

The Energy Roadmap: Canadian Nitrogenous Fertilizers An Emerging Industry Strategy

**Co-sponsored Energy Efficiency Roundtable by:
Canadian Fertilizer Institute (CFI) and
The Office of Energy Efficiency of Natural Resources Canada (NRCan)**

**Calgary Airport Delta Hotel, Calgary Alberta
Wednesday, February 22, 2006**

Executive Summary

Purpose

An Energy Efficiency Roundtable, co-sponsored by the Canadian Fertilizer Institute (CFI) and the Canadian Industry Program for Energy Conservation, took place in Calgary, Alberta on February 22, 2006. Its purpose was to develop an industry strategy for continuous improvement on energy efficiency and greenhouse gas (GHG) performance in the nitrogenous fertilizer sector, based on results and learning from several CFI and other sector initiatives.

The meeting focused on how the sector can clearly present its position and work with stakeholders towards achieving emission reduction targets, while reducing costs and maintaining competitiveness. By day's end, the group had reached consensus on a modified goal and a shared intention to meet again in the near future to discuss solutions.

Target

A hypothetical but plausible 5-year energy reduction target for a typical Canadian ammonia plant was derived using the following assumptions:

Assume:	600,000 tonne/year plant @ 40 GJ of natural gas/tonne = 2,400,000 GJ/year
Assume:	33% as fuel = $0.33 \times 2,400,000 = 8,000,000$ GJ natural gas as fuel/year
Assume:	5% reduction over 5 year period 2008 - 2012 = $0.05 \times 8,000,000 = 400,000$ GJ/reduction target
Assume:	1% or 80,000 GJ/year reduction each year (additive) to achieve the 400,000 GJ/year reduction target
Summary:	A typical Canadian ammonia plant would target a reduction of 1% per year for the 5 year period of 2008-2012.

The group then discussed the factors that could contribute to achieving this target, which included:

1. Incremental improvements in energy management practices;
2. Technology advancements or modifications of existing processes and equipment; and
3. Major process or energy efficiency breakthrough (which is not likely in the short timeframe being considered).

Support

Industry representatives in attendance expressed a willingness to work with the Canadian Industrial Program for Energy Conservation (CIPEC) to look at the means that will result in meeting the new goal over the five-year time frame. The group also discussed the recent change of federal government, noting this is an opportune time to "brief up" new decision makers in Ottawa. By sending a powerful message from the industry as a whole, which is backed by credible data showing past performance and specific future commitments, CFI can influence policy-makers to provide incentives that make economic sense and can help

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

make a difference to the fertilizer sector. Doing this means more comprehensive information gathering on the part of the industry, which is something CIPEC can help make happen.

The group also wished to tell the new government where the fertilizer industry needs support to achieve energy efficiency targets, namely:

1. Credit needs to be given where due for voluntary adoption of energy efficiencies to date.
2. North America has the highest natural gas prices in the world. We already play at a disadvantage in the global marketplace.
3. Improving the economics of energy efficiency will stimulate investment in projects and result in productivity improvements.

Path Forward

The group agreed that having a tangible target and a desire to continuously improve performance and work cooperatively with CIPEC was a great start. The next steps include:

1. Convening a follow-up session that should focus on specific actions and initiatives that will help the CFI members meet the target that they have established, and should include technical representatives from CFI member companies. The session can include a discussion of the potential for sites to benefit from:
 - a. Development of site/company energy policy and performance metrics
 - b. Review of energy management matrix (See Appendix 5) and relevance for specific sites
 - c. Areas of opportunity identified in potash and nitrogen sector benchmarking studies
 - d. A regular energy auditing program and identification of a site energy champion
2. Establishing a system for CFI energy data collection on a regular basis that is as non-duplicative as possible but will allow CFI to present and defend credible sector reports.
3. Continue to work with CIPEC to develop a medium to long-term plan for the sector's energy efficiency initiatives (and encourage greater participation in the Industrial Energy Innovator program).
4. Review federal, provincial, utility and municipal incentive programs to ensure programs are being used by companies where it is advantageous.
5. Look for opportunities to profile the energy efficiency achievements of the sector more widely, using existing reports and publications yet to be developed.

**Canadian Fertilizer Institute Energy Efficiency Roundtable
Report - February 22, 2006**

Preface.....	5
Presentations and Industry Discussions	7
Benchmarking Plus: How are we positioned as an Industry, Dave Finlayson, CFI	8
(Appendix 4)	8
Energy Management Survey Results, Jim Farrell, HATCH Consulting	10
(Appendix 6)	10
Relevant Sector Comparisons, Jim Farrell, HATCH Consulting	13
(Appendix 7)	13
Improving Energy Management: CIPEC Toolbox, Miranda Williamson - CIPEC	16
Recommendations	18

APPENDICES

Appendix 1	Energy Efficiency Roundtable, Calgary, Alberta, February 22, 2006: Agenda
Appendix 2	List of Participants
Appendix 3	Minutes of the Roundtable discussion
Appendix 4	Benchmarking Plus: How are we positioned as an Industry (Presentation by Dave Finlayson, CFI)
Appendix 5	Energy Management Survey
Appendix 6	Energy Management Survey Results (Presentation by Jim Farrell, HATCH Consulting)
Appendix 7	Relevant Sector Comparisons (Presentation by Jim Farrell, HATCH Consulting)
Appendix 8	Improving Energy Efficiency in the Nitrogenous Fertilizer Sector CIPEC: One-Stop Shopping on Energy Management (Presentation by Miranda Williamson, OEE/CIPEC)
Appendix 9	Evaluation Form
Appendix 10	Participant Feedback

Preface

The Energy Efficiency Roundtable co-sponsored by the Canadian Fertilizer Institute (CFI) and the Canadian Industry Program for Energy Conservation took place in Calgary, Alberta on February 22, 2006.

The purpose of the Energy Efficiency Roundtable was to develop an industry strategy for continuous improvement on energy efficiency and GHG performance in the nitrogenous fertilizer sector, based on results and learning from several CFI and other sector initiatives. This included: Energy Benchmarking: Canadian Potash Production Facilities (2004), Energy Efficiency and CO₂ Emissions Benchmarking of CFI Ammonia Producers (2005) and the preliminary plan as developed in draft by HATCH.

The primary objective of this project is to develop a plan for the Canadian Fertilizer Institute and its members that will help the industry to continue to improve its energy efficiency and demonstrate the World Class nature of the Canadian facilities.

Trudy Chapman and Jeanette Sanderson of Chapman Communications facilitated discussion and provided note-taking facilities respectively. Jim Farrell of HATCH Consulting led the project. Their combined efforts have resulted in this report.

