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December 3, 2008

MEMORANDUM

TO: Council Members

FROM: Charlie Grist

SUBJECT: Cost and Availability of Conservation Potential in the Industrial Sector

Achievable conservation potential in the industrial sector is roughly double what was estimated in the 5th Power Plan on a percentage basis. This presentation will provide an overview of the key findings of costs and savings potential for the industrial sector. Strategic Energy Group, a contractor, has developed a new industrial conservation supply curve for the Pacific Northwest. Their work is nearly complete. I will present an overview of the methodology and results.

Preliminary results indicate that estimated technical potential is over 20 percent of loads. Achievable conservation potential is about half of that. However, total available conservation, in average megawatts, will depend on the industrial forecast, which is significantly lower in the 6th power plan than the 5th. The new industrial supply curve also contains more conservation potential in higher cost measures than the curve used in the last power plan.

A suite of over 60 measures and practices are analyzed for 19 industry types prevalent in the Pacific Northwest. In parallel with findings on the commercial sector, a significant fraction of the savings potential is in system optimization and business practices - measures that require a high degree of human interaction. This reduces the share of technical potential thought to be achievable. It also informs the kinds of programs and initiatives the region should pursue to tap this valuable resource.

6th Plan Industrial Conservation Potential

December 9, 2008



Process

- Phase 1: Scope
 - Review others' work
 - Catalogue sources, results, & useful info
 - Develop scope for assessment
- Phase 2: Assessment
 - Industrial Load Research ✓
 - End Use Estimates by Industry ✓
 - Develop Savings by End-Use by Industry ✓
 - Develop Program Concepts to Deliver Savings
- Consultant: Strategic Energy Group (SEG)

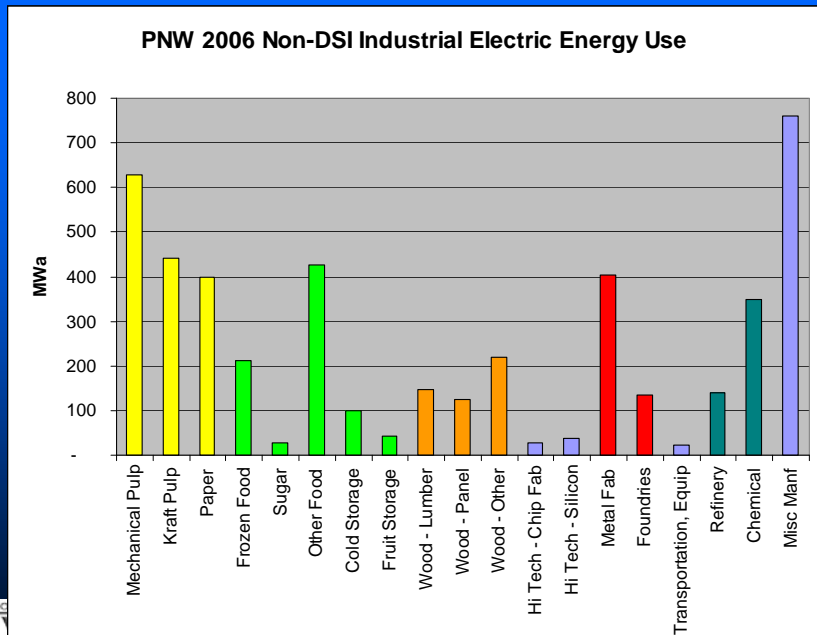
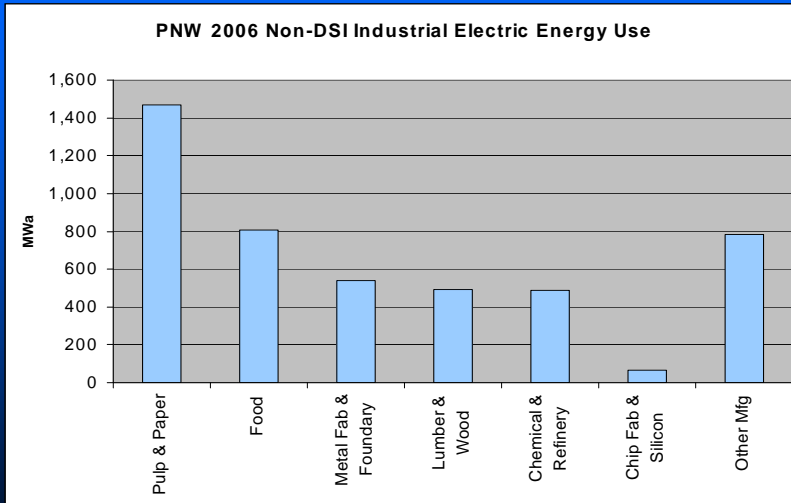


