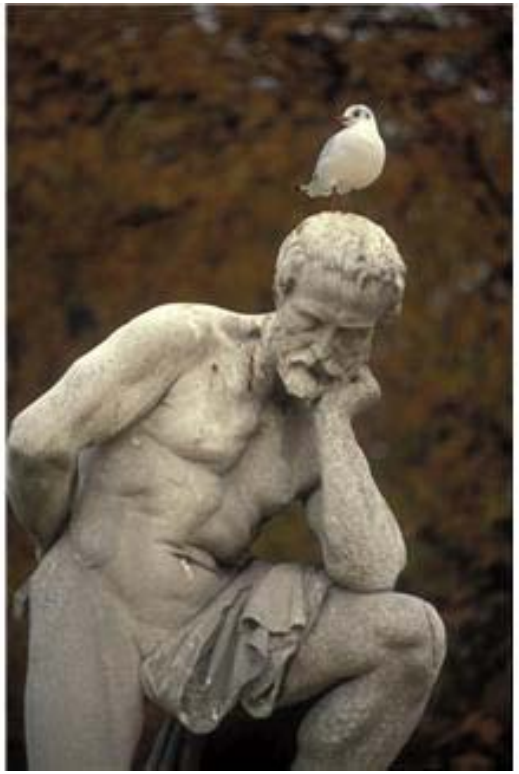
Commissioning

Retro-Commissioning

Re-Commissioning

Performance Assurance

Savings Guarantees



Performance Based Contracts

Based on demonstrating the performance of the installed equipment and systems.

The Statement of Work includes equipment and system performance metrics and measuring tools and processes.

