FIEA – Exhibition 2006

Forestry and Wood

Energy Management

Tools

10 March 2006
Erin Roughton

Increase profits with Energy Management?

Two ways to increase profits:

1. Sell more
2. Do more with what you sell e.g. Energy Management
How are savings achieved?

Reduce two components

1. $ per kWh (and kVA) x
2. kWh (and kVA) per m³

= $ per m³ production

Savings potential
(eg. $95,000 in two years)
Energy Management Plan

Managing Energy

- Monitoring & Targeting (1)
- Analysing Projects (Technology upgrades 4)
- Implement, Staff awareness (2)
- Managing Use (Improve controls 3)
- Department allocation (2)
- Contract Negotiation (1)

Monitoring energy

<table>
<thead>
<tr>
<th>Month</th>
<th>Energy cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 05</td>
<td>$30,201</td>
</tr>
<tr>
<td>Feb 05</td>
<td>$45,769</td>
</tr>
<tr>
<td>Mar 05</td>
<td>$42,960</td>
</tr>
<tr>
<td>April 05</td>
<td>$43,962</td>
</tr>
<tr>
<td>May 05</td>
<td>$45,129</td>
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<tr>
<td>June 05</td>
<td>$47,748</td>
</tr>
<tr>
<td>July 05</td>
<td>$49,334</td>
</tr>
</tbody>
</table>
Energy Management Plan

How to maintain momentum

improvement

Managing Energy
- Monitoring
- Targeting
- Analysing
- Projects
- Implement, Staff awareness
- Managing, Use
- Department allocation
- Contract Negotiation

Energy Management Plan

How to maintain momentum

improvement

Managing Energy
- Monitoring
- Targeting
- Analysing
- Projects
- Implement, Staff awareness
- Managing, Use
- Department allocation
- Contract Negotiation

Business as Usual

Nothing
- Fixed costs
- Waste
- No silver bullet solution
- No starting point
- All too big!!!
Energy Management Plan

Where I have been and where I am now

Develop a Sense of Current Position
- Monitoring & Targeting
- Meet with Key Personnel
- Tariff Analysis

Business as Usual
- Nothing
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Managing Energy
- Monitoring
- Targeting
- Analysing
  - Projects
- Implement
  - Staff awareness
- Managing
  - Use
- Department allocation
- Contract Negotiation

Where we could be

Develop a Sense of Potential
- Investigation
  (level 1 audit)
- Walk through
- Contract Negotiation
- Managing
  - loads

How to maintain momentum

How to maintain improvement

Business as Usual
- Where I have been and where I am now

Where we could be
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How to maintain improvement

How to maintain momentum

Business as Usual
- Where I have been and where I am now

Where we could be
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Energy Management Plan

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Where we could be

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How to get there

- Analysis of Options to Create a Plan
  - Thorough investigation (L2 audit)
  - Identify projects and potential
  - Monitoring & Targeting
  - Recommends

How to maintain momentum

Business as Usual

Develop a Sense of Potential
- Investigation (level 1 audit)
- Walk through
- Contract Negotiation
- Managing loads

Managing Energy
- Monitoring Targeting
- Analysing Projects
- Implement Staff awareness
- Managing Use
- Department allocation
- Contract Negotiation

Secrets or big energy savers

- Energy Manager
- M & T
- Targets
- Investment same

Others vs Big savers
Monitor energy use

![Graph showing energy use vs production.](image1)

**Managing cleaners**

Benchmarks

![Graph showing benchmarks for electricity use vs production.](image2)

Year 1

Year 2
Contract negotiation

- Save 5%
- Understand energy use and load patterns
- Keep in touch with all suppliers
- Speak with your lines company
- Analyse all tariff options

Energy Management Plan

How to maintain momentum
Continuous improvement

Managing Energy

- Monitoring & Targeting (1)
- Analysing Projects (Technology upgrades 4)
- Implement, Staff awareness (2)
- Managing Use (Improve controls 3)
- Department allocation (2)
- Contract Negotiation (1)
Motivating staff

- What are the barriers?
- Lack of awareness of benefits
- EM is regarded as a technical problem
- Lack of accountability
- Lack of ownership / reward
- Knowing what staff need / buy-in
- Other priorities
- Unsuccessful experiences

Energy Management Plan

Managing Energy

- Monitoring & Targeting (1)
- Analysing Projects (Technology upgrades 4)
  - Implement, Staff awareness (2)
- Managing Use (Improve controls 3)
  - Department allocation (2)
  - Contract Negotiation (1)
1. What is an energy audit?