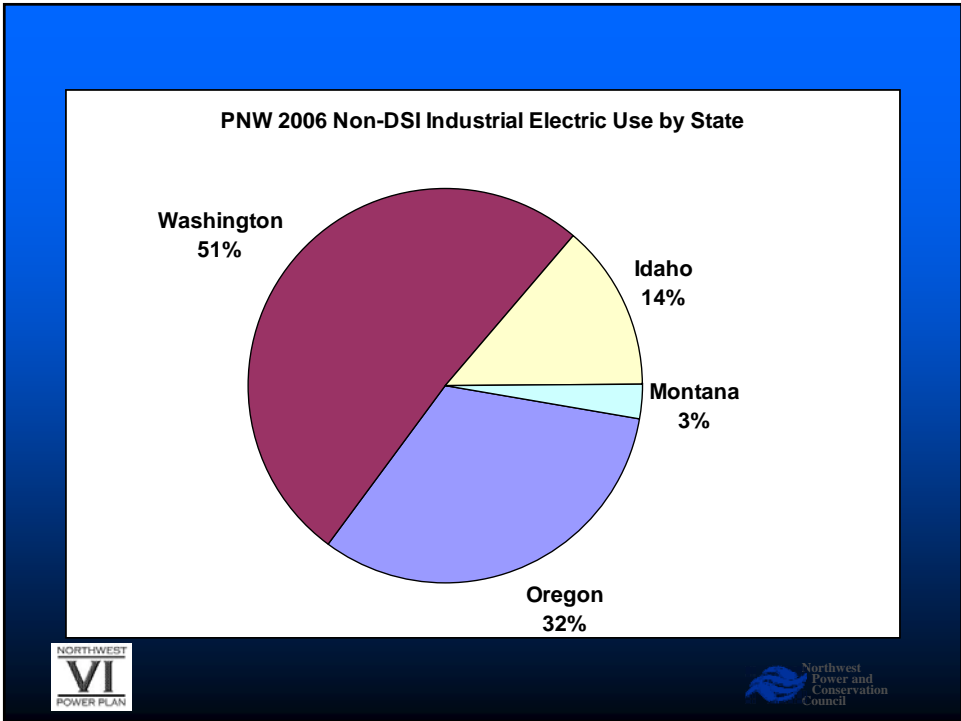
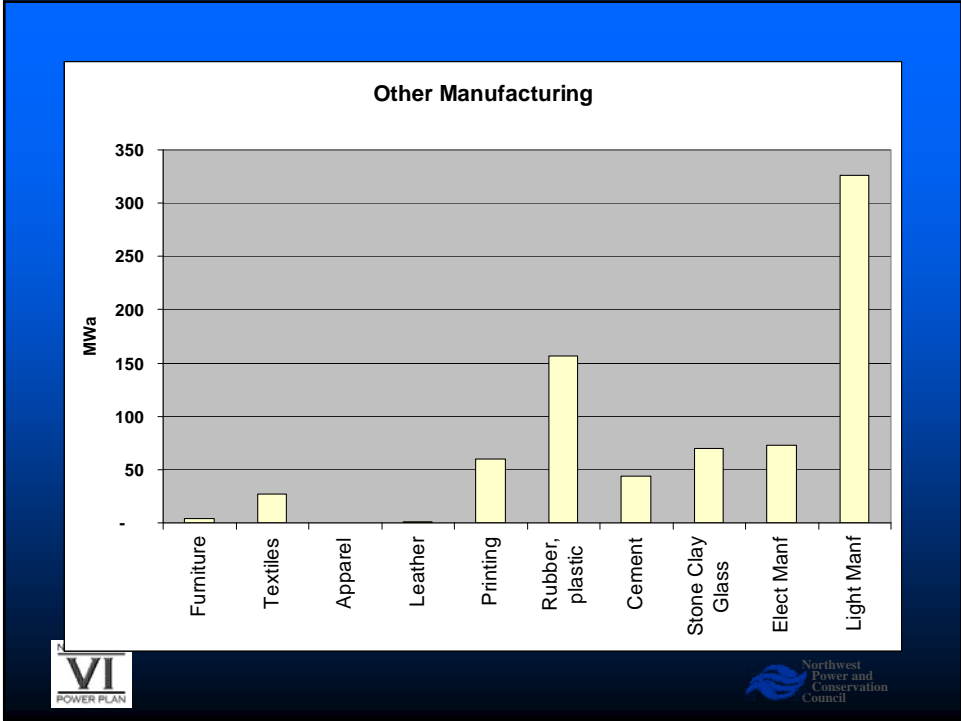
Industrial Load Research