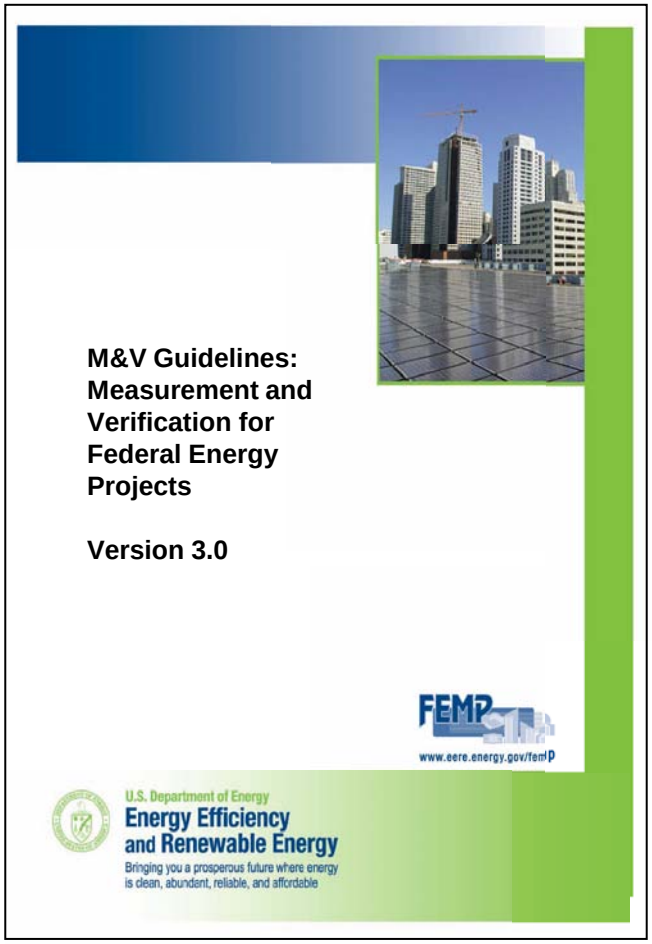
Measurement and Verification Protocols

Options A: Retrofit Isolation with Key Parameter Measurement

Option B: Retrofit Isolation with All Parameter Measurement

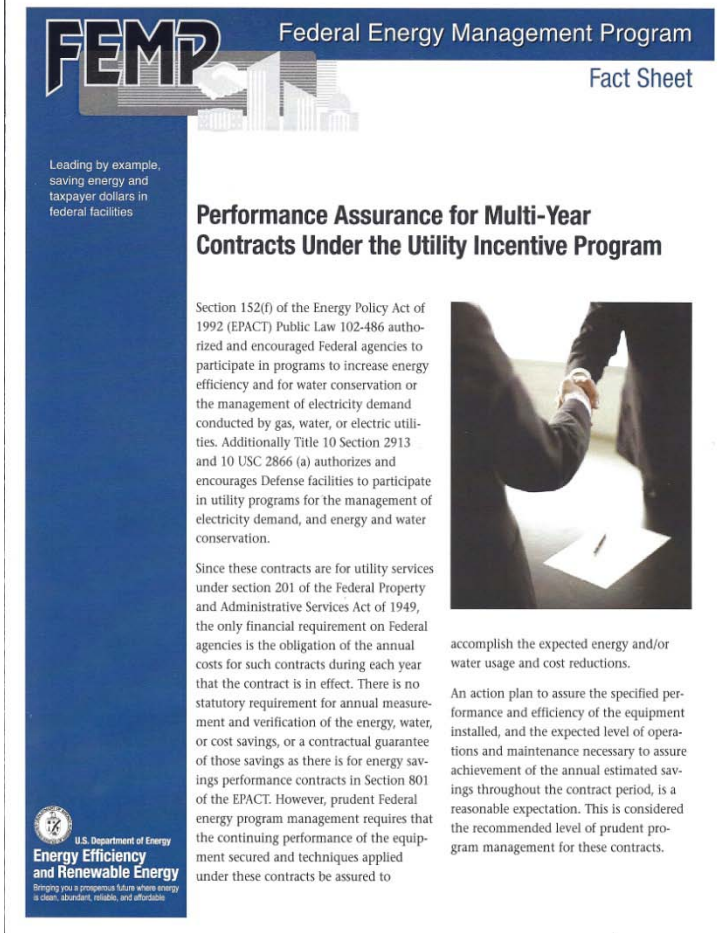
Option C: Whole Building Metering

Option D: Calibrated Computerized Simulation



Performance Assurance

1. Start-up performance verification (based on measured data)
2. Performance verification at the end of warranty period (based on measured data)
3. Operations and maintenance training
4. Provision of continuing training throughout the contract period as specified in the contract as determined by the needs of the facility
5. Periodic inspections and verification of appropriate O&M performance
6. Performance discrepancy resolution



FEMP Federal Energy Management Program

Fact Sheet

Leading by example, saving energy and taxpayer dollars in federal facilities

Performance Assurance for Multi-Year Contracts Under the Utility Incentive Program