Background

The nitrogenous fertilizer industry is uniquely placed in its vulnerability to natural gas costs since it uses natural gas as both a feedstock for making fertilizer and an energy source. Natural gas currently accounts for about 85 per cent of the cost of manufacturing nitrogenous fertilizers in Canada. Of that, 30 per cent goes to energy consumption, the burning of natural gas, to run the operations. Facing these high costs has, by necessity, made nitrogenous production facilities extremely efficient. In fact, Canada's fertilizer industry ranks as the world's most energy efficient for nitrogen production.

The Canadian fertilizer sector is responsible for six per cent of Canadian natural gas consumption. Natural gas prices vary greatly from region to region based on existing market conditions as there is no global market for natural gas. This may be changing however, with the growth of LNG exports worldwide. That being said, the global price for natural gas in the fall of 2005 ranged from a low of 70 cents in the Middle East, to \$3.85 in Australia, to highs of \$9.25 in Canada and \$11.60 /million BTU in the US. Growing demand for natural gas in North America has been a trend for a number of years, increases that can largely be traced to increased use of natural gas for electrical power generation.

The natural gas market in North America is maturing, new supplies are becoming harder to find and more expensive to develop. Added infrastructure is needed to bring the gas to market, as seen by projects like the Mackenzie gas and Alaska pipelines. This results in higher costs in North America for natural gas than anywhere else in the world, putting North American producers at a severe competitive disadvantage in the global marketplace.

In a presentation at the 2005 Council of Energy Ministers, Roger Larson, President of CFI and representative of the Coalition of Industrial Energy Consumers revealed that tight energy supplies and higher costs are affecting current operations and future investment for a number of industries, including fertilizers. While companies seek to improve energy efficiencies, energy costs continue to rise.

Despite the challenges of higher costs, the fertilizer industry still manages to contribute six billion dollars annually to the Canadian economy and supplies fertilizer to over 50 countries.

Presentations and Industry Discussions

The CFI/CIPEC Energy Efficiency Roundtable was held on February 22, 2006 in Calgary, Alberta. Initially, the discussion centred on the difficulties facing the industry, particularly the lack of maneuverability companies faced when making plant or process modifications in the name of energy efficiency. “Improve the economics of energy efficiency and productivity will follow,” said one representative. Reference appendix 3 for more complete minutes of the day.

Most agreed however, that there was one underlying question that underpinned the discussion. This question is one that straddles differences between sectors:

- Do Canadians really want to have value-added industry in Canada?

While few would answer “no” to this question, the system in place does not result in an even playing field for Canadian companies who must compete in the international environment.

For Canada to have successful value-added industry, there must be leadership and resolve to even out the playing field and effect change that will make a difference to companies.

Attendees felt the economics must change in order to stimulate investment. Some of that comes down to the tools used to encourage investment. Representatives at the CFI Energy Efficiency Roundtable urge governments at all levels to create incentives that will make a difference. As one industry representative put it, “Incentives into uneconomic ventures are not worthwhile.”

An incentive can be effective in helping a company develop a new market or adopt actions or technology whose return on investment takes longer than the usual timeframe for reasonable return. Incentives can help companies do the “nice-to-do” actions that will make a difference in a decade but not in less than two years; or they can help companies adopt actions that will meet public policy goals that will help Canadians in the long-run.

Discussion covered the issue of environmental emissions and improvements in energy intensity, especially as the group discussed emissions targets. All agreed that their aim is to be **best in class rather than meet esoteric targets**. Doing this would require the development of a strategy for continuous improvement of energy efficiency and GHG emissions. This should include:

1. Implementing technical improvements;
2. Raising the sector profile to get credit for taking action; and
3. Forging better connections with CIPEC as well as making use of all government programs on offer.

Benchmarking Plus: How are we positioned as an Industry, Dave Finlayson, CFI

(Appendix 4)

The Fertilizer Industry Energy Task Force initiated an energy benchmarking project during the 2002-2003 fiscal year. The intention was to facilitate a comparison between operations across potash producing companies that would facilitate a comparison of energy consumption data without requiring additional capital for installation of metering/monitoring equipment. A diagnostic session on energy management practices was conducted at each of the 11 Canadian potash operations that participated in the study.

The final report of the energy benchmarking process produced an overview of the energy consumption, energy use by type, energy-related greenhouse gas emissions and the relationship between energy efficiency and rate of production for the Canadian potash industry. The report also provided inter-mine comparisons of energy consumption for the nine conventional mining/milling operations. A summary of energy management practices and areas of opportunity for improvement was included.

According to the final report, “Energy Benchmarking: Canadian Potash Production Facilities,” there were four areas of potential opportunity identified:

1. Awareness and training – raise the awareness and level of training about energy conservation across the organizations to help identify and drive many of the lower-cost savings opportunities associated with behavioural issues;
2. Formalizing energy plans – to develop a strategic and action-oriented program, usually a three-year strategic plan supported by a one-year budgeted action plan for a start;
3. Energy auditing (understanding opportunities) – developing a formalized approach to quantifying the main areas of energy use and identifying and prioritizing the opportunities for savings; and
4. Improved reporting, feedback and control systems – most sites indicated adequate metering systems in place to monitor energy consumption but what was needed was a system for the management of the information for effective reporting and feedback

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

systems to ensure that variances in energy performance are identified and acted upon.

If implemented, it is expected that these areas would bring the greatest value to the companies' overall energy performance.

A similar process was adopted for the nitrogenous sector. The Canadian Fertilizer institute (CFI) nitrogen sector benchmarking project includes:

1. Benchmarking of Canadian industry energy efficiency performance for the past three years (2000-2003);
2. Comparing Canadian performance with global operations;
3. Evaluating Best Available Technology for the nitrogen manufacturing sector; and
4. Conducting a parallel exercise that resolves the current energy efficiency/intensity reporting issues for the sector.

All in attendance agreed the studies were valuable in that the studies told the industry what it already knew:

- Energy efficiency is taken seriously by Canadian companies.
- Canadian plants are generally more efficient than their international counterparts.

These studies have been of use internally to individual companies in that they provide suggestions for incremental change in energy efficiency rates. CFI used the benchmarking studies and reports in large final emitter discussions with government, in discussions with other governmental departments, and with both other industries and the public.

At the same time, the benchmarking study did outline some opportunities to companies:

- In the potash sector, international benchmarking is needed.
- In the nitrogenous sector, it would be useful to show the production mix in other products – ammonia, urea, ammonium nitrate, phosphates, sulphates
- Process integration studies could help identify areas for further improvement.