- 2006 Base Year
- Sales data from 18 utilities & other sources
- About 80% sales categorized by industry type
- Other data sources: MIPD, D&B, Published Reports, BPA Audits, USDOE, Industry Experts
- Covers major non-DSI industries & Refrigerated Warehouse
- Does not cover Data Centers



PNW Non-DSI Industrial Electric Load 2006 4,640 MWa



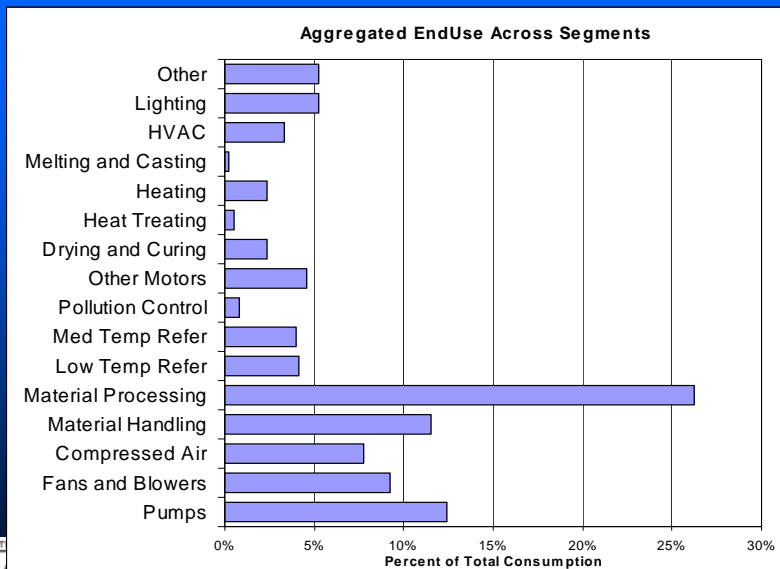


Develop End Use Estimates

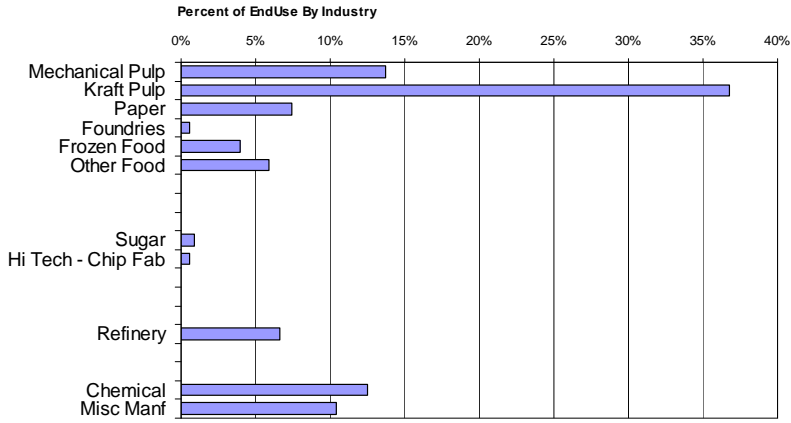
- Importance
 - EE measures apply by end-use
 - Industries differ in process needs & end uses
- Sources
 - Industry Experts