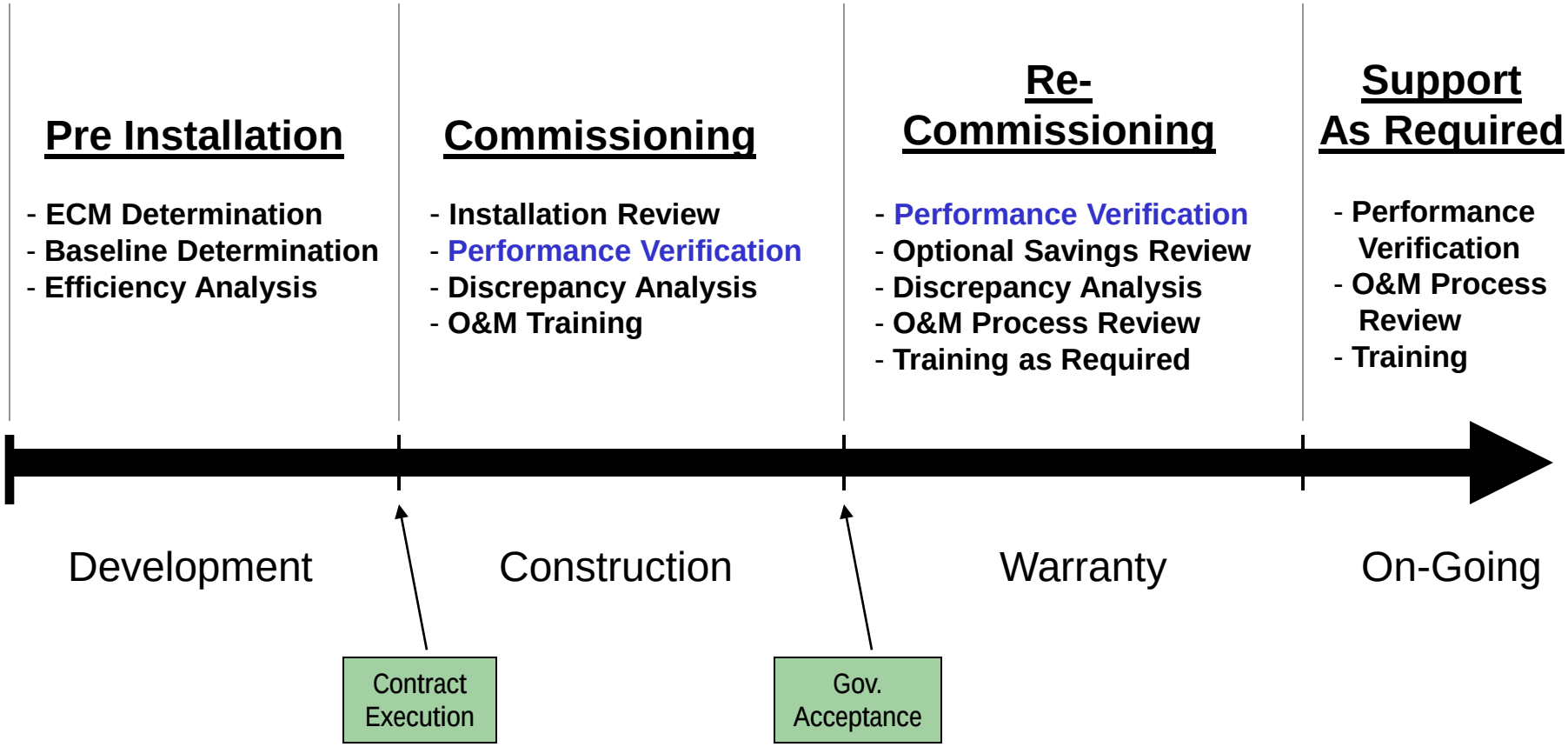
Section 152(f) of the Energy Policy Act of 1992 (EPACT) Public Law 102-486 authorized and encouraged Federal agencies to participate in programs to increase energy efficiency and for water conservation or the management of electricity demand conducted by gas, water, or electric utilities. Additionally Title 10 Section 2913 and 10 USC 2866 (a) authorizes and encourages Defense facilities to participate in utility programs for the management of electricity demand, and energy and water conservation.

Since these contracts are for utility services under section 201 of the Federal Property and Administrative Services Act of 1949, the only financial requirement on Federal agencies is the obligation of the annual costs for such contracts during each year that the contract is in effect. There is no statutory requirement for annual measurement and verification of the energy, water, or cost savings, or a contractual guarantee of those savings as there is for energy savings performance contracts in Section 801 of the EPACT. However, prudent Federal energy program management requires that the continuing performance of the equipment secured and techniques applied under these contracts be assured to accomplish the expected energy and/or water usage and cost reductions.

