Husky Injection MS Ltd – Total Energy Management (TEM)

Case Study – Bolton Campus

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HUSKY
Keeping our customers in the lead

Husky Injection Molding Systems

- Founded in 1953, Husky is world's largest Injection Molding equipment supplier ($1.2B in sales in 2008)
- A technology and environmental leader with history of innovation
- 3300 employees worldwide
- Bought by Onex, a leading North American private equity firm, in 2006

Bolton, Canada

Dudelange, Luxembourg

Vermont, USA

Shanghai, China

Design & Construction Management at Husky

Provide operational consulting, design and project management services to support our existing facilities and prospective customers in:

- Evaluating business opportunities
- Implementing business improvements
- **T**otal **E**nergy **M**anagement
- New and renovation factory projects

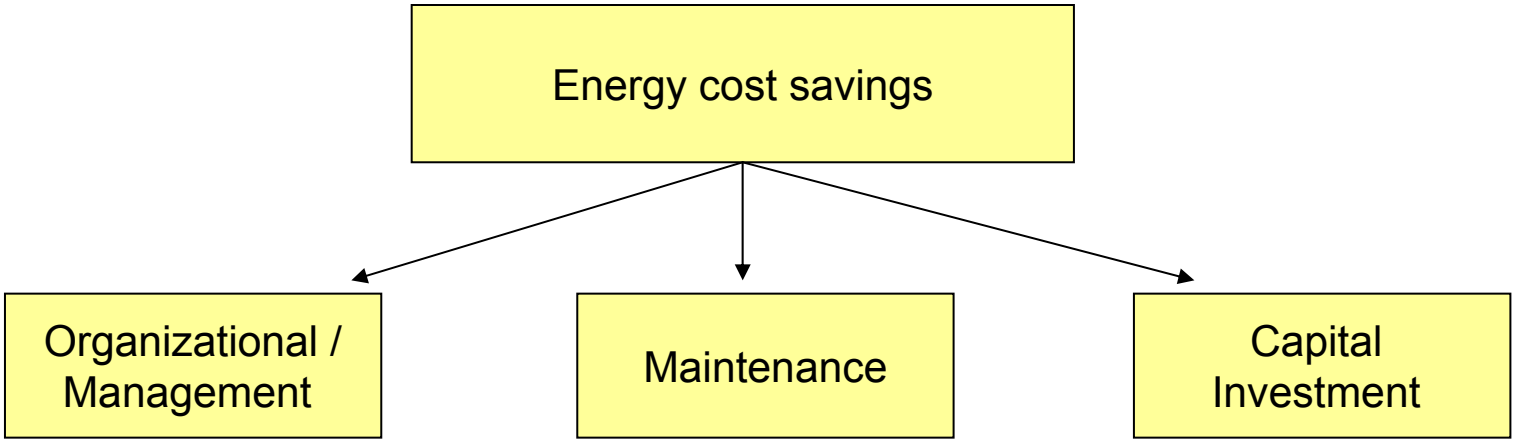
Husky utilizes **TEM** as a holistic approach to **Reduce** and **Sustain** energy Consumption in injection molding operations.

Total = Energy involves everyone and all activities in the company
Energy = Energy reduction must be continuous and sustainable
Management = Energy can and must be managed

TEM requires 100% top management commitment

Magnitude of Savings

- Potential savings from effective Energy Management System are around 10% to 35% of current energy cost for most plastics processing plants
- Savings can be achieved through a combination of No-cost, Low-cost, and Investment actions



- Top management commitment
- Monitoring and Targeting
- Improved process management
- Creation of management control system
- Staff Energy Awareness

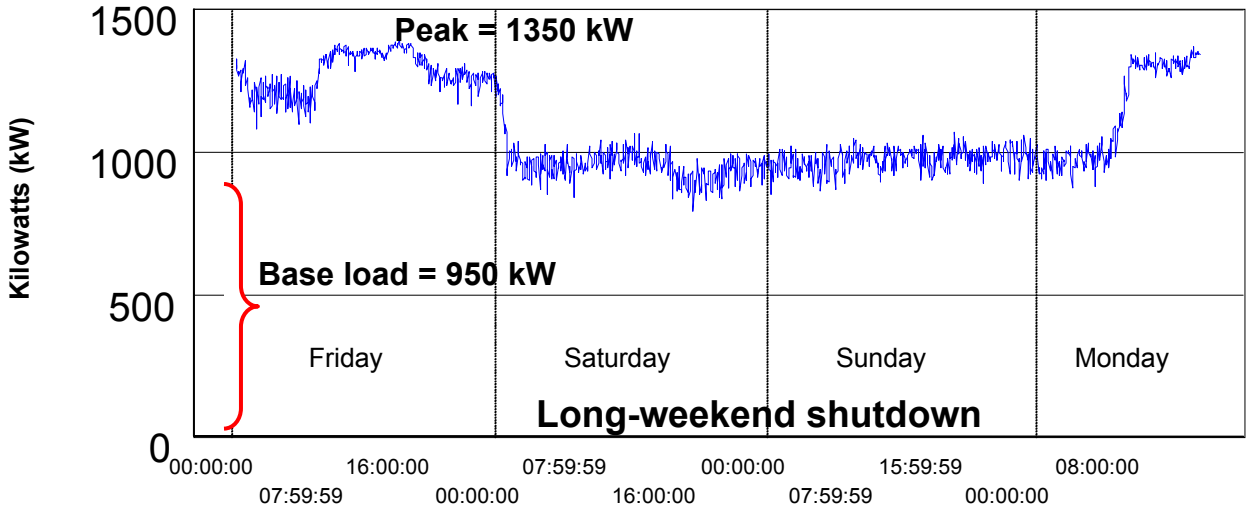
- Controlling the use of services in process and building
- Includes small maintenance investment (typically < 1 year)

