Whole System Approach to Improving Efficiency in Industrial Facilities

Motor System Savings Opportunities post EISA

12 April 2011
Overview

- What are the implications & consequences of EISA
- What does the C&I motor population look like after a decade + of program influence?
- Where are the energy savings in motor systems now?
- Various approaches to energy savings and collaboration
Implications of EISA

- NEMA Premium® became Federal standard on 19 December 2010 through EISA Legislation
  - Goal: Improve national motor efficiency over time through attrition
- EPAct class motors still for sale until inventories consumed
- Increased expense of NEMA may force end users to repair more old, inefficient motors versus replace
- Expanded coverage, but still does not cover all classes of motors
# NYS Motor Inventory Analysis

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Total kW Savings: $1,388.88$

Total kWh Savings: $9,760,427.04$

% NEMA at Fail: **55.9%**

% Retrofit: **12.7%**

Applied Proactive Technologies, Inc.
Observations

- In NYS 80+% of motors are not NEMA Premium
  - Eventually will be replaced with NEMA Premium through attrition, **BUT**
  - Motors are being repaired, not replaced – could increase after EISA
  - Old, inventoried motors are being used as replacements

- NEMA Premium represents only a 0.5 – 4.0% efficiency gain

- System Approach can obtain 10-50+% efficiency gains

- 60+% of motors are driving centrifugal / variable loads
  - Yet, many of these applications are not controlled by VFD

- Existing and emerging technologies can be implemented
Various Opportunities

- Retrofits to accelerate migration to NEMA Premium
- Definite and special purpose motors and Type 2 motors.
- Permanent Magnet motors

System Approaches
- VFD
- Synchronous belting
- Synthetic lubricants
- Helical gearing

Efficient motor repair
- Even low HP motors are being rewound/repaired due to first cost, mis-information and not having analysis tools like Motor Master.

Motor Inventories and Best Practice Motor Management Training
Examples

- Properly programmed VFD can save 20-50%, including ability to stop the process when not in use.
- Synchronous belting can obtain 5+% in decreased losses
- Synthetic lubricants can obtain 5-10% in decreased losses
- Helical (vs. worm) gearing can save 20-30%
- Direct Drive PM motors (embedded controls) 20-50%*

Hasbro, Longmeadow MA
  - Retrofit 40 air handlers with VFD and synchronous belting
  - Actual measured system savings of 20-30+%  
  - Greatly reduced maintenance

* Over replaced existing fixed speed
Value of Facility Assessments

- System opportunities can be obtained now, even though motor populations may be pre-NEMA for years to come.
- Using Motor Audits as a means of gaining access to facilities and personnel – Management, Purchasing, C-Level
- Best Practice Motor Management training
- Shepherd opportunities to DOE IAC, E3, Utility program, etc.
- Collaborative effort between end user and motor service provider
Thank you

Questions or Comments?

ACEEE MT Symposium 2011
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