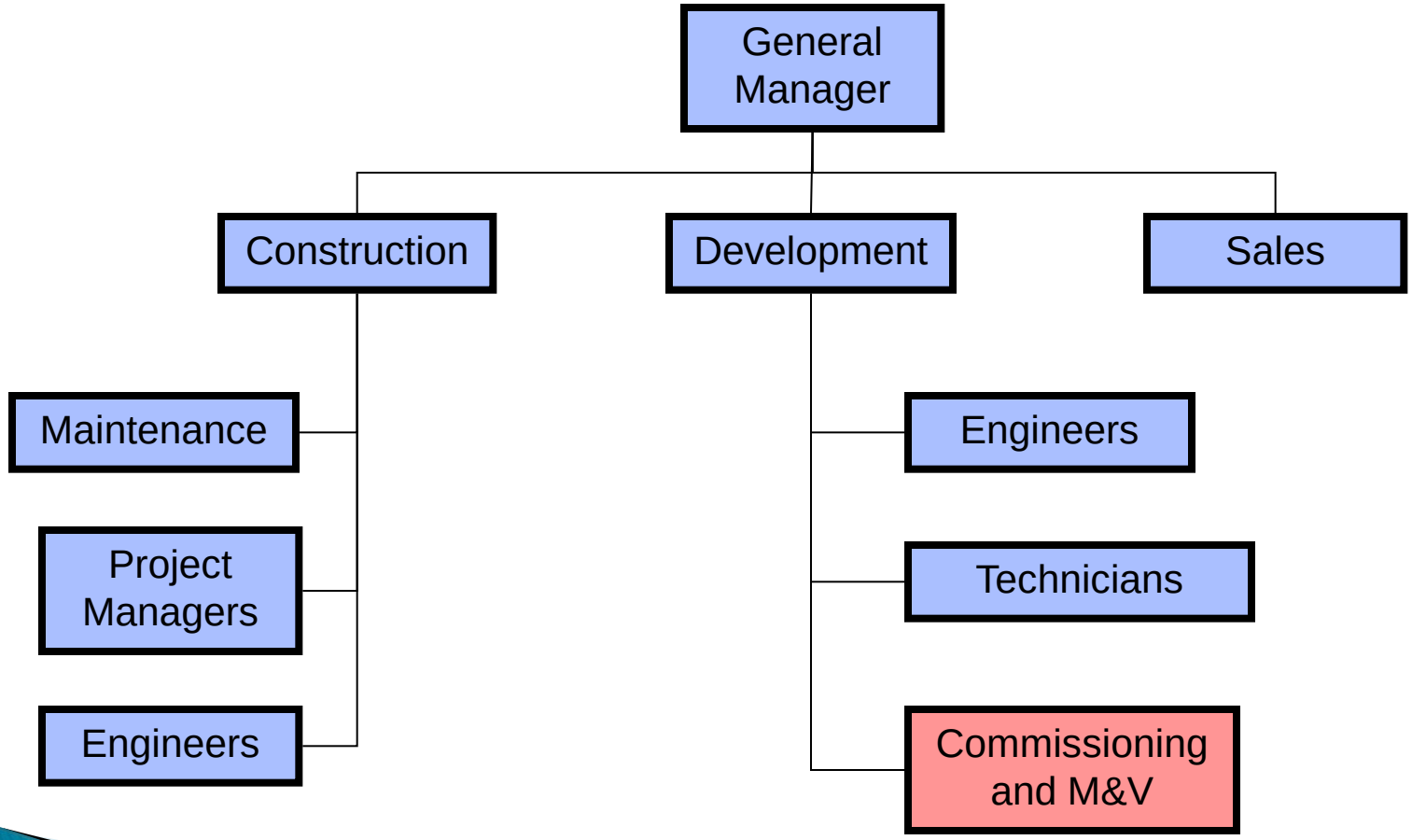
An action plan to assure the specified performance and efficiency of the equipment installed, and the expected level of operations and maintenance necessary to assure achievement of the annual estimated savings throughout the contract period, is a reasonable expectation. This is considered the recommended level of prudent program management for these contracts.