- Possible through investment in energy-efficient processing technologies
- Typical payback is < 3 years
- Certified Energy Manager

Husky TEM Program – 9 Steps

1 - Understanding where and how much energy is used

2 - Understanding of When energy is used through Sub-metering



3 - Monitoring and Targeting (M&T)

Metering at main switchboard does not always provide necessary information

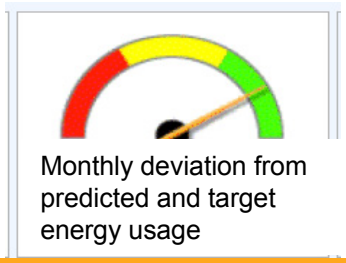
Costs and responsibilities should be allocated based on real energy usage

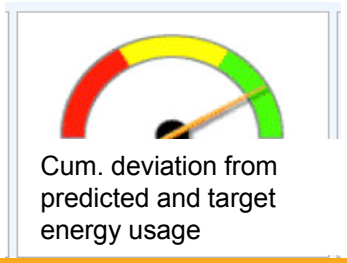
Steps in Implementation of TEM

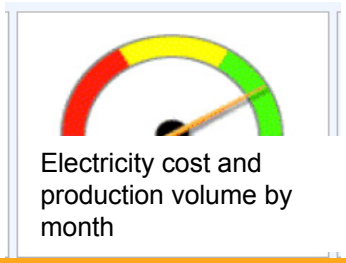
4 - Data analysis
- SPC analysis for energy usage
- Energy profile
- Cost allocation and budgeting
- Forecasting energy consumption per department

5 - Reporting energy KPIs (Energy dashboard) by department
- Electrical cost as % of production cost
- Monthly deviation from predicted and target energy usage
- Cumulative deviation from predicted and target energy usage
- Electricity cost and production volume by month
- Status of energy reduction projects


Electrical cost as % of production cost


Monthly deviation from predicted and target energy usage


Cum. deviation from predicted and target energy usage


Electricity cost and production volume by month

Steps in Implementation of TEM

6 - Identify, Quantify, and Prioritize opportunities in the following areas:

- Process
- Building and infrastructure: 1) Insulation 3) HVAC
  2) Lighting 4) Infiltration
- Auxiliary equipment: 1) Electric motors 4) Compressed Air
  2) Process water 5) Grinders
  3) Dryers

7 - Eliminate waste and reduce consumption through Implementation of selected energy reduction projects

8 – Conduct internal and external benchmarking

9 - Repeat steps 1-8 – Continuous improvement

Implementation of TEM at Husky

(Bolton Campus Case study)

TEM Case Study - Husky

- Savings achieved through implementation of "Total Energy Management" program (TEM)

- TEM was implemented in three parallel steps:

  A. Rate Negotiation & Risk Mitigation

  B. TEM's 9 steps program

  C. Energy Education of Husky employees

TEM Case Study - Husky

A - Rate Negotiation & Risk Mitigation

- **Supply agreement** negotiation with third party **Electricity** suppliers resulted in $500K savings in first 3 years.
- **Demand / Response program** (OPA)
  - $6 k / month rebate if Husky reduces consumption by 5% with 90 minutes advance notice
- **Husky Peak Response**
  - Energy Champion monitors campus electrical consumption and advises team leaders to curtail consumption
- **Supply Agreement** negotiation with third party **Natural Gas** suppliers resulted in $400K savings over 6 years.

TEM Case Study - Husky

B – TEM's 9 steps program

- **Dedicated Energy / Facilities Manager** at all Husky sites:

GREEN TEAM	» Global Sponsor: C.O.O. – Keith Carlton	
	» Bolton:	Al Fiacco, Dave Kernaghan, John Florian, Ryan Fabi, Greg Rebec
	» Luxembourg:	Pascal Brandebourg
	» Vermont:	Gary Gawor
	» Shanghai:	Mike Chen