 - Oregon State University Energy Audit Data
 - ACEEE, BC Hydro & Utility studies
 - USDOE Industrial Assessment Database



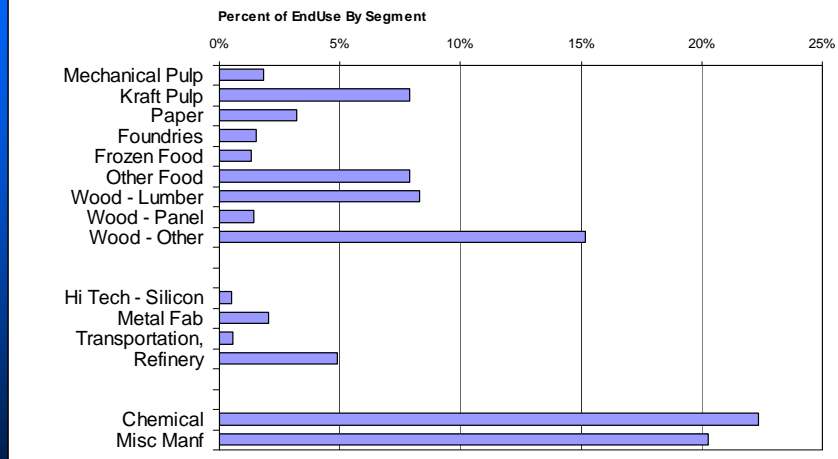
End Use Estimates

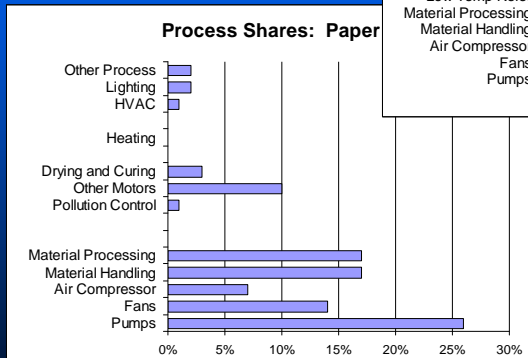
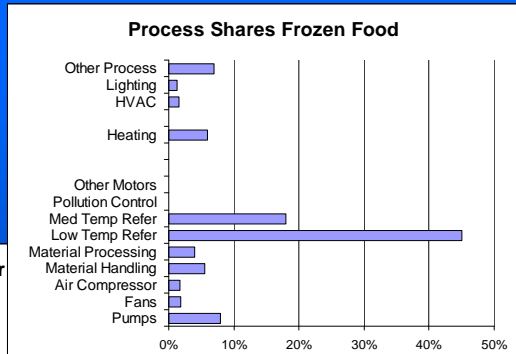


Pumping Energy



Air Compressors





Industrial Energy Savings Potential

An Act in Three Parts

- High-Efficiency Equipment
 - Cross-industry systems (pumping or lighting)
 - Industry-specific (refiner plates in mech pulp)
- Systems Improvement
 - Optimization, demand management, sizing
- People
 - Operational & Business Practices