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Total Project Performance Assurance Process



FPL Organizational Structure (Abbreviated)



Commissioning Process

2 Steps:

Pre-functional

1.) Validate Equipment Installation
- Installation Complete and Safe
- Installed per SOW
- Meets all Building and Construction Codes
- Equipment Operation and Maintenance Training

Functional

2.) Verify Equipment Performance
- Output (Lumens, Water temp, Gallons/flush…)
- Input (kW, BTU, therms….)
- Efficiency (Output/Input)
- Control (On/off, rpm, set-points, schedules…)
- Document and Submit Report

Defining Facility Operations Parameters and Performance Baselines

Commissioning Process

2. Pre-functional Checklist

a) As - Built for the lighting system is complete and approved: N/A / Yes / No

b) All punchlist items for this ar

c) All existing lighting

lamps operate during

d) Documentation of li

e) All M&V pre-installa

PAFB Building 1645 Lighting Baseline and Performance Verification

Pre-Retrofit Measurements					Post Retrofit Measurements (Baseline)				Year One Verification			
Fixture Type & Code - Cross Reference Audit	Number of Fixtures	Measured Watts	PF	Foot Candle	Fixture Type & Code - Cross Reference Audit	Measured Watts	PF	Foot Candle	Fixture Type & Code - Cross Reference Audit	Measured Watts	PF	Foot Candle
2x2 2 Lamps "U"	1	57	0.93	84	2x2 2 lamp F17	30	0.96	73	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	48	0.85	86	2x2 2 lamp F17	27	0.93	71	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	56	0.9	60	2x2 2 lamp F17	30	0.95	45	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	53	0.91	58	2x2 2 lamp F17	31	0.93	40	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	54	0.9	53	2x2 2 lamp F17	29	0.95	44	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	55	0.92	50	2x2 2 lamp F17	30	0.95	48	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	54	0.95	46	2x2 2 lamp F17	30	0.94	32	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	54	0.92	48	2x2 2 lamp F17	31	.94.	35	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	56	0.9	42	2x2 2 lamp F17	30	0.94	38	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	51	0.91	50	2x2 2 lamp F17	30	0.88	39	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	56	0.99	46	2x2 2 lamp F17	31	0.93	40	2x2 2 lamp F17			
2x2 2 Lamps "U"	1	58	0.99	46	2x2 2 lamp F17	31	0.95	35	2x2 2 lamp F17			

Step	Mode		
1	Standard Operation		
2	Emergency Lighting	Functional Test No. 2: a) All switches turned off b) For Battery backup press test button.	Verify/identify: a) All emergency lights on, record any lights off. b) Battery Backup light functions
3	Occupancy Sensors	Functional Test No. 3: a) With lights off enter room. b) Sensor Placement	a) Verify all lights on, record any lights off. b) Very occupancy sensor can view all areas of the room
4	Daylighting Controls	Functional Test No. 4: a) During daylight hours, observe lights. b) Simulate reduction in day light, observe lights. c) During night hours, observe lights.	a) Verify lights are off, record any lights on, record light levels. b) Record light levels, verify lights turn on when interior light levels drop below proper level. b) Verify lights are on, record any lights that are off, record light levels.
5		Repeat step 1 & 2 for all lighting panels on all floors	