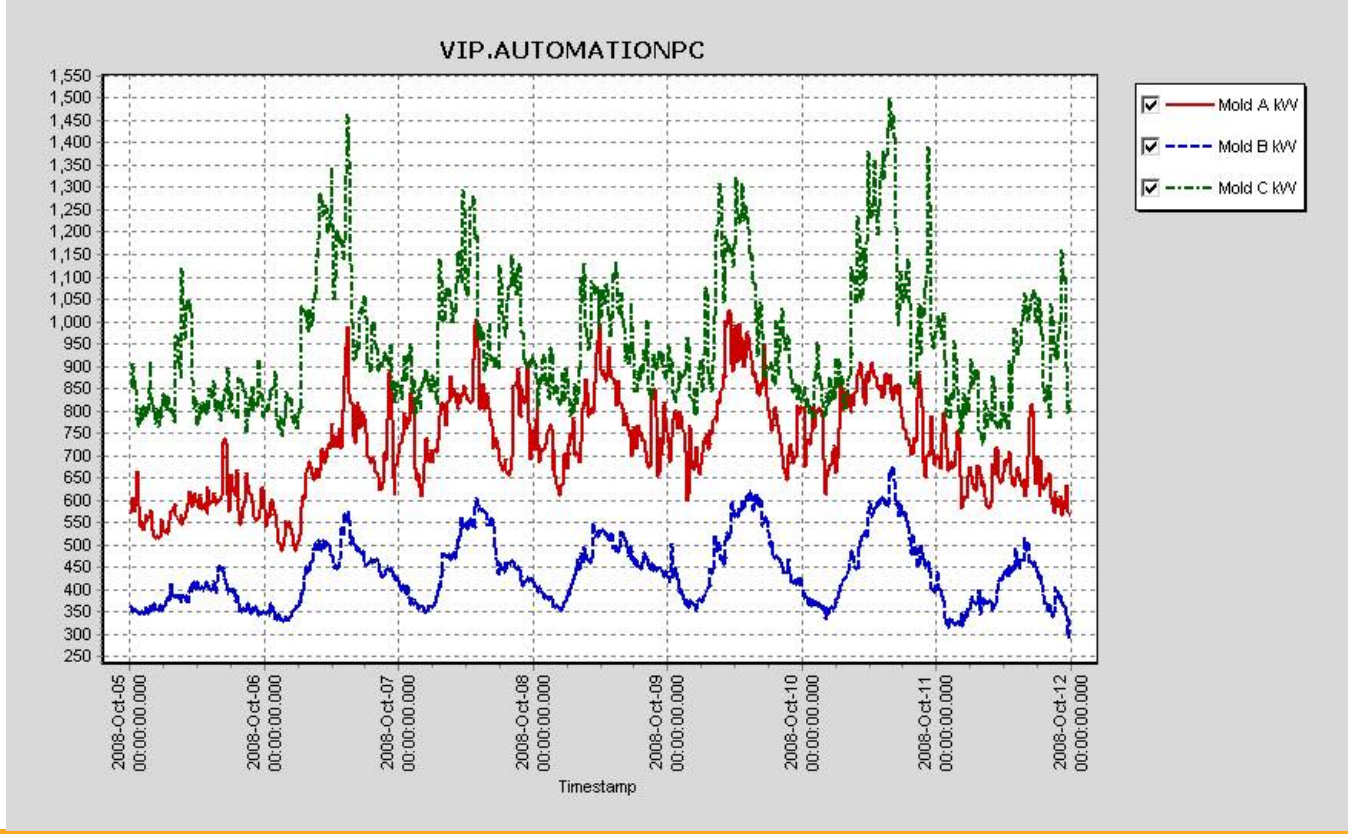
- Create **Global Energy Standards** for Lighting levels and HVAC seasonal set points as company policy.

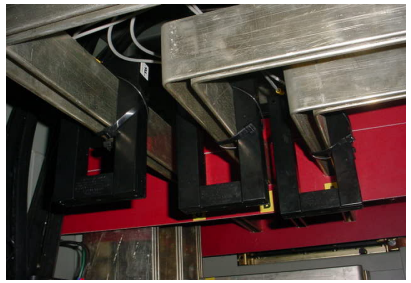
- Understanding when, how much, and where energy is used through **Monitoring & Targeting** (M&T)
  - ION Sub-metering electricity and Natural gas usage of every building in campus
  - 14 sub-meters in one Bolton building as it represents 50% of the whole campus' consumption

TEM Case Study - Husky

B – TEM's 9 steps program

Metering & Targeting – ION Metering of main substations to understand When & How much:

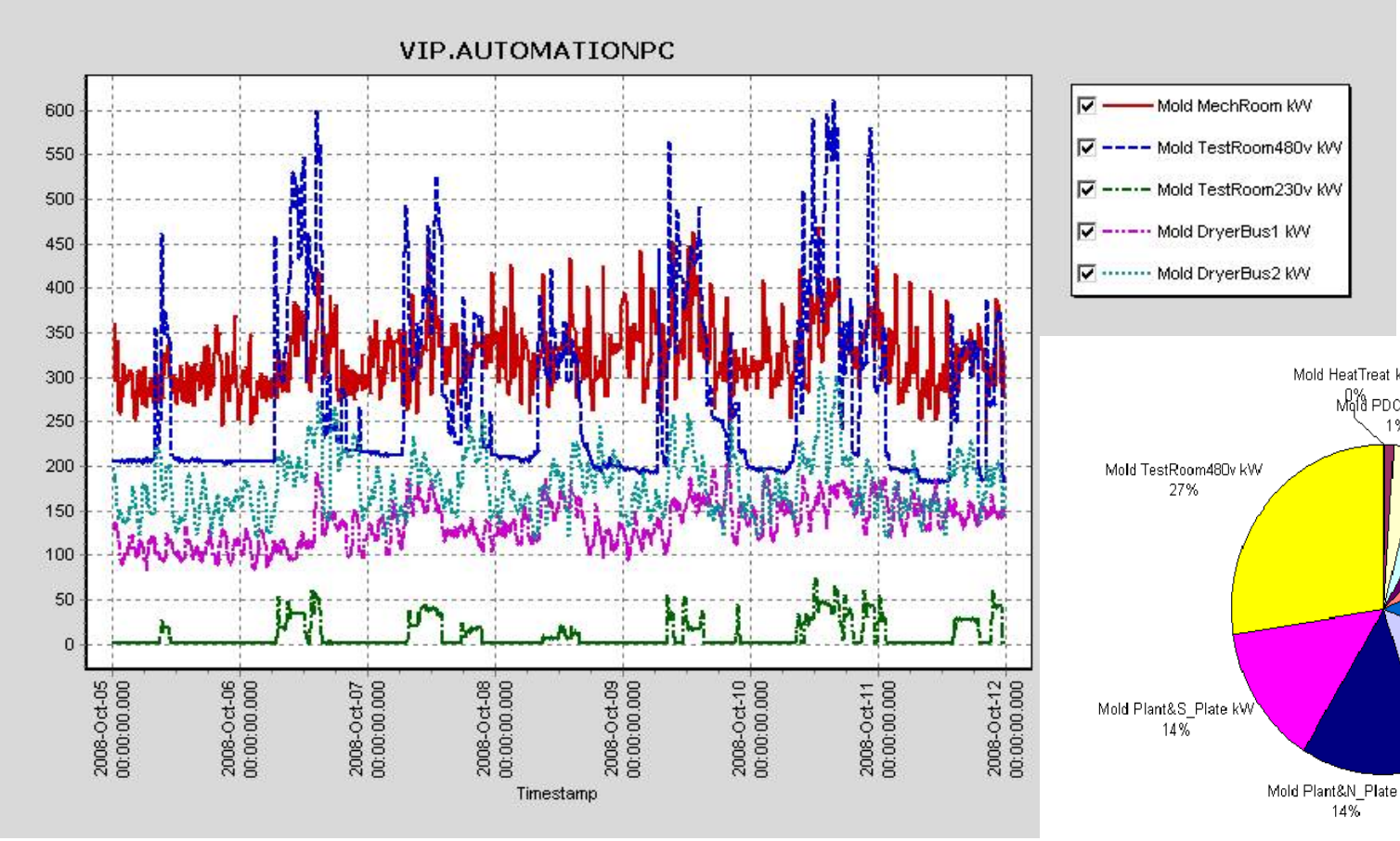




TEM Case Study - Husky

B – TEM's 9 steps program

Metering & Targeting: Mold Test Hall ION Sub-metering… Where:



Since May 2009, Molds test hall is savings over $2000 / month in electricity

TEM Case Study - Husky

B – TEM's 9 steps program

- Identify production times and opportunities.
  - Energy Conservation & Team Leaders meet regularly to optimize energy conservation.
  - Identify light fixtures, motors and other electrical devices.

- Energy / Facilities Manager Functions
  - Performed after-hours audits to itemize savings opportunities
  - Evaluate new energy efficient technologies, set standards.
  - Assign project priority and secure funding and grants for projects.
  - Manage mechanical installation
  - Document energy savings progress.

- Security & Team Members manual shutdown
  - Security Staff initially shut down computers, lighting, chilled pumps, Air compressors and Plastic injection equipment until automated controls were installed.

TEM Case Study - Husky

C - Energy Education of Husky employees

- A series of campus wide training seminars were conducted to increase employees' awareness. Over 900 Bolton employees were trained using Husky and NRCan best practices in August 2007.

- The Energy awareness presentation was translated to Mandarin and provided to our 200 Shanghai employees in September 2007.