Conclusion:

Incremental improvements in energy efficiency are possible.

This discussion suggested to the attendees that while the Canadian industry ranks highest in the world for energy efficiency, and while Canadian plants are slightly more competitive than their US counterparts, there were areas for **incremental improvement** that could be pursued. Again, the aim was to be best in class rather than meet esoteric targets imposed from outside the industry.

Energy Management Survey Results, Jim Farrell, HATCH Consulting

(Appendix 6)

The Energy Management Survey was an attempt to look at incremental change as a means to increase energy efficiency and establish a common framework for energy management activities. It was geared towards identifying the barriers to improvements in plant technology and operations, and to identify what programs were needed. Six surveys were sent out and five were completed and returned. The survey results indicated positive replies to the qualitative questions but “no” answers, generally, to the softer, “policy” questions.

Jim Farrell went through the results of the survey, which showed some interesting findings. The survey was split into two parts – energy management and barriers to implementation.

Energy management

While all companies run tight operations and waste is at a minimum, no company had a signed directive or policy for improving energy efficiency or reducing energy costs. The Roundtable attendees felt that the lack of a stated company energy policy was simply an oversight, that they were already doing all the things that might be included in an energy policy, it was just not identified as such. As a group however, they did agree to consider the development of company energy policies, and by the end of discussion, were actually interested to see what would be discovered in the process.

All companies responded that they had energy reduction targets and key performance indicators to track progress against stated targets. This would make sense given the sector’s vulnerability to volatile natural gas prices and the role that natural gas plays in the creation of nitrogenous fertilizer.

No company had an energy efficiency champion, and there was debate around the table as to the value of appointing one. “What would an energy champion do?” one representative asked. The role of an energy efficiency champion is quite simple – develop a company energy strategy and implementation plan that ensures that, from the plant floor to the boardroom, energy efficiency is top of mind.

Each company reports and examines variations in energy use and efficiency but again, there was the lack of a formal continuous improvement program covering energy management issues. Many of these oversights on the part of companies would be offset by going through the exercise of drawing up an explicit energy policy for the company.

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

Barriers to implementation

The majority of companies have not completed an energy audit within the past two years nor established energy consumption by major user and opportunities for savings. Such an initiative would serve to identify gaps and help address incremental change towards continuously improving energy efficiency.

Further, the majority of companies have not completed a Process Integration study within the past two years, another initiative that could help with incremental change. Nor do companies have a documented Energy Plan that includes short term projects and a strategic plan for the next two to three years. Financial analyses of energy saving projects do not consider life-cycle operating costs of the project and apply a value for the avoided carbon dioxide equivalent emissions expected over the life-cycle of the project. Having this kind of valuable proof of the emissions reduction would go a long way to making the case that the industry is doing all it can to decrease environmental emissions and could help make the case for voluntary emissions standards.

Most companies have been pragmatic about the need to retrofit to improve plant energy efficiency. However, retrofits are done only when the projects meet payback criteria, a point that is important when considering how to incent activities that go beyond the routine period for return on investment (ROI). As one would expect, industry operates quite pragmatically, making the changes or investments that provide a reasonable rate of return in a short time frame. Changes that will take longer to have an impact are either put off or neglected entirely.

The survey found that companies have a series of projects that do not meet the corporate hurdle rate for payback based on current energy prices. Examining these projects and considering those that will have a positive effect on energy efficiency would likely be a good use of time, especially if that information was used by government to develop programs to help with the roll-out of these initiatives that may have a longer ROI period. Companies do not have a series of projects that do meet the corporate hurdle rate based on current energy prices that are not funded. This suggests the sector is doing all it can, given the existing costs of energy and a reasonable rate of return over time.

Finally, most companies have considered third party financing options and available government funding to supplement internal financing for major energy projects. At the same time, it would be worthwhile to look at all the federal, provincial, municipal and utility programs as a whole to consider which programs can be used together and which cannot, and determine if each company is accessing all the help it can regarding energy efficiency matters.

Energy Management Matrix

The energy matrix is a tool used in the CIPEC Dollars to \$ense workshops. In moving through the matrix, companies grade themselves in six areas along a continuum from zero to four. The matrix helps companies to evaluate their organization and to effectively manage energy day-to-day.

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

The six categories are:

1. Energy policy – from no explicit policy to a clear energy policy with actions and regular review;
2. Organizing – from no energy management to energy management fully integrated into the management structure;
3. Skills and knowledge – from energy users relying on existing knowledge to specific energy training integrated into staff activities for relevant staff members;
4. Information systems – no information systems or accounting for energy consumption to comprehensive system with targets and monitoring of consumption;
5. Marketing and communicating – no promotion of energy efficiency to communicating the value all through the company and outside to the public; and
6. Investment – from no investment in increasing energy efficiency of the plant to positive discrimination in favour of green schemes.

The energy management matrix caused quite a stir in its discussion, with people initially questioning its value.

Sponsored by Natural Resources Canada's Office of Energy Efficiency, Dollars to \$ense workshops are instrumental to companies that are serious about putting their energy plans into action. Dollars to \$ense workshops offer participants the latest information about energy management practices from highly trained instructors – information that, in turn, helps companies improve operational efficiency and lower production costs. The energy management matrix is a tool used by the Dollars to \$ense workshops to help companies focus on energy efficiency.

Over 10,000 participants from across Canada have found ways to save energy in their companies and organizations. Some industries have modified the matrix to meet their particular needs.

In the end, it was agreed that with a little tweaking, the energy management matrix could be a useful tool to the fertilizer sector to help them more concretely state what companies are already doing and identify gaps that might exist. It was agreed that the energy management matrix would be sent out to companies for consideration.

Comments on the energy matrix:

- Energy management is everybody's job;
- Energy management can evolve the way safety management has evolved;
- If you can't measure it, you can't control it, and this is a positive frame of reference;
- Look at opportunities where we're not efficient in relation to other companies. We currently target cost savings not specific energy policy; and
- There are opportunities for increasing awareness and training, and making energy management part of a "values" based mission for the individual companies.

Relevant Sector Comparisons, Jim Farrell, HATCH Consulting

(Appendix 7)

Sometimes, learning from the experiences of others is the best way to pick-up some tips about what your next step could be. By comparing the experience of the fertilizer industry to that of some other large energy consuming industries, it was felt the fertilizer industry could learn about some industry best practices on energy efficiency, modify them and make them applicable to their own experience. Jim Farrell of HATCH presented experiences from the mining sector, pulp and paper, upstream oil and gas and the steel sector.