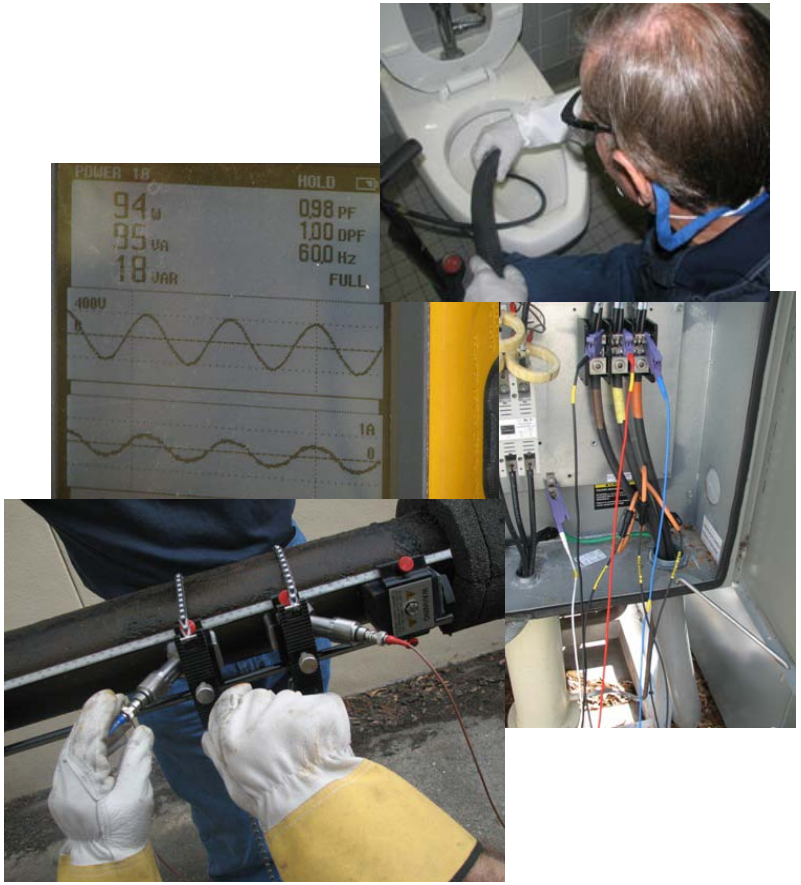
Re-Commissioning Process

3 Parts:

1.) Verify Equipment Performance
- Output (Lumens, Water temp, Gallons/flush…)
- Input (kW, BTU, therms….)
- Efficiency
- Control (On/off, rpm, set-points, schedules…)

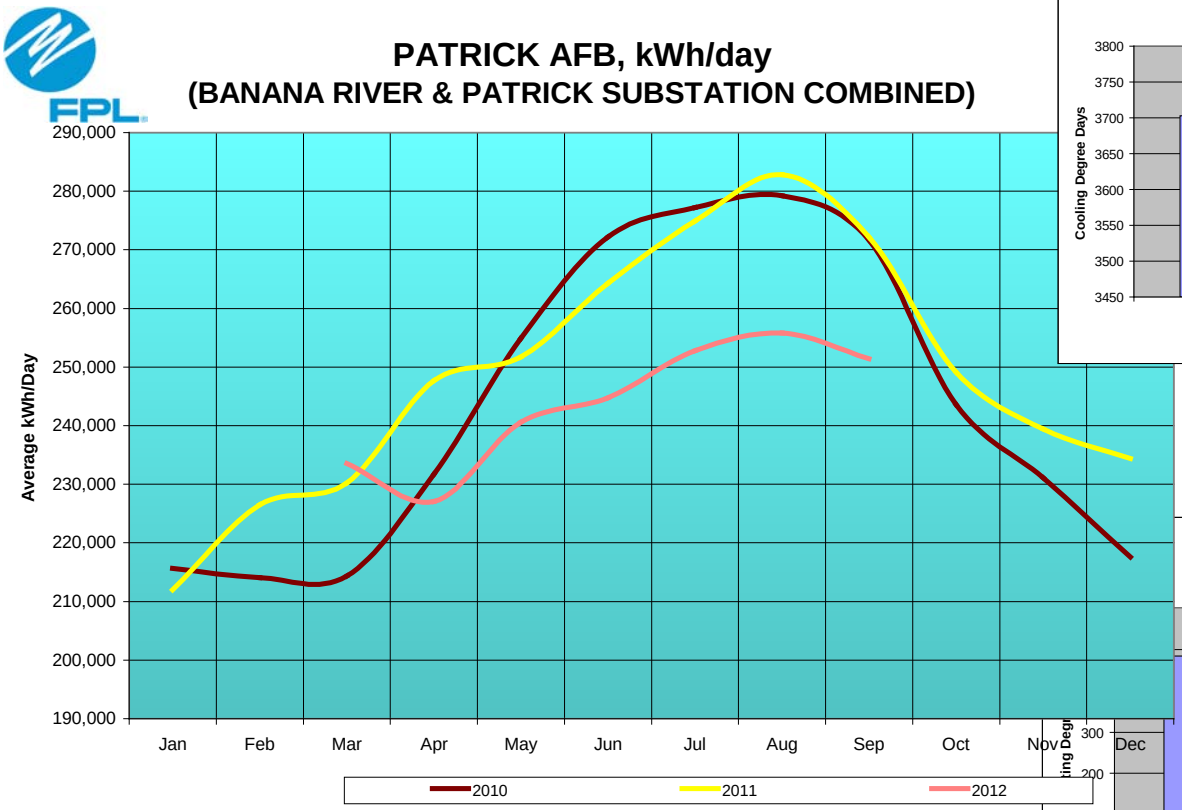
2.) Verify Operating Parameters
- O&M Processes
- Building/Area Usage
- Weather Variations