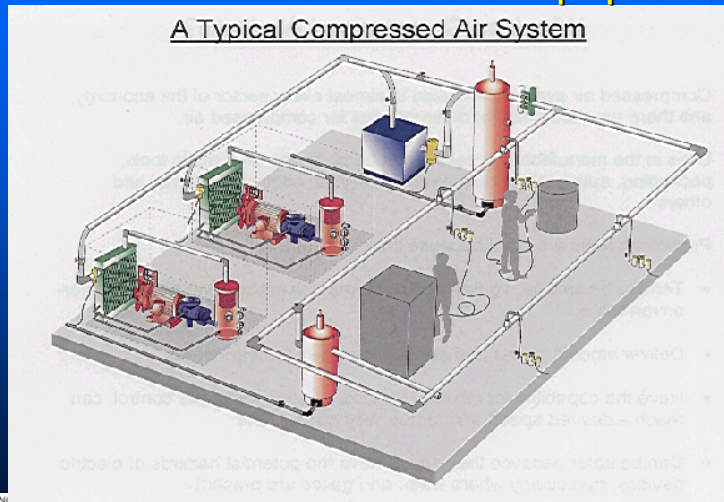


Example: Compressed Air

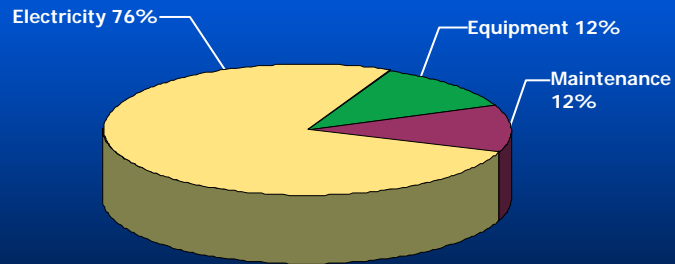


Compressed Air System Optimization It's More Than the Equipment

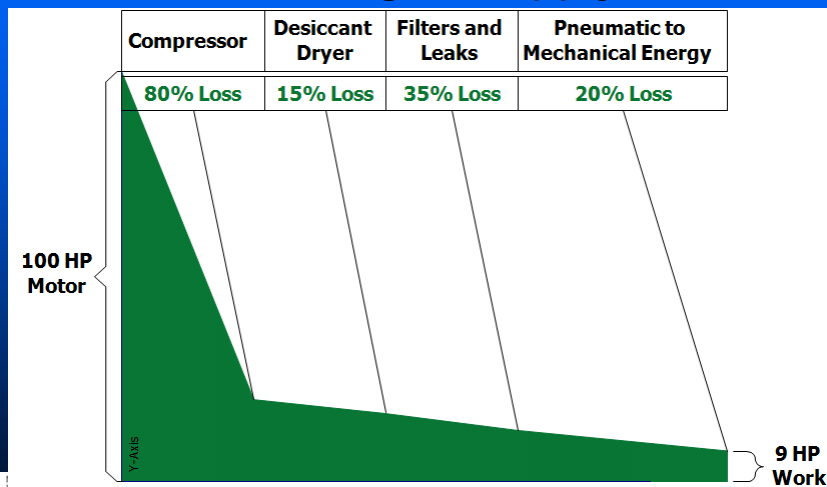
A Typical Compressed Air System



Compressed Air System Relative Cost Over 10 Years



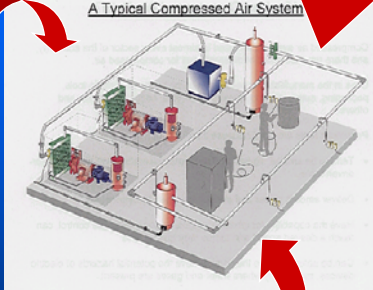
Compressed Air System Optimization Demand Side Savings > Supply Side Savings