Mining Sector

In the 1990s, the mining sector found itself facing difficult times. Relations with the communities in which they operated were difficult, largely because of a mentality that did not focus on building links with the public and stakeholders but rather focused only on isolated corporate priorities and increasing shareholder value. The industry had to address some significant issues if it were to move forward effectively.

The *Towards Sustainable Mining* (TSM) initiative was developed as an answer to the myriad of issues facing the industry. The goal was to improve the sector's reputation by improving its performance. TSM fosters consistent action with the goals of communities and the public at large on an on-going basis. The sector launched a series of studies to understand the issues, interests and priorities of their stakeholders. They also looked at how the mining sector's interests dovetailed with the interests of the stakeholders.

In 1999 and 2000, the Mining Association of Canada (MAC) completed two energy benchmarking studies: one for underground bulk mines and another for open pit mines, respectively. And in 2003, MAC developed performance indicators for four areas including energy management. These indicators were supported by a ranking system and clear criteria for evaluating performance and monitoring progress. For each indicator, there were five levels of performance with criteria for each level, simply a modified version of the energy matrix. Companies selected the level that most clearly reflected their company's performance. The metrics for the program are outlined in Appendix 7.

This work resulted in the establishment of TSM targets requiring:

- Establishment of a formal energy management system and GHG emissions reduction strategy;
- Comprehensive energy use and GHG emissions inventory, public reporting using recognized inventory methodology;
- Establishment of an energy intensity improvement target of at least one percent per annum; and
- Establishment of GHG intensity improvement target of at least one percent per annum, net of any quantified and accredited offsets.

The process that led to producing the *Towards Sustainable Mining Strategy* included developing the following tools or activities:

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

1. Cost-shared Large Energy Audits: Through funding from the Office of Energy Efficiency, MAC helped cost-share an expert consultant to perform either a comprehensive or large process audit at a MAC member facility to identify energy efficiency opportunities.
2. Cost-shared Energy Team Leader: Through funding from the Office of Energy Efficiency, MAC is funding 50% of the costs for a company to hire a full-time human resource to manage energy for an extended period to identify and implement energy efficiency opportunities.
3. Request government support for energy metering at operations with the philosophy “If you cannot measure it you cannot manage it.”
4. Fiscal and regulatory options to create a favorable environment to make energy efficiency investments and reduce GHG emissions
5. Strategic research on wide range of energy sources that can reduce GHG emissions - no fuel or technology should be ignored:
 - a. Wind power at remote sites;
 - b. Geothermal energy from underground mines; and
 - c. Hydrogen fuel cells for mine equipment

The ultimate aim of the TSM is to show the sector how they are doing on energy performance and GHG emissions reduction. It has served as an opportunity to show the laggards where they should be and shepherd them along to meet the industry targets.

Pulp and Paper

The pulp and paper sector has been very active in energy management. Activities in this sector include:

- Benchmarking 49 Canadian mills representing over 50% of production capacity;
- Holding regular Task Force meetings across Canada to discuss and share best practices;
- Developing and producing sector-specific publications on energy management (i.e. energy efficiency opportunities for the Kraft industry, monographs on energy and water, etc.);
- Awarding annual energy efficiency awards;
- Offering an annual three-day energy efficiency course covering such topics as setting up an energy management program, simulation, pinch analysis, energy efficiency opportunities for specific systems such as paper making, pumps, combustion, etc.;
- Holding an energy session at their AGM; and
- Hosting regional events with an energy management focus.

Upstream Oil and Gas

The industry looked to adopt industry best practices and found these through key performance indicators and a benchmarking study. A compressor efficiency program also helped companies. Case study development helped companies compare against each other to learn in very pragmatic terms what worked and what did not.

Clear metrics provided effective evaluation of the initiatives:

- Number of audits completed;

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

- Number of workshop participants at customized Dollars to \$ense CIPEC workshops; and
- Level of Industrial Energy Intensity.

Case study from the steel industry – Gerdau Ameristeel

Learning from the energy benchmarking studies is being used differently by each sector and company that participates. For example, Gerdau Ameristeel is a steel company that has truly taken the energy efficiency mantra to heart. Gerdau Ameristeel is the second largest minimill steel producer in North America. Gerdau was originally established by the Gerdau family in Brazil. Ownership has only recently become expanded beyond the family with the recent consolidation of the steel industry globally. Yet, Gerdau family values continue to influence the company values, which were translated into practical programs.

Energy efficiency has become a core value of the company so much so that daily, weekly, monthly and annual targets for energy use are posted on billboards along the path from the parking lot to the plant entrance at the plant in Cambridge, Ontario. This informs all staff of plant goals.

Gerdau values in action

One core value is the philosophy that the operator of a station is the one who knows most about how to make that station most efficient. The company puts a lot of money into their hourly wage staff to ensure core values are honored and the company operates as efficiently as possible. 100% of mill problems are known by those who operate the machinery itself. Management is only aware of 4% of problems.

Gerdau management believe that if the awareness of all employees is raised through education and communication, employees can be inspired to commit to constant vigilance and come up with creative new ideas for conservation and plant efficiency.

At the plant in Cambridge Ontario, management hired a team of people with soft skills (negotiation, mediation, communications) as well as technical knowledge to work with each shift on the floor to help debrief how the shift went, if the shift met their goals on a variety of metrics, why/why not and how to change to do better the next shift they work at the plant. Incentives for hourly staff, from restaurant gift certificates to trips to Brazil or Japan to study operations at other plants, reward the hourly staff for their attention to energy efficiency and their role in helping to achieve plant goals. Giving credit right down to the floor level shares the philosophy of energy efficiency through the plant and helps make the hourly staff the focus of plant improvements in the Cambridge Ontario operation.

Gerdau also sets up friendly competition on a global scale, between Gerdau plants in different countries. This makes the process fun, builds team spirit in a plant, and sets a cooperative goal, for the learning from the initiative is shared across the corporation.

Energy conservation has long reach at the Cambridge plant. The plant is also located adjacent to the local dump. Gerdau now captures the methane gas from the dump and burns

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

it in the plant as an energy source. Thus, a greenhouse gas is captured and used, protecting the environment and boosting the plant's image as a good corporate citizen.

Gerda has adopted a comprehensive plan to consider how to meet energy efficiency goals. With clearly set objectives and an effective toolbox, Gerda has managed to decrease plant emissions, meet energy efficiency targets, keep staff engaged and meet corporate goals in an every tightening and competitive marketplace.