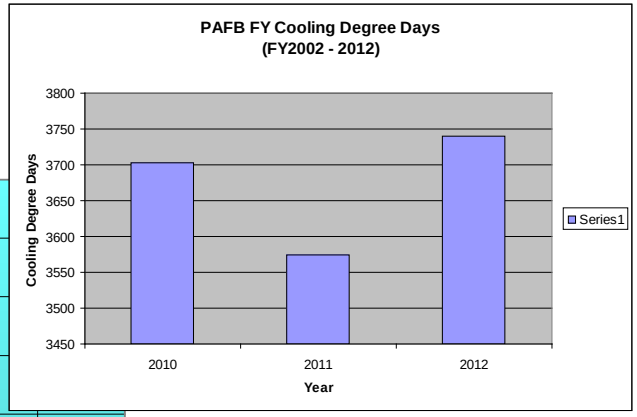
3.) Identify/Investigate Performance Variations
- Analyze Scope of Variation/Cause/Affects
- Identify Repair Options (if any)
- Document and Submit Report

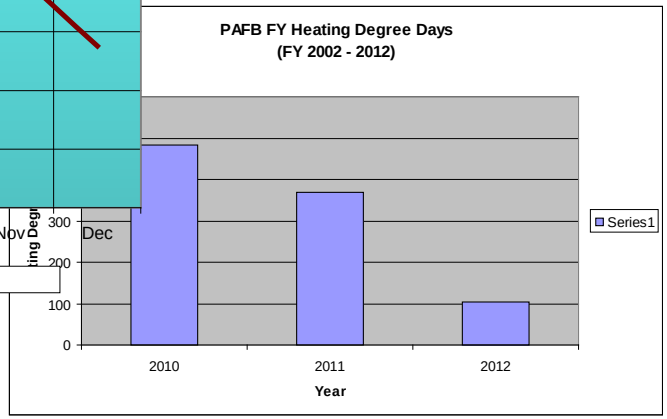


<u>Re-Defining Facility Operations Parameters and Performance Baselines</u>

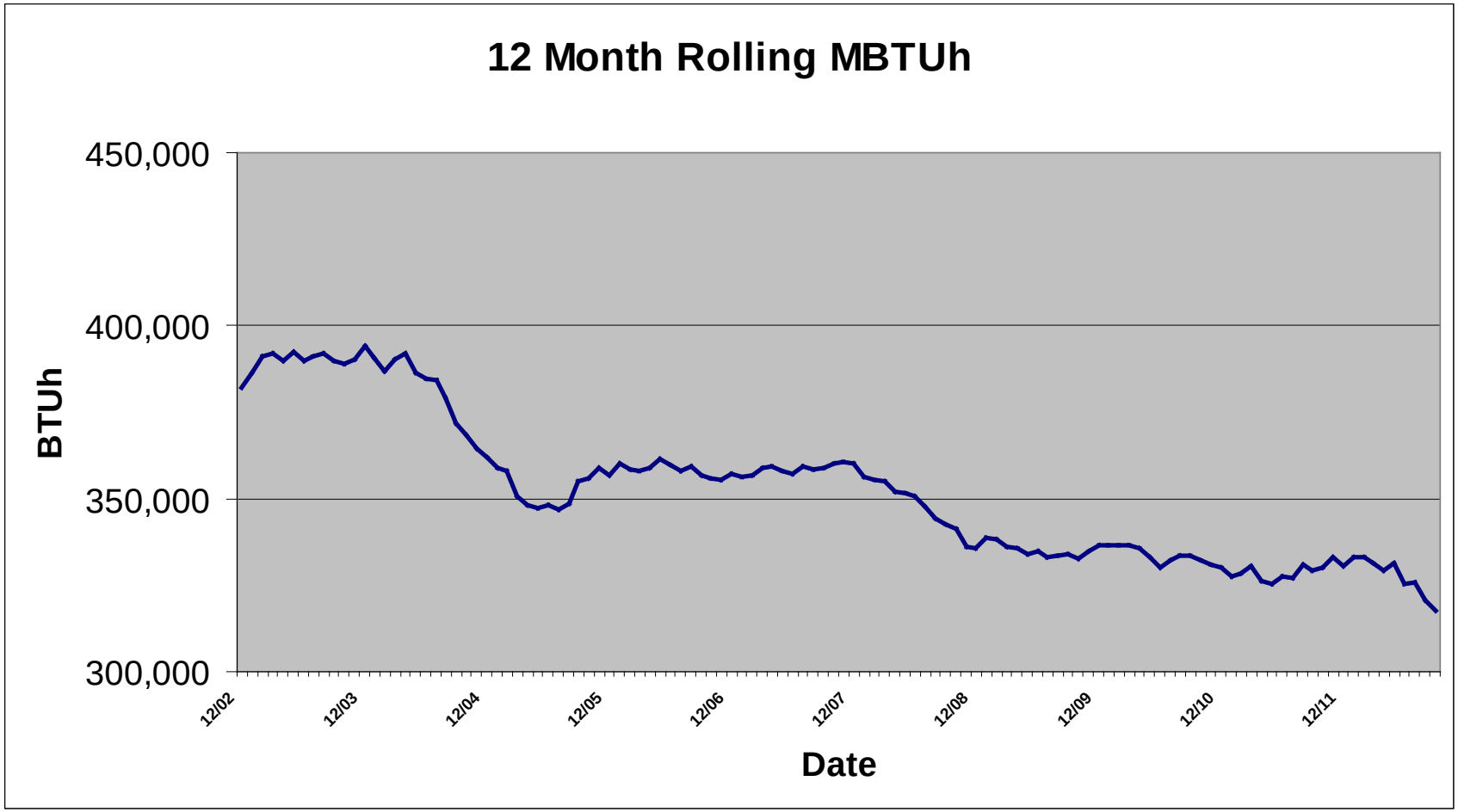
Whole Facility Metering



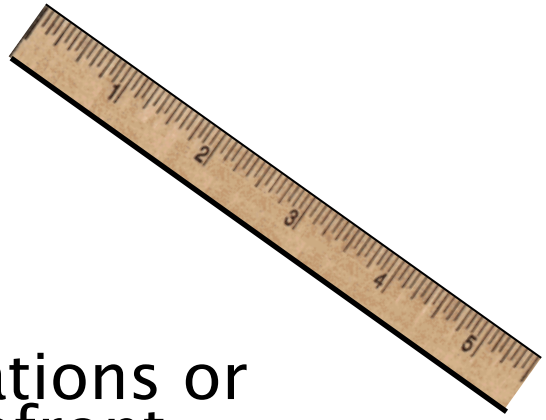




Whole Facility Metering



FPL Recommendations



- Understand Customer Expectations or Requirements In Detail and Upfront
  - Negotiate to acceptable level
  - Utilize detailed explanation and real examples
- Get Commissioning Team Involved Early
  - Involvement in ECM identification
  - Involvement in savings analysis
- Continuous Communication
  - Contracting
  - Engineering
- Deliver Formal Documents and Hold Review Meetings
  - Customer understand and accepts:
    - Baseline determinations
    - Analysis processes
    - Ownership requirements

Contact

Ed Anderson
UESC Federal Sales Manager
Ed.a.anderson@fpl.com
321-626-1010