- AS/NZS 3598:2000 Energy Audits
- A measure of your energy costs and consumption
- A measure of whether these are high or low for your site
- Answers how to improve energy efficiency and profits
- On its own, does not result in savings

Energy Use by Fuel Type

- Total Sawmills Energy by Fuel Type
  - Natural Gas: 19.0%
  - Wood: 56.8%
  - Electricity: 11%
  - Diesel: 3.8%
  - Waste Wood: 56.8%
  - Waste Oil: 1.4%
  - Coal: 8.0%
Energy Cost by Fuel Type

- Diesel: 4%
- Waste Oil: 2%
- Coal: 4%
- Natural Gas: 26%
- Waste Wood: 4%
- Electricity: 60%

Energy Cost Savings Expected from Main Recommendations

- Insulation upgrades: 21%
- Peak load controls: 22%
- Reduced chain friction: 1%
- Efficient motors: 3%
- Lighting upgrades: 3%
- Housekeeping: 4%
- Compressed air leaks: 6%
- VSDs: 17%
- Stellite saw tips: 9%
- Re-tune boiler: 14%
Energy audit process

Collate all existing data

Analyse benchmarks / tariffs

Site inspections / measurements

Evaluate all savings options

Feedback / Reporting

Prioritise & Implement Projects

Collate existing data

• All energy costs, kWh, kVA, kVAr

• Matching monthly production

• Specifications and maintenance of equipment and buildings

• Past audits

• Operation and process manuals
Analyse benchmarks / tariffs

- Benchmarks (kWh/m³ or GJ/m³)
  - Mill 20
  - Kilns 50 / (500 heat)
  - Planers 8
  - Office/workshop 0.8
  - Whole site 70-600
- $/kVA 25% (winter, anytime, monthly)
- $/kWh 75% (network, off-peak, winter)
- Power factor >95%

Establish Energy balance

<table>
<thead>
<tr>
<th>Energy using Equipment</th>
<th>A: Quantity</th>
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<tbody>
<tr>
<td>Motor 1</td>
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<table>
<thead>
<tr>
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<th>B: Load (kW)</th>
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<th>A: Quantity</th>
<th>B: Load (kW)</th>
<th>C: Time On (hours per day)</th>
<th>D: Total (kWhs per day) (AxBxC)</th>
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<tbody>
<tr>
<td>Motor 1</td>
<td></td>
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<td></td>
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<tr>
<td>Each motor/pump</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each equipment item</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Compressors</td>
<td></td>
<td></td>
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<tr>
<td>Each light type</td>
<td></td>
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<tr>
<td>All heating loads</td>
<td></td>
<td></td>
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<tr>
<td>All office loads</td>
<td></td>
<td></td>
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<tr>
<td>Workshop equipment</td>
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<tr>
<td>Boiler fuel</td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
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How much is EECA grant?

- 100% of audit costs (electricity $1m+)
- 50% of costs (energy $100,000+)
- EIB grant

Some potential cost savings

<table>
<thead>
<tr>
<th>Savings Measure</th>
<th>Mill 25%</th>
<th>Kilns 45%</th>
<th>Other areas 30%</th>
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<tbody>
<tr>
<td>Power factor correction</td>
<td>4%</td>
<td>4%</td>
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<tr>
<td>Kiln fans/ VSDs/ motor sizing</td>
<td>4%</td>
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<td>2%</td>
<td></td>
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<td>4%</td>
<td>12%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Compressors/ leaks/ cleaning</td>
<td>2%</td>
<td>0.5%</td>
<td>1%</td>
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<tr>
<td>Switch-off/ other</td>
<td>5%</td>
<td>3%</td>
<td>10%</td>
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</tr>
</tbody>
</table>

**Switch--off/ other**

FI Clinics 2006
Summary
Energy Management

Two ways to increase profits:

1. Sell more
2. Do more with what you sell

Savings achieved (eg. $95,000 in two years)

Energy cost per year:
- $0
- $100,000
- $200,000
- $300,000
- $400,000
- $500,000

2002 2003 2004 2005

Energy cost BAU
For more information

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Or
Ph: 0274-495 288

Site inspections
Interview users/ managers

• Mill
  • Staff awareness/ cleaning
  • Check motor inventory: load sizes and times, efficiencies, bearings
  • Saw Doctor sharpening policies
  • Saw thicknesses
  • Compressed air: leaks, size, pipe routes, pressure requirements
• Drives and drive belts
• Start-up procedures
• Light levels and types
• Switch-off during breaks
Site inspections

Interview users/ managers

- Kilns/ boilers/ presses
  - Staff awareness
  - Kiln Charge schedules
  - Insulation checks
  - Steam leaks/ steam traps
  - VSDs and fans
  - Heat recovery options
  - Boiler tuning
  - Water temperature
  - Alternative fuels
  - Cogeneration

Site inspections

Interview users/ managers

- Other areas
  - Planer loads
  - Blade sharpening policies
  - Milled thicknesses
  - Fan / duct sizes
  - Treatment pressure checks
  - Offices and equipment
  - Workshop occupation hours
  - Switch-off during breaks
  - Light levels/ types/ sensors

FI Clinics 2006
Why commission help

- Energy auditors save you the time
- Outside objective view
- Expert’s view with wide experience
- Authoritative report
- Formal document for action plan