The steel industry learned a great deal from their energy benchmarking study and produced the following results:

1. Provided Canadian steel producers with a methodology to determine benchmarks for the efficiency with which energy is consumed at the plant level and at each stage of production.
2. Provided a list of technologies with the potential for achieving more efficient use of energy and enhancing the competitive position of the Canadian steel sector.
3. Provided a compilation of energy-intensity benchmarks and an analysis of the penetration of energy-efficient technologies for the CSPA member plants.
4. Provided a comparison of benchmarks and technology penetration between plants and against international technology-based benchmark levels, thereby allowing areas of potential improvement to be identified.

As a result, they are initiating a second phase of the energy benchmarking study with the following objectives:

1. Provide each company with a list of their energy projects as identified by the Energy Benchmarking Study;
2. Establish the extent to which the participating plants have investigated the energy and CO₂ savings and the economic feasibility of energy projects;
3. Establish for each process area (based on the process areas defined in the Energy Benchmarking Study):
 - a. energy projects that companies have concluded are feasible;
 - b. energy projects that companies have concluded are marginal and which would require an incentive to make them feasible undertake; and
 - c. energy projects which companies feel are not feasible for financial reasons.
4. Compile the potential specific energy and CO₂ savings by process category from the projects in (3a) and (3b) above; and
5. Provide advice and any clarification required to the Canadian Steel Producers Association Board on the feasibility of achieving the savings identified.

Improving Energy Management: CIPEC Toolbox, Miranda Williamson - CIPEC

Miranda Williamson from the Office of Energy Efficiency (OEE) at Natural Resources provided an overview of the Energy Technology and Programs Sector where she works as a

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

Senior Industry Officer. (Improving Energy Efficiency in the Nitrogenous Fertilizer Sector, Appendix 9)

Established in April 1998, the OEE's mandate is to renew, strengthen and expand Canada's commitment to energy conservation and energy efficiency. In promoting energy conservation, the OEE manages seven energy efficiency and alternative fuels programs aimed at the residential, commercial, industrial and transportation sectors. Informing key decision-makers in government, industry and the environmental and international communities about Canada's energy conservation and energy efficiency efforts and successes is a major focus of the OEE.

With the assistance of the National Advisory Council on Energy Efficiency, the OEE is also charged with identifying opportunities for new and heightened energy efficiency measures. As well, it keeps Canadians abreast of developments in technology that can conserve fossil fuels or support the transition to less carbon-intensive energy sources, including renewable energy.

CIPEC, the Canadian Industry Program for Energy Conservation, is operated through the Industrial Programs Division of the OEE. CIPEC is a unique industry-government partnership with extensive industry reach. Established in 1975, it currently represents 50 industry associations, 5000 companies, representing 98 percent of Canadian industry. Their bi-monthly newsletter, *Heads Up CIPEC*, reaches more than 12,000 middle and senior managers.

CIPEC has helped members reduce their combined energy intensity by 8.7 percent between 1990 and 2003. Improved energy management enabled Canadian industry to avoid approximately \$3.4 billion in purchased energy in 2003, enough to meet the energy required to heat 4.8 million Canadian households for one year. ("The Measure for Success – For Thirty Years", CIPEC Annual Report, 2003-2004, p.5)

CIPEC's goal is to improve industry energy intensity by one percent a year from 1990-2005. A new target is under development. The program helps companies use energy efficiency as a tool to cut costs, improve productivity and reduce emissions. CIPEC does this through providing information, advice, training, incentives and celebration of successful ventures.

CIPEC Membership has its privileges:

- Over the past five years, the increase in energy consumption among the non-CIPEC participants was more than double that of CIPEC participants.

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

Miranda did point out, however, that much of the CIPEC funding has been frozen, pending program review and the establishment of the new government's priorities in the spring 2006 Speech from the Throne.

Budget 2005 also had an impact on federal action on energy incentives. Budget 2005 brought changes to the Capital Cost Allowance System, enhanced incentives for efficient energy production (wind power, renewable production for sources other than wind), the partnership fund, and creation of a new CCA class (new 50% CCA rate). Refer to Appendix 9 for details.

Recommendations

Through the course of the meeting, the sector representatives developed a series of recommendations centered on a measurable and achievable goal that the sector can work towards over the next five years.

The new goal, as developed by the industry representatives and expanded upon earlier, is:

- **How is this goal of reducing energy consumption by 400,000 GJ/year going to be achieved by 2012?**

The representatives at the meeting would like to move forward using the following action items:

1. Develop an industry strategy for continuous improvement of energy efficiency and GHG emissions.
2. Implement the areas of opportunity identified in the potash and nitrogenous sector energy benchmarking studies.
3. Conduct international benchmarking of the Canadian potash industry.
4. Develop a company energy policy with real metrics tied to performance. The plan should have short-term projects with real timelines for implementation reflecting a strategic plan with a clearly stated company goal about energy efficiency.
5. Consider appointing an energy champion who has the task of writing the energy strategy and implementing it.
6. Complete an energy audit annually.
7. Conduct Process Integration studies regularly.
8. Find opportunities for staff training to improve plant processes.
9. Conduct a gap analysis of operations.
10. Develop an implementation plan for those existing projects that have longer ROIs and look for co-sponsorship opportunities with government or utility incentive programs.
11. Conduct an overview of federal, provincial, utility and municipal incentive programs and ensure all programs are used effectively by their companies. The development of a matrix of all available programs, comparison of how they can interrelate, and a review of each company's use of the programs, would be a useful exercise.
12. Increase the number of CIPEC Industrial Energy Innovator companies from the fertilizer industry.

**Canadian Fertilizer Institute Energy Efficiency Roundtable
Report - February 22, 2006**

13. Work with CIPEC to develop a plan for helping the sector with its energy management initiatives.
14. Adjust the energy management matrix for the fertilizer sector and send it out to individual companies for consideration and application.
15. Profile the industry and its energy efficiency achievements more broadly to the general public and the political decision-makers. Look to raise sector profile to get recognition and credit for action taken
16. Send out the pulp and paper energy efficiency course outline to CFI members.
17. Consider technical advances and technical means of improving plant processes. Invite more technical experts to sector discussions on energy efficiency.
18. Adapt and adopt learning from other sectors:
 - a. Study where you stand as an industry on energy use;
 - b. Benchmark against others, nationally and internationally;
 - c. Each company to apply the Energy Matrix and grade themselves, looking for opportunities for incremental advancement;
 - d. Set a realistic target;
 - e. Establish route to target with clear expectations and metrics; and
 - f. Trust your people to come up with creative solutions to problems

APPENDIX 1

Energy Efficiency Roundtable, Calgary, Alberta, February 22, 2006: Agenda

**Canadian Fertilizer Institute Energy Efficiency Roundtable
Report - February 22, 2006**

AGENDA
Canadian Fertilizer Institute Energy Efficiency Roundtable
February 22, 2006
Calgary Airport Delta Hotel
Calgary, AB