Compressed Air System Optimization It's More Than the Equipment

Equipment Elements

- Compressors
- Dryers
- Regulators
- Filters
- Nozzles & tools



Business Practice Elements

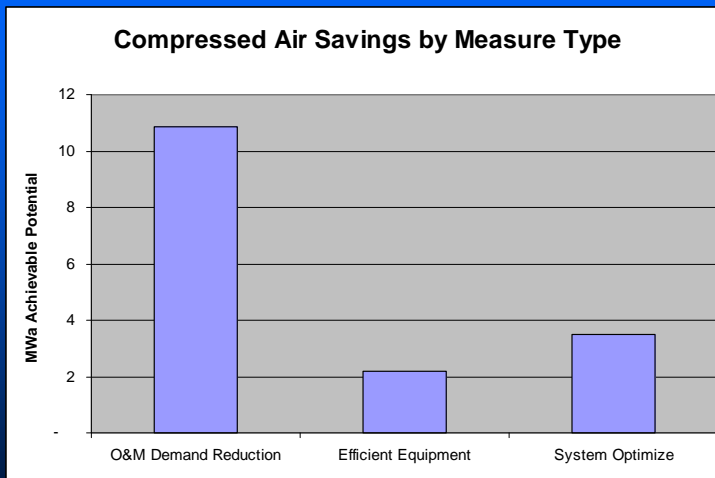
- System Champion
- Key Performance Indicators & Monitoring
- Savings Goals
- System Improvement Plan
- Regular reports on KPI
- Training for operators, maintenance & system champion

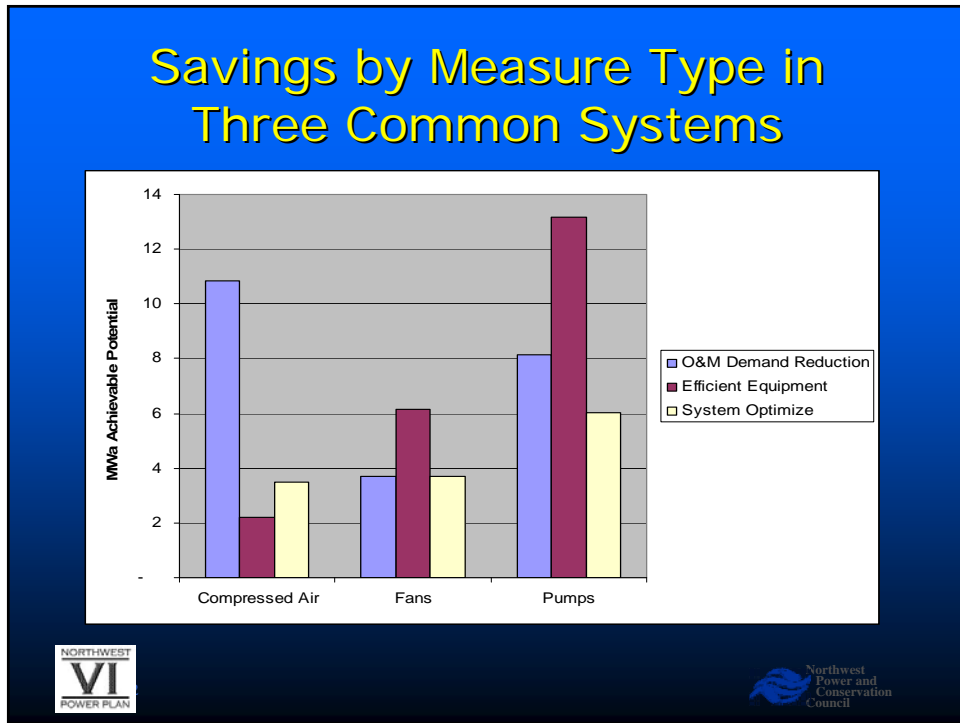
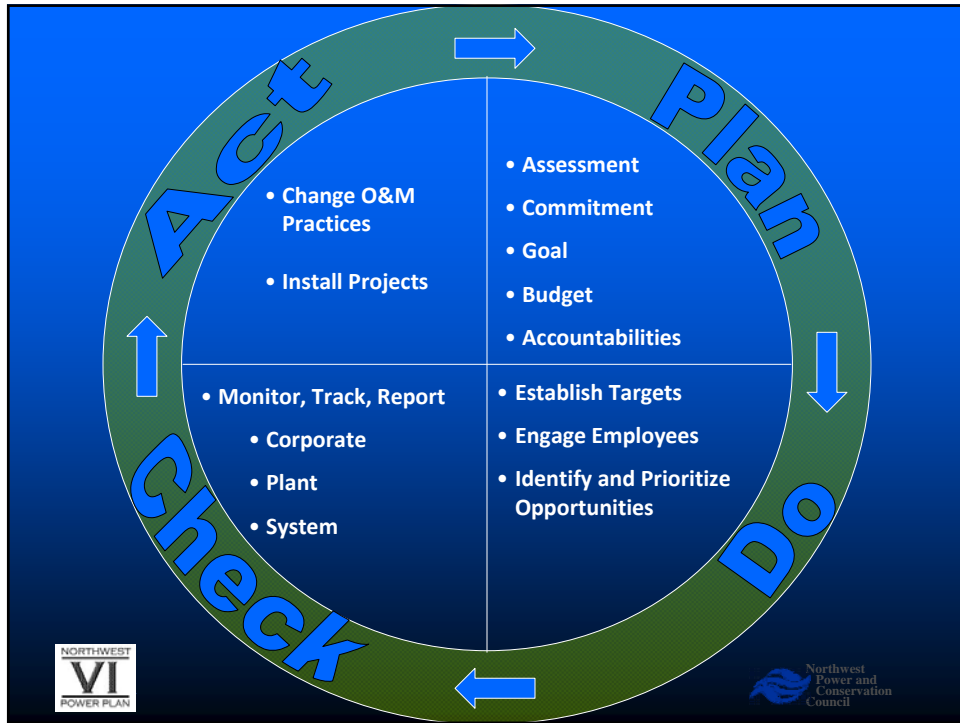
System Optimization Elements