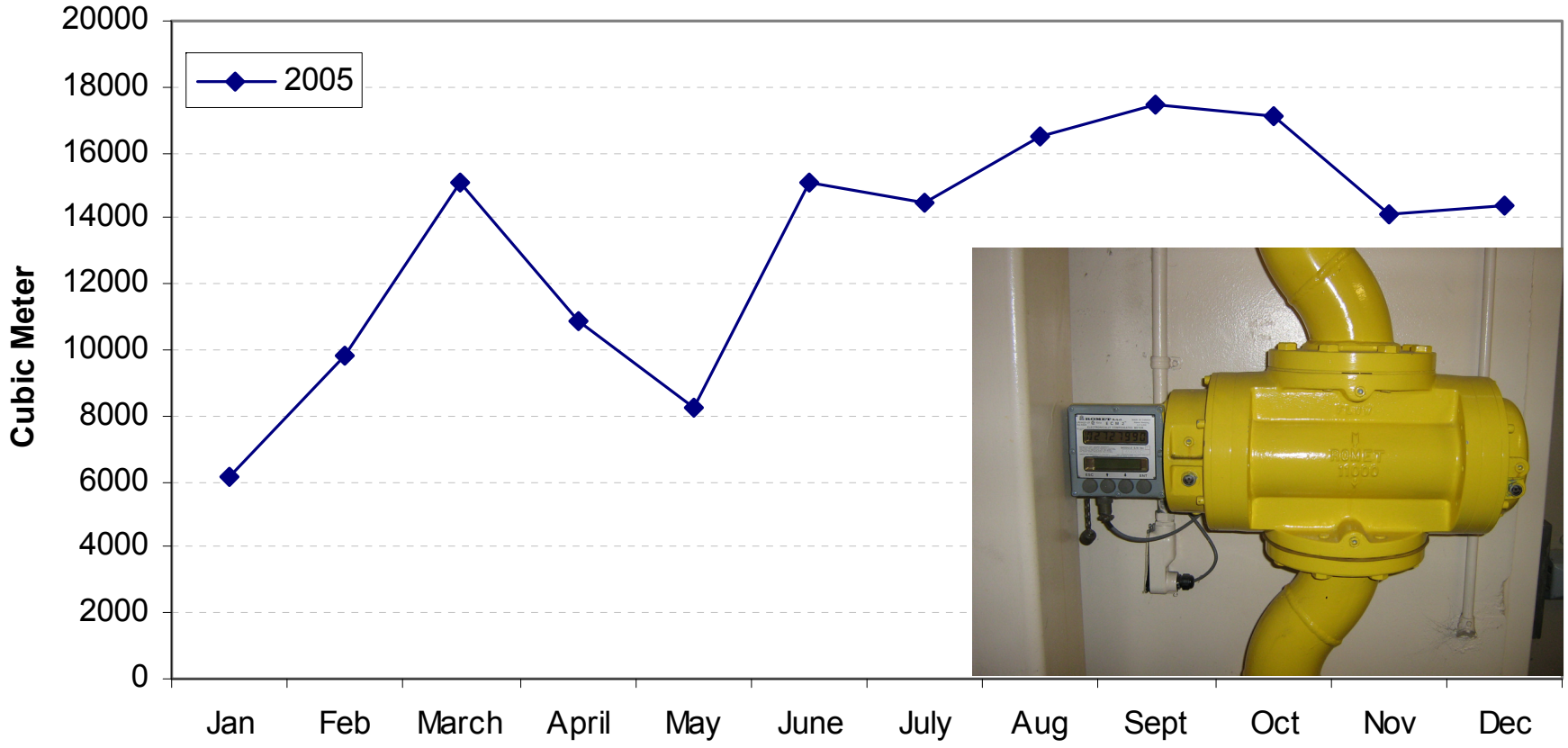
- New Husky staff with receive sustainable training through the 'Intro to Husky' Program effective November 1, 2007

Husky Energy Projects (TEM)

