Presentation on Energy Management Standard and System Optimization

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Structure of the Presentation

I. Energy System Optimization

II. Energy Management Standard, EnMS

III. Promotion of EnMS in South Africa, the dti/UNIDO Project on IEE

I. Energy System Optimization

Industrial Energy Systems

- Shift the FOCUS from component optimization (5-10% saving potential) to system optimization (40-50%)
- Steam and motor-driven systems account for approximately for >50% of final manufacturing energy use worldwide [1]
- Widely used in USA, Germany, soft wares available.

1 2007 IEA Statistics

Elements of System Optimization

- Evaluating work requirements
- Matching system supply to these requirements
- Eliminating or reconfiguring inefficient uses and practices (throttling, open blowing, etc)
- Changing out or supplementing existing equipment (motors, fans, pumps, compressors) to better match work requirements and
- Increase operating efficiency

Elements of System Optimization

- Applying sophisticated control strategies, such as variable speed drives, that allow greater flexibility to match supply with demand
- Identifying and correcting maintenance problems
- Upgrading ongoing maintenance practices

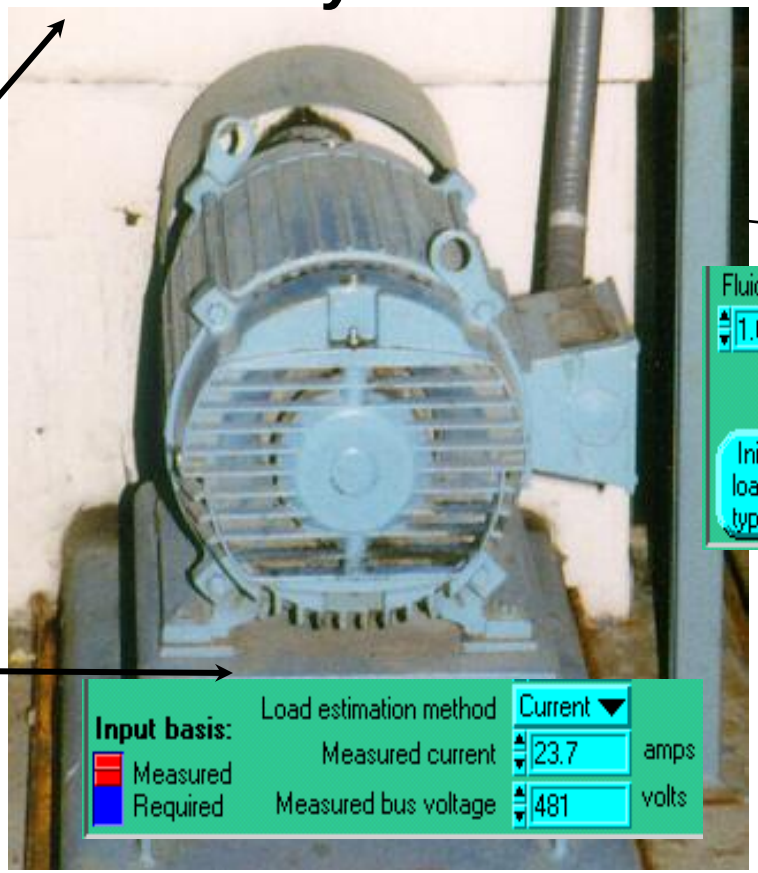
System improvements in China

System /facility	Total Cost $US	Energy savings kWh/y	Payback Period
Compressed air/forge plant	18,600	150,000	1.5 years
Compressed Air/machinery	32,400	310,800	1.3 years
Compressed air/tobacco	23,900	150,000	2 years
Pump system/ hospital	18,600	77,000	2 years
Pump system/ pharmaceuticals	150,000	1.05M	1.8 years
Motor systems/ petrochemicals	393,000	14.1M	0.5 years

Optimizing a Motor System

15 kW Motor
Efficiency is ~ 91%

Calculated Results:	Existing pump, motor
Motor rated hp	20
Shaft power, hp	19.6
Motor efficiency, %	90.6
Motor power factor, %	81.9
Motor current, amps	23.7
Electric power, kWe	16.2
Annual energy, MWhr	141.7
Annual cost, $1,000	7.7