- Pressure reduction
- Shift pneumatic to mechanical for some uses
- Tool choice & use
- Reduce leakage
- Multi-compressor control strategy
- Reduce system standby time
- Flow control
- Piping & tank configuration



Compressed Air Savings





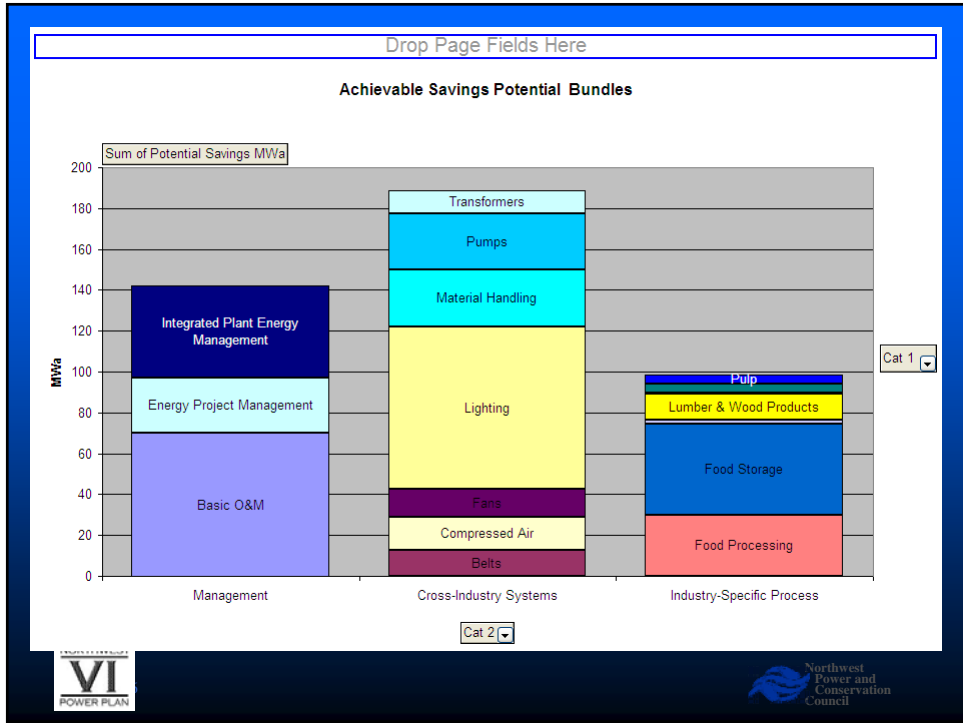
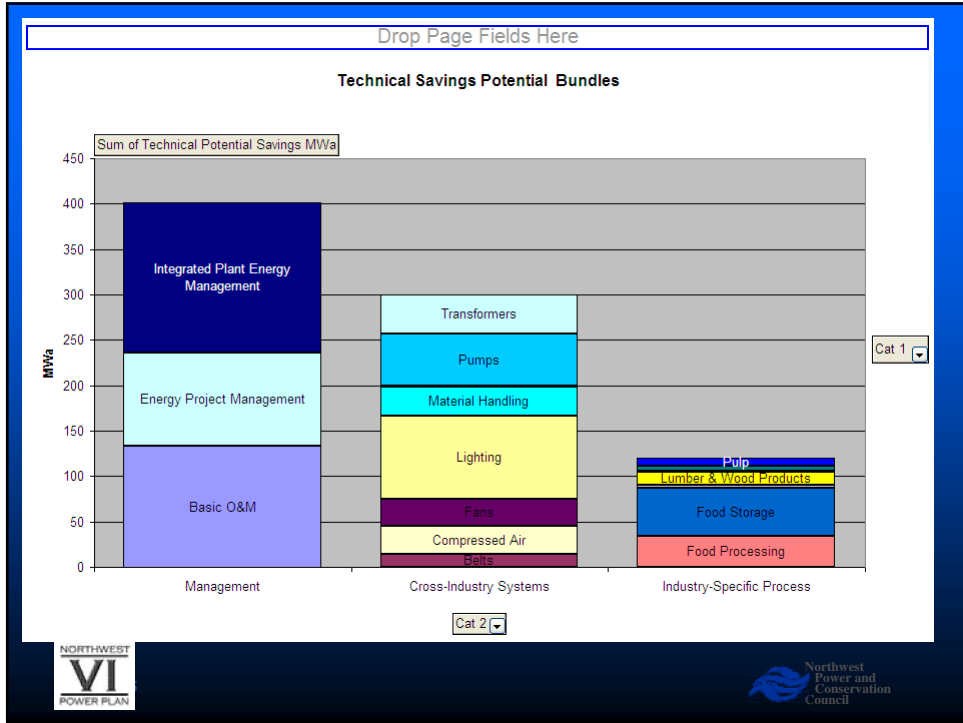
Some of the Measure & Practices

- Air Compressor Demand Reduction
- Air Compressor Equipment
- Air Compressor Management
- HighBay Lighting
- Lighting Controls
- Motors: Efficient Rewind VSD Controls
- Motor Management Program
- Fan Efficient Centrifugal
- Food: Fans and Blowers
- Other: Fans and Blowers
- Fan ASD Control
- Premium Pump
- Pump ASD Control
- Transformers
- Synchronous Belts
- Food: Cooling and Storage
- Food: Refrig Storage O&M
- Metal: New Arc Furnace
- Paper: Medium Consistency Pump
- Mech Pulp: Refiner Replacement
- Mech Pulp: Premium Process
- Mech Pulp: Refiner Plate Improvement
- Kraft Pulp: Effluent Treatment System
- Kraft Pulp: Efficient Agitator
- Paper: Efficient Pulp Screen
- Paper: Premium Fan
- Paper: Material Handling
- Wood: Replace Pneumatic Conveyor
- Wood: Hydraulic Press
- Cold Storage Retrofit
- Cold Storage Tuneup
- Fruit Storage Refer Retrofit
- CS Retrofit -- CO2 Scrub
- CS Retrofit -- Membrane
- Fruit Storage Tuneup
- Groc Dist Retrofit & Tuneup
- Generic O&M



Preliminary Results





Preliminary Supply Curve