TEM Case Study - Husky Projects

Plant Dehumidification - Sample project 1

- Ion Sub-metering AMC Building to explain **Natural Gas** Consumption

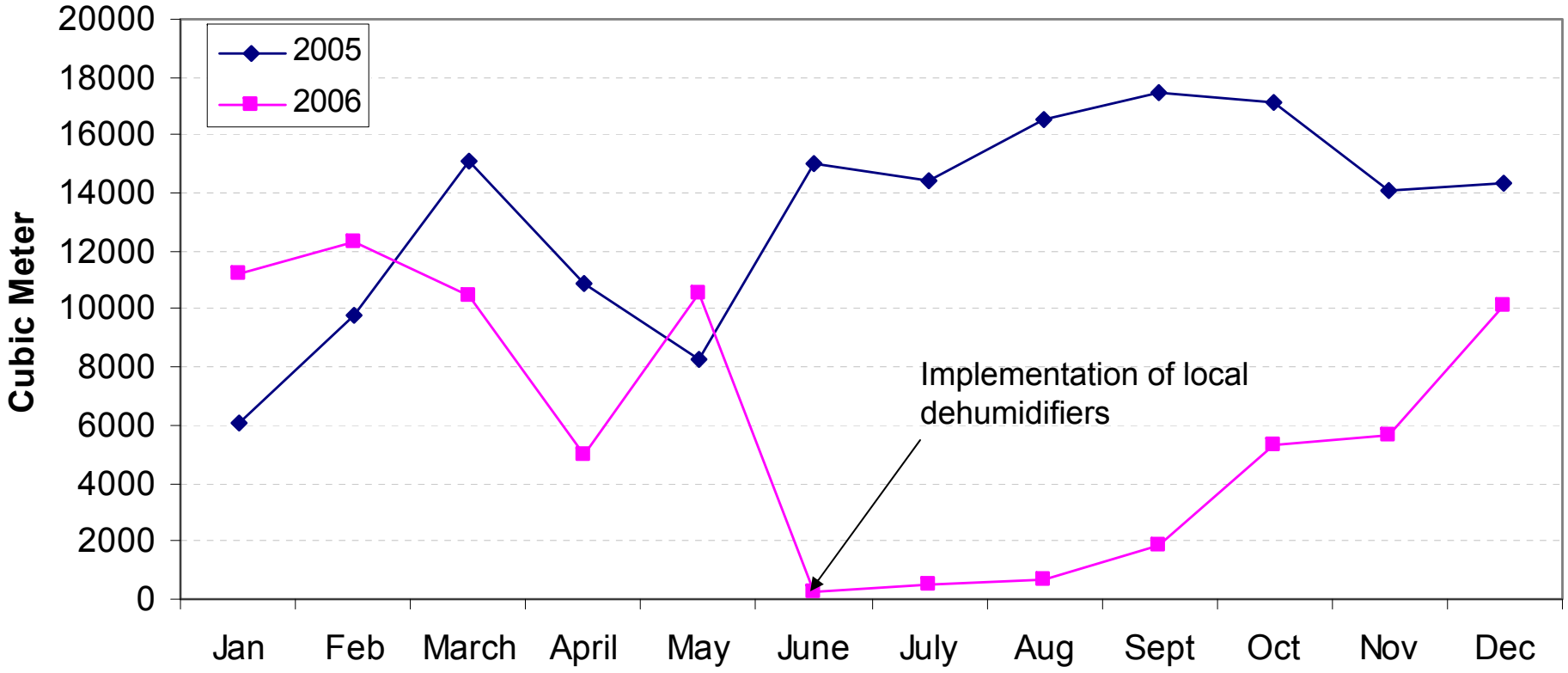


- If you cannot measure it, you can not fix it.
- Audit everything…

TEM Case Study – Husky Projects

Plant Dehumidification - Sample project 1

- $30K/ year saved through local dehumidification instead of central AMC rooftop dehumidification… 9 month ROI*.



* 70,000 m^3/ year at $0.43 / m3 all inclusive Natural Gas Cost

TEM Case Study – Husky Projects

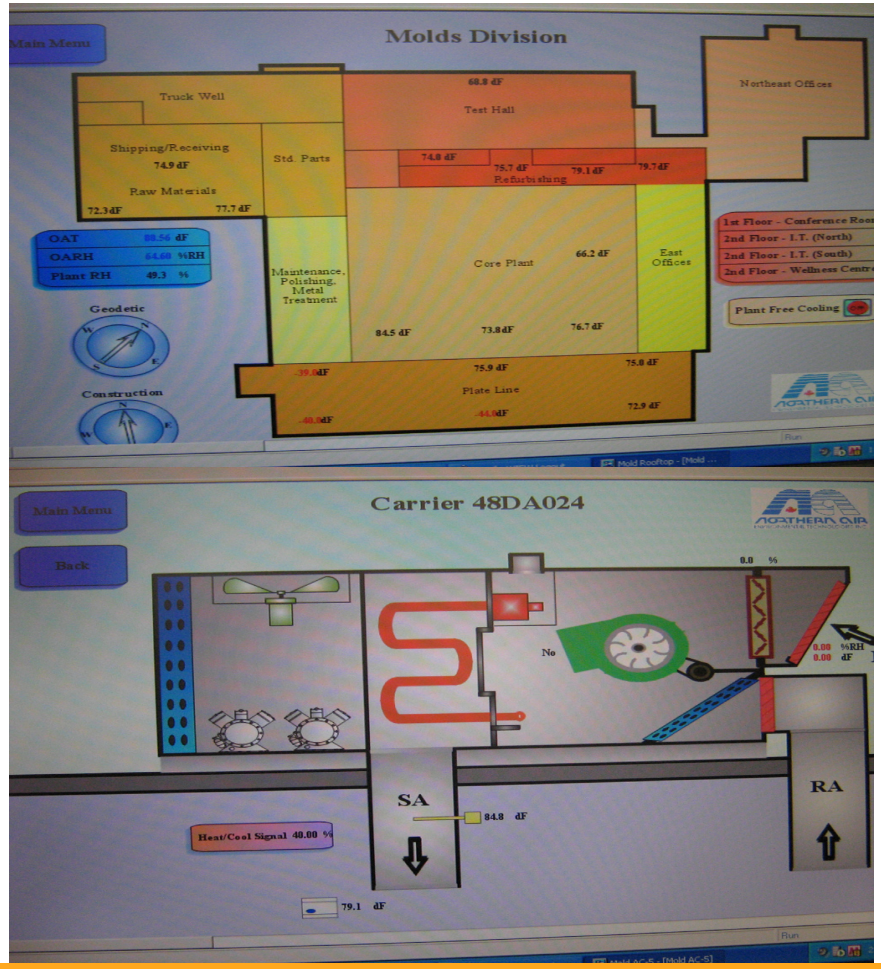
HVAC – Sample Project 2

- Five dated Heat Pumps /w rooftop ductwork were replaced by FIVE new 410A Carrier High Efficiency Rooftops in 2009. EER = 11.4
- $134,000 investment
- 2.5 yr ROI on Energy Saved
- Hydro One ERIP* rebate of $7,500 received within 2 months.