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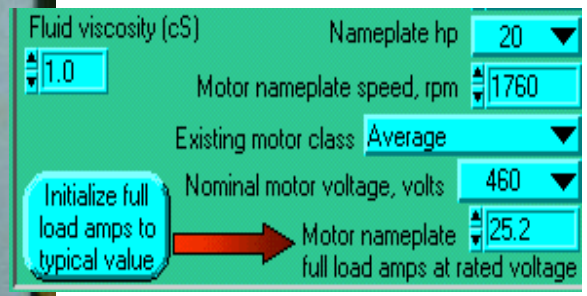
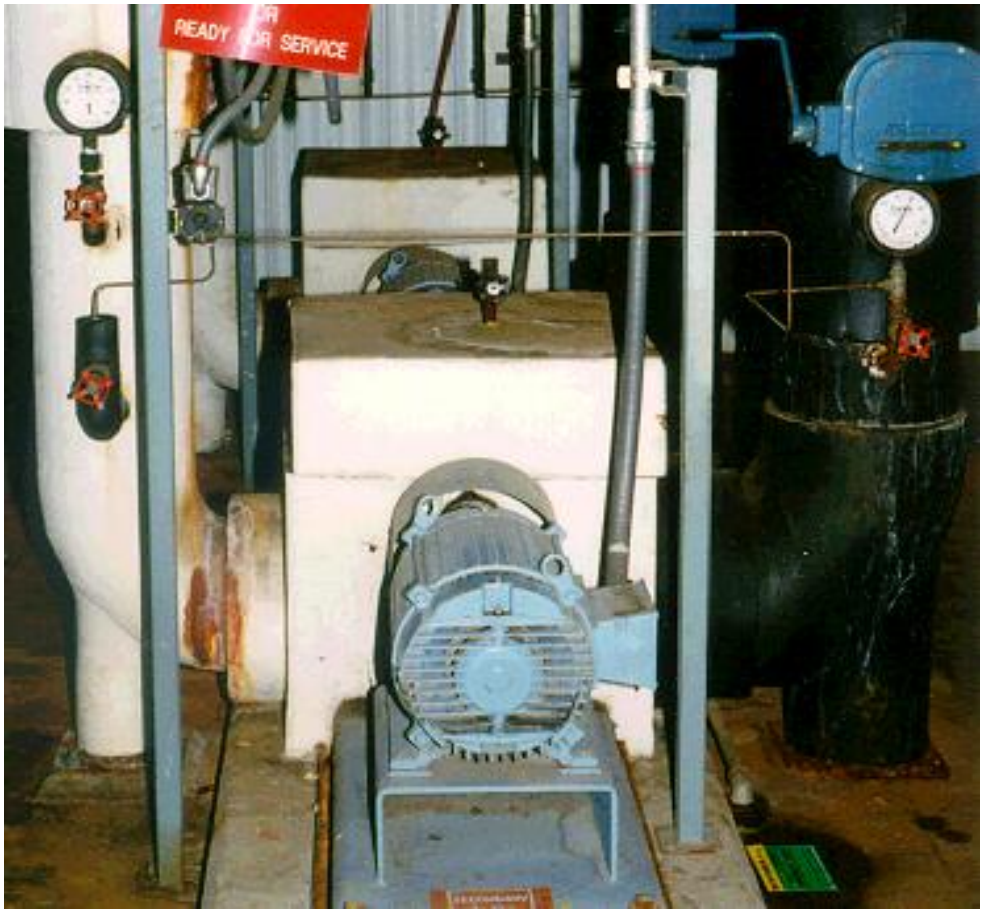


Measured electrical data

Information courtesy of Don Casada, Diagnostic Solutions, LLC

Expanding the Box to include the pump



Pump head: 36 m
Flow rate: 97.6 m^3/h

=> hydraulic power: 9.6 kW

Combined pump and motor efficiency = 59%

Expanding the box still further –to include the discharge valve

There is > 28 m pressure drop across the throttled valve

Actual delivered hydraulic power = 2.1 kW

Actual *System* Efficiency is only 13%

Additional barriers to efficiency

- System optimization knowledge resides with the individual who has been trained, it is not institutionalized
- Trained individuals leave or transfer and take this knowledge with them
- Processes change over time and inefficiencies can re-occur
- *How can system energy-efficiency be maintained in this complex, changing environment*?

II. Energy Management Standard

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Energy Management Standards
ISO 50001

- Continual improvement: PLAN – DO – CHECK – ACT cycle, similarly to Environmental Management Standard, ISO 14,000
- A method for integrating energy efficiency into existing industrial management systems for continual improvement
- Applicable to industrial, commercial, institutional, and transportation sectors
- UNIDO to assist active participation of developing countries in formulation of ISO 50001: country projects and regional workshops

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Components of EM Standards

- A Strategic Plan that requires measurement, management, budget, and documentations for continuous improvement for energy efficiency
- Cross – divisional Management Team, led by a representative, who reports directly to management, and oversees implementation of strategic plan
- Policies and Procedures to address all aspects of energy purchase, use and disposal
- Projects to improve energy use

Components of EM Standards, continue

- Energy Manual, a living document that evolves over time as additional energy saving projects and policies are undertaken and documented
- Energy Performance Indicators, unique to the company that are tracked to measure progress
- Periodic Reporting of progress to management
- Revision of Strategic Plan to ensure continual improvements

Potential benefits

- EE improvement, less payment for energy consumption, less GHG emissions
- Management improvement
- Productivity improvement
- Recognitions: access to support, financing, market access, etc.

Current Status

- Several countries already have national EMS: Demark, Ireland, USA, Korea, Sweden, Thail and
- The EU developed a regional energy management standard, pr EN 16001
- Under development: China, Spain, Brazil, and South Africa
- ISO Project Committee 242 planned to place ISO 50001, EnMS for use end 2010; Committee Draft available for comments.

III. Promotion of EnMS in South Africa

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The dti/UNIDO Project on IEE in SA

- Objective: *South African industrial energy consumption improves with 15% efficiency by 2015 contributing to sustain the targeted national GDP growth and carbon emission reduction*
- 4-year, from July 2009 to June 2013
- 4 Components: Component 2 on promotion of EnMS implementation in SA
- Main counterpart: SABS

Promotion of EnMS in SA

- Adaptation of EnMS to SA
- Supporting policy framework
- Awareness raising
- Capacity building for implementation and verification: public, consultants and factory engineers.

THANK YOU