Vision for the day:
*To develop an industry strategy for continuous improvement
on energy efficiency and GHG performance in the nitrogenous fertilizer sector.*

8:30 am – 8:40 am	Trudy Chapman, Welcome & Overview of the day
8:40 am – 8:55 am	Jim Farrell - Results of Energy Management Survey
8:55 am – 9:20 am	Dave Finlayson, Benchmarking – How are we positioned as a sector?
9:20 am – 9:50 am	Jim Farrell - Relevant Sector Comparisons - Components of a Sector Strategic Plan
9:50 am – 10:30 am	LEGO – small group discussion Three groups – what can we apply from: #1 Results from the benchmarking #2 Recent survey results #3 Industry comparisons
10:30 am – 10:45 am	BREAK
10:45 am – noon	Plenary by group – presentations from discussions
Noon – 1:00 pm	LUNCH
1:00 pm – 1:30 pm	Miranda Williamson, NRCan/OEE “I’m from the government and I’m here to help.” Current programs for energy efficiency New programs in light of Budget 2005 announcement
1:30 pm – 2:15 pm	Group Discussion – On the Road Again Develop a Roadmap with the goal of continuous improvement on energy efficiency using today’s learning Three groups #1 Setting targets #2 Technical support programs #3 Financial support programs

**Canadian Fertilizer Institute Energy Efficiency Roundtable
Report - February 22, 2006**

2:15 pm – 2:30 pm

BREAK

2:30 pm – 3:30 pm

Reporting back on group discussions

3:30 – 4:00

Trudy Chapman, Wrap-up

Where do we go from here and how do we get there?

Evaluation of the day

APPENDIX 2

Participants:

Chris Micek, Agrium Inc, CIPEC Executive Board member for the Fertilizer sector

Ron Wendling Canadian Fertilizers Ltd.

Russ Holowachuk, Canadian Fertilizers Ltd.

Dave Finlayson, CFI

Miranda Williamson, NRCan/OEE

Jim Farrell, Hatch Consulting

Trudy Chapman, Chapman Communications

Jeanette Sanderson, Chapman Communications

APPENDIX 3

ENERGY EFFICIENCY ROUNDTABLE

MINUTES

FEBRUARY 22, 2006

CALGARY AIRPORT DELTA HOTEL

Calgary, AB

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

Vision for the day...

To develop an industry strategy for continuous improvement on energy efficiency and GHG performance in the nitrogenous fertilizer sector.

The facilitator for the roundtable, Trudy Chapman started the proceedings with an overview of energy use in the industry and why energy efficiency is of vital importance to maintain industry viability with the continued upward trending of prices for natural gas, the primary feedstock of the industry's product.

Showing two comparative mappings of Global Natural Gas Prices for July 7, 2005 and September 8, 2005, it was pointed out the spiking in our market in Canada (\$6.35 in July vs. \$9.25 in September – \$US per million BTUs) compared to other countries in the world, such as Australia and Trinidad where prices did not change at all or very little. Another handout showing manufacturing energy end-use breakdown drives home the necessity of energy management. Although energy efficiency upgrades can't increase efficiency by 30%, if companies can maintain the level of use of energy at 30% by managing resources through energy efficient targets of daily use, use may not be decreased but may keep a "lid" on costs.

A submission to the Council of Energy Ministers Meeting held in September, 2005 was next discussed. "The Demand Crunch" highlighted the coalition's interests:

- Manufacturing and resource processing industries face severe competitive pressures
- Tight energy supplies and higher costs affect both current operations and future investment
- Strong demand has applied upward pressure on some prices – offsetting to varying degrees higher energy costs
- But this offset is declining as the economic cycle progresses
- High and volatile energy costs are key factors in investment decisions
- Major sectors (e.g. steel-making, chemicals, nitrogen fertilizers) have essentially no new investment planned to increase capacity in Canada
- Northern Ontario's forest products sector is under stress, citing energy as a causal factor

The coalition concluded negative trends can be arrested by addressing major energy supply and demand issues. They recognized it as a long term issue that requires urgent progress.

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

A discussion followed...”our high costs are killing us!” Money is not being invested in Canada because there are better returns to be had by investing elsewhere. One participant reiterated that even though “... we’ve taken less of a ‘hit’ in Canada, I still can’t justify any significant investment in Canada.”

It was pointed out that now is the ideal time to “brief up” to the new minister, Gary Lunn. If federal and provincial ministers decide to commit to upgrade and add value rather than to sell resources, what suggestions can we make to ensure the continued viability of our industry? By sending a powerful message from the industry as a whole, which is backed by solid data showing past performance and specific future commitments, industry can influence policy makers to provide incentives that make economic sense.

Benchmarking Plus: How Are We Positioned As An Industry?

Dave Finlayson of the CFI next presented a talk on sector benchmarking and data resolution (Appendix 4).

The significant variability between reporting plants points out the need to ensure accurate industry representation in defining and reporting energy efficiency performance. The value to individual companies is that information is submitted on a confidential basis and then each receives a report and it is up to each of them as to how they wish to use the information. It has been used with LFE groups. If companies can compare favorably with others in their sector, “best in class”, it stands the company in good stead (re: Kyoto).

Time magazine profiled CIPEC and its accomplishments. Raising the profile of the industry can have far-reaching effects. It is important to do a profile for the industry to provide a roadmap for continuous improvement and out of this can come technical benefits as well as influencing policy makers in relation to LFE and the Kyoto process as they unfold.

In the roundtable discussion following, the benefits of benchmarking were confirmed. **“Benchmarking positioned us amongst ourselves but overall it is written confirmation of what we thought we knew.” The Canadian industry compared well internationally.** The Canadian industry is surviving better than that in the U.S. Canadian plants are not the newest in the world having been built in the 70s, but they have been upgraded. **Energy efficiency is critical.** “85% of our costs are for natural gas, so we are driven to do this. U.S. plants aren’t too far behind us. If we have \$1.60 gas, there is no incentive to reduce because it costs more.” “We’re also successful because the market we serve is more accessible to Canadian producers.”

Results of Recently Completed Energy Management Survey (Appendix 5)

Presented by Jim Farrell of Hatch Consulting, the survey looked at the possibility of finding incremental energy efficiency increases, the barriers to getting the programs going, what would government incentives look like, and how to transfer knowledge so it could be used in other companies and sectors.

The survey results indicated positive replies to the qualitative questions but “no” answers, generally, to the softer, “policy” questions. **The Energy Management Matrix** is a way to

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

determine what makes sense for individual companies and for the industry as a whole. It pushes members to continuously improve plus it provides a sector stance to further the sector agenda, re: public policy. In general discussion it was agreed that this was a valuable tool to take back to the company and the plant. Comments made were: Energy management is everybody's job; energy management can evolve the way safety management has evolved; If you can't measure it, you can't control it, and this is a new frame of reference; now we can look at opportunities where we're not efficient in relation to other companies; we currently target cost savings not specific energy policy; there are opportunities for increasing awareness and training and making energy management part of a "values" based mission for the individual companies.

The Matrix is being sent out to all companies to get more complete sector information.

Relevant Sector Comparisons (Appendix 7)

- a) **The mining sector** – completed energy benchmarking project in 2002, established energy audit program through contribution program, which led to energy team leader program with cost-shared human resources dedicated to energy management. They can demonstrate to the government and public where they are at as far as energy and GHG emissions management. The intent behind this is to show everybody else how they are doing, "transparency", and to shepherd the laggards along. TSM (Towards Sustainable Mining) indicators help determine "where should we be going re: energy management". There is a big gap between best performers and laggards. The whole TSM initiative is aiming for level 3 on all indicators. The industry can define the "levels". Each indicator is assessed on a scale of 1-5:

Level 1 – no action has been taken, no systems/targets in place

Level 2 – Some actions, but sporadic and not fully documented; systems/processes planned and being developed, targets in place but not being achieved.

Level 3 – Systems/processes are developed and implemented, targets are being achieved.

Level 4 – Integration into management decisions and business functions, performance exceeds targets.

Level 5 - Excellence and leadership.

- b) **The pulp and paper sector** – program metrics: No. of Industrial energy innovators; no. of dollars to sense workshop participants; no. of energy audits completed; no. of PI studies completed.
- c) **Upstream Oil and Gas** – best practice – key performance indicator, benchmarking project; compressor efficiency program; case study development; customized dollars to sense workshops; energy management forums.

Program metrics: IEs; workshop participants; audits completed.

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

Phase 2 benchmarking, Gerdau Ameristeel (Appendix 8) : individual companies are taking this forward, less as an industry. Ideally, companies can create an energy efficient culture, for example Gerdau. The Gerdau family values determined the company values which were translated into practical programs. They put a lot of money into the hourly wage group to ensure core values were honored.

If the awareness of all employees is raised through education and communication, they can be inspired to commit to constant vigilance and coming up with creative new ideas for conservation. The point was made that energy savings can be translated into “jobs saved”. The human value to community strengthening should not be underestimated.

Summary at halfway point (Trudy Chapman)

Benchmarking

Confirmed what we know, energy efficiency is taken seriously, and we compare well internationally

Opportunities

International comparisons for Potash industry are needed, useful to show production mix in other products, and process integration

Aim

Best in class, NOT esoteric targets

Where from here?

- 1) Technical benefits - Since North American gas prices are the highest in the world, improvements are needed in energy efficiency and productivity improvements will follow.
- 2) Raise sector profile – (re: energy policy – formalize it and communicate it effectively), feed up to new government, everybody expects something new so therefore there is an opportunity. If the current government really wants to have a value-added industry in Canada, then we need to work with them to change the economics to stimulate investment in our industry, incentives for non-economic ventures are not worthwhile.
- 3) Guidance from CIPEC
- 4) Gap analysis
- 5) Learning from other sectors (re: energy matrix exercise – at the company level, apply to the nitrogenous sector)

Presentation by Miranda Williamson, NRCan/OEE (Appendix 8)

Canadian Fertilizer Institute Energy Efficiency Roundtable Report - February 22, 2006

“I’m from the government and I’m here to help”

In operation since 1975, CIPEC is a joint government-industry partnership that encourages energy efficiency as a tool to cut costs, increase productivity and reduce emissions. It set a target to improve energy intensity of 1% per annum from 1990 to 2005 (voluntary). **Why get involved in CIPEC?** Over last five years, the increase in energy consumption is more than double for non-CIPEC members!

Under the program, Industry Energy Innovators, benefits include access to programs, discounts for energy efficiency workshops and access to customized workshops, and coverage in CIPEC newsletter and annual report.

Members of Industry Energy Innovators include all Canadian divisions of PCS, all MOSAICs Canadian sites and Agrium Inc. Non IEs include Canadian Fertilizers Ltd., Simplot Canada Ltd., Sherritt International, Terra International and SaskFerco.

How to become an innovator? Submit a letter to the chair of CIPEC, establish energy efficiency targets, quantify energy consumption and report annually.

The toolbox available to members includes **networking opportunities** (task force meetings, energy managers network, sector energy days); **information and awareness** (nitrogen data strengthening, nitrogen benchmarking, energy efficiency roundtable, industry publications/media, employee energy efficiency awareness days, and alternative financing); **financial support** (Industrial energy audit incentive, process integration, combustion efficiency, building incentives); **employee training-assistance through Dollars and Sense workshops and FleetSmart**; **Technical advice** (Class 43.1 and CRCE –technical guide available, Energuide for industry); **R and D resources** (Canmet Energy Technology Centres – maintains 3 world class labs, costs are shared, 50% of project costs).

Budget 2005 brought changes to the Capital Cost Allowance System, enhanced incentives for efficient energy production (wind power, renewable production for sources other than wind), the partnership fund, and creation of a new CCA class (new 50% CCA rate).

NOTE: Beta testers are needed for Boiler Efficiency calculator – any volunteers?

The range of what we think and do is limited by what we fail to notice. And because we fail to notice that we fail to notice, there is little we can do to change; until we notice how failing to notice shapes our thoughts and deeds.

R.D. Laing as quoted in Stephen Covey’s The Eighth Habit

**Canadian Fertilizer Institute Energy Efficiency Roundtable
Report - February 22, 2006**

Where do we go from here?

- It is necessary as a sector to put together a concrete plan with specific goals
- One more meeting with all sector members present is essential to define goals (only 2 companies were represented at this round table). We need to spend time discussing the development of new tools/processes; involve other experts from other industries; there is not just the KYOTO incentive, we need to save energy dollars to keep production in Canada. It is not just energy management which can help keep our industry viable – there is technology (Miranda suggested creating specific workshops for the sector – “experts talking to experts”), tax incentives, the people side (practices) and non-capital investment type things. Funding is needed for studies, this is where CIPEC can fit in. Pure research is done by suppliers and vendors (CFI is not into pure research). Also good to explore what help is available through municipal, provincial agencies and how efforts can be effectively co-coordinated.
- This meeting has identified the broad needs of the Nitrogen group; the Potash group may have different parameters
- The one SMART goal decided upon is to reduce typical plant use by 400,000 GJ by the end of five years, either all at once or incrementally. “Can we come up with something meaningful that links this target to government programs?” CIPEC, NRCan, OEE can help us to achieve this.
- With the report from this meeting, pragmatic information can be forwarded to the minister’s office

APPENDIX 4

Benchmarking Plus: How are we positioned as an Industry
(Presentation by Dave Finlayson, CFI)



Benchmarking Plus

How are we Positioned as an Industry?