* To Qualify for ERIP, the EER must be 10.8 minimum

TEM Case Study – Husky Projects

HVAC – Sample Project 3 – Molds HVAC Controls Upgrade



- Invested $166 K on complete visibility of all HVAC systems
- Unoccupied temperature setback in all areas – Energy Savings
- Husky awarded $50,000 **SMART** sponsorship, < 3 yr ROI
- Allows remote monitoring of critical manufacturing areas
- The increased effectiveness of the internal HVAC staff allowed for the removal of the external rooftop comprehensive agreement = $53K saved / year

TEM Case Study – Husky Projects

Lighting Project – Machines – Sample Project 4

Before

After

Description:

- High Bay lighting retrofit in the **Machines Test Hall.**
- Metal Halides light fixtures were replaced by 8 lamp T5 Fluorescent fixtures.
- Light levels and color rendition improved 25%

Summary Financials:

- Hydro costs reduced by 34% or 43,077 kWh / yr
- The 3.1 yr ROI will produce $ 4 K savings/yr
- Hydro One incentives will improve the return to 3 yrs.

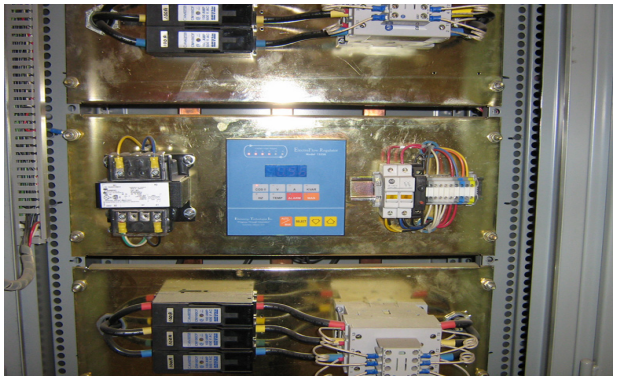
TEM Case Study – Husky Projects

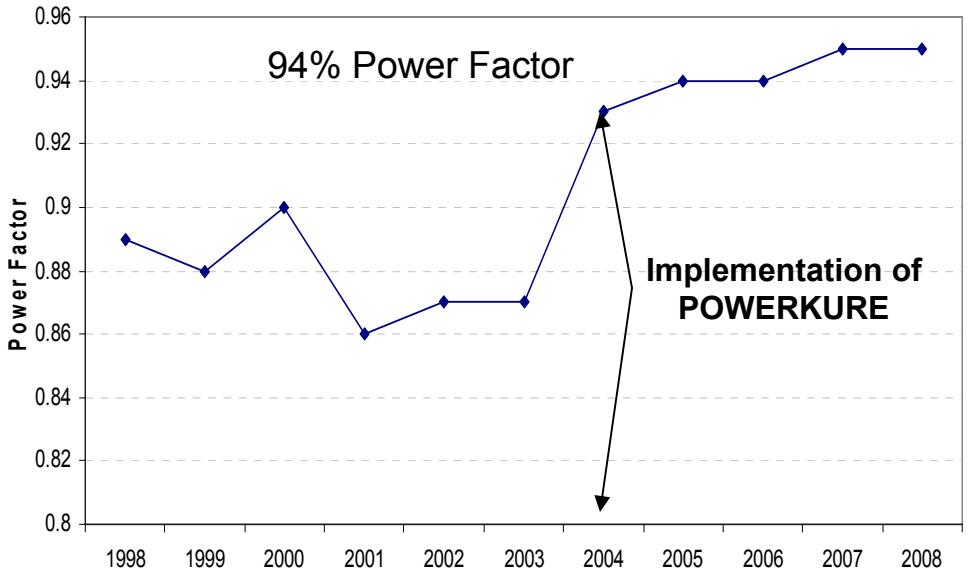
Compressed Air Design in AMC - Sample Project 5

- $85,000 invested on a new VFD Air Compressor, increased piping diameters, 1660 USgal Reservoir and Flow Controller in Aug.2009
- **SMART** Program sponsored $40,000 towards the project and reduced the ROI to 1.8 years
- Plant Air pressure reduced from 125 psi +/- 10 psi to a steady 107 +/- 1 psi

TEM Case Study – Husky Projects

PowerKure Power Conditioning - Sample project 6



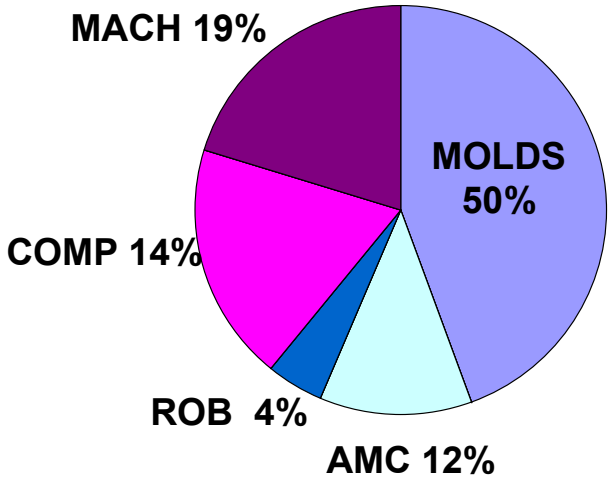


- $285K / year energy savings produced a 1.9 year ROI
- Reduced line losses and harmonic distortion
- Power Factor consistently above 94%

2009 Energy Reduction Target - 3%

TargetZERO - Husky Carbon Neutral Target by 2025

Bolton kWh distribution by BU



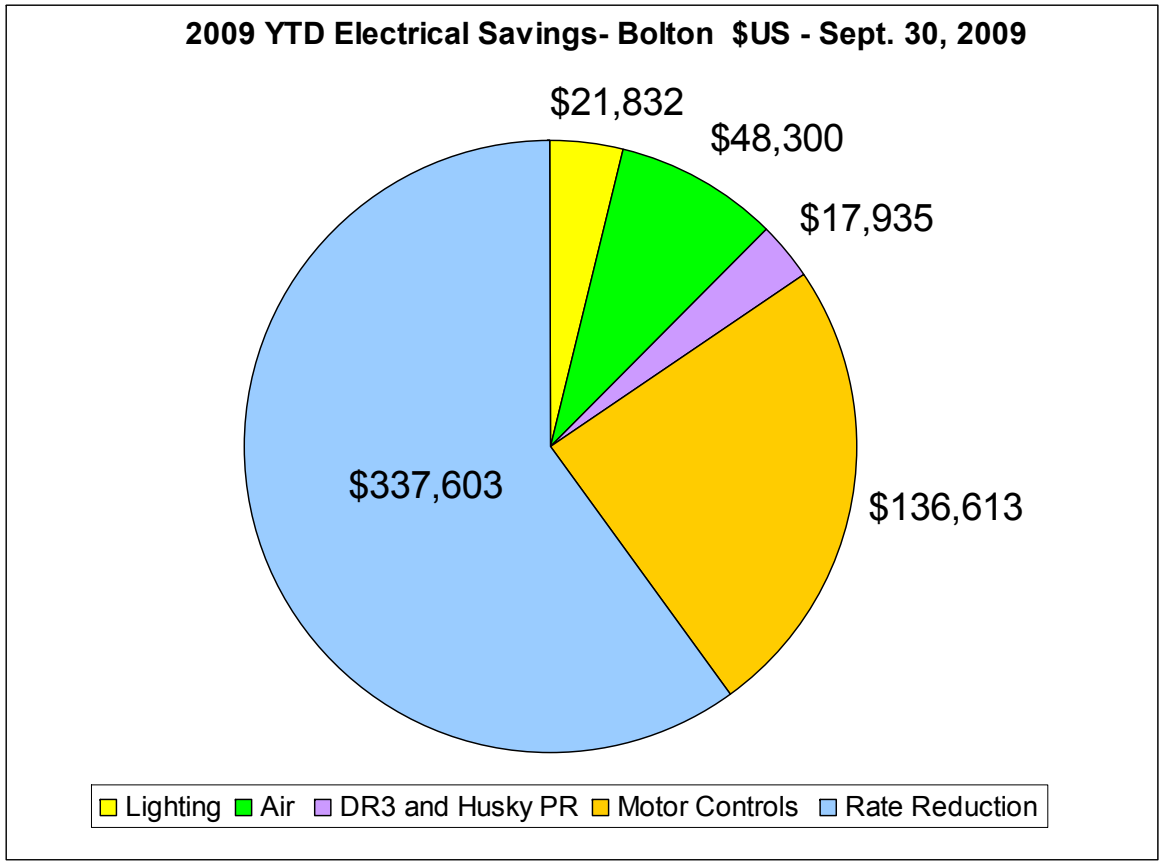
In Bolton alone, a 3% or 1,285,050 kWh **annual electricity reduction** equates to:

- 232 Tons of CO_2e reduction, or
- Planting 28,800 evergreen trees
- $117,000 / year <u>bottom line</u> savings

1. Bolton Campus Annual KWH consumption 2008 = 42,835,218
2. Reducing 5,555 kWh in Ontario = 1 Ton CO_2 ; Sequestration: 1 Evergreen Tree = 9.05 kg CO_2 / year

25

Bolton Electrical Savings Impact in 2009



On Target for a 20.5% or $780,000* cost reduction and a 7% kWh Energy Project reduction over 2008

* $500K from Demand Rate and $280K from Energy Reduction

Global Energy Vision for Husky

- Ensure energy effectiveness is a priority
- Perform facilities energy audits globally
- Engineer energy-efficient Systems
- Market Husky's successes and encourage other industries to follow
- Mitigate rates with electricity and gas supply agreements
- R&D into new technologies and sustainable generation.

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