CFI

Energy Efficiency Roundtable

February 22, 2006

Calgary

Retrospective & Prospective



As a Sector

What Have We Done & Where Are We Going?

- Potash Benchmarking
- Nitrogen Benchmarking
- Data Resolution

Sector Projects



Highlights of Benchmarking Results

Potash

- inter-company benchmarking
- opportunities

Nitrogen

- inter-company benchmarking
- international

Data Resolution

Potash Benchmarking



Individual Plant and Sector Reports

- total CO₂ (eq)
- total E consumption
- E consumption vs. production
- underground vs. surface
- natural gas vs. electricity

Summary: real data for the industry

Nitrogen Benchmarking



Inter-plant and Sector

- CO₂ generated – fuel and process
- CO₂ recovered
- E intensities and plant efficiencies
- international benchmarking:
 - Canada vs. 12 global regions
- Future of Ammonia Plant Low E Designs

Data Resolution



Potash

- compared benchmarking data (production and E consumption) with CIEEDAC -
- identified data reporting duplication and potential for international data sharing/benchmarking

Data Resolution, cont...



Nitrogen

- compared benchmarking (Williams), CIEEDAC, CFI/CIPEC
- importance of consistent ICE reporting
- value of CFI Information system
- impact of considering production mix
 - ammonia, urea, ammonium nitrate, phosphates, sulphates

How Have We Used the Results?



- value to individual companies
- value to CFI
 - in LFE discussions
 - other government departments
 - other industries and the public

Where to from here?



Strategy for continuous improvement

Benefits:

- technical benefits
- sector profile
- role of CIPEC

APPENDIX 5

Energy Management Survey
& Energy Management Matrix

SURVEY OF CFI AMMONIA PRODUCING MEMBERS ENERGY EFFICIENCY – OPPORTUNITIES AND BARRIERS

Company Name:

Company Contact:

Role within the Company:

Plant Location:

Background

The CFI Ammonia Producers completed an energy benchmarking project in 2005 that demonstrated the overall high level of energy efficiency of Canadian plants versus the global average. The report highlights the fact that *“there is unlikely to be any further significant reduction in energy consumption of the natural-gas based steam reforming ammonia process since it is already close to the theoretical minimum”*.

The report does point out that fuel efficiency improvements of 0.65% per year are estimated to be achievable for the most fuel efficient plants currently operating, from now until the year 2014. The Benchmarking report also demonstrated the variability in energy efficiency between Canadian plants and within plants on an annual basis, suggesting that there may be some opportunities for improvement, over and above the 0.65%/year, for some plants.

The purpose of this brief survey is to gain an understanding of the key issues with respect to implementing energy efficiency projects, for CFI members, and to identify barriers to implementation. Once the survey has been compiled the objective is to plan a workshop that will seek to resolve barriers to implementation and identify resources required to complete this task.

The survey is broken into two parts, a simple Yes or No answer is required. This survey should take a maximum of 20 minutes to complete. Please feel free to provide comments in the area provided for each question.

The survey is broken into two parts:

- Part I is a series of questions aimed at gaining an understanding of the level of development of energy management systems at your site. The components of an energy management program queried in Part I are the building blocks of an Energy Management program that will drive continuous performance improvement;
- Part II is a series of questions aimed at gaining an understanding of the hurdles or barriers to implementation that have been experienced at the sites. Overcoming the identified barriers will be the focus of a future CFI workshop.

Part I – Energy Management Practices

1. Our company has a signed directive/policy for improving energy efficiency or reducing energy costs that includes quantitative goals.

Yes

No

2. Our site has energy reduction targets and key performance indicators to track progress against those targets.

Yes

No

3. Our site has a person responsible for energy management in our plant and an energy management group or committee to coordinate activities in this area.

Yes

No

4. Variations in energy use and efficiency (e.g. kWh per ton) from target in energy intensive cost centers for this site are reported and examined in shift, production or operations meetings.

Yes

No

5. Our site has a formal continuous improvement program that covers energy management issues.

Yes

No

Part II – Barriers to Implementation

1. Our site has completed an energy audit within the past two years and established energy consumption by major user and opportunities for savings.

Yes

No

2. Our site has completed a Process Integration study within the past two years.

Yes

No

3. Our site has a documented Energy Plan which includes short term projects (within the next year) and a strategic plan for the next 2 to 3 years, including projects identified in our energy audit and/or process integration study.

Yes

No

4. Financial analysis of energy saving projects considers life-cycle operating costs of the project and applies a value for the avoided carbon dioxide equivalent (CO₂e) emissions expected over the life-cycle of the project (if any).

Yes

No

5. At our site we have undertaken retrofits to improve plant energy efficiency, where these retrofits meet our payback criteria.

Yes

No

6. We have a series of projects that do not meet our corporate hurdle rate (payback) based on current energy prices, which cannot be justified financially.

Yes

No

7. We have a series of projects that do meet our corporate hurdle rate (payback) based on current energy prices, which we cannot get funded.

Yes

No

8. We have considered third party financing options and available government funding to supplement internal financing for major energy projects.

Yes

No

9. Our site/company has a specific energy efficiency/cost reduction project that we would consider discussing (in general terms) at a workshop convened to seek solutions to overcoming “barriers to implementation”.

Yes

No

The Energy Management Matrix

	Energy Policy	Organizing	Skills & Knowledge	Information Systems	Marketing & Communicating	Investment
4	Energy policy, action plan and regular review have commitment of top management as part of a business & environmental strategy <input type="checkbox"/>	Energy management fully integrated into management structure. Clear delegation of responsibility for energy consumption. <input type="checkbox"/>	All energy users receive specific energy training integrated into other development activities. Workshops facilitate a sharing of knowledge. <input type="checkbox"/>	Comprehensive system sets targets, monitors consumption, identifies faults, quantifies savings and provides budget tracking. <input type="checkbox"/>	Communicating the value of energy efficiency and the performance of energy management within the organization and outside. <input type="checkbox"/>	Positive discrimination in favour of green schemes with detailed appraisal of all new-build & refurbishment opportunities. <input type="checkbox"/>
3	Formal energy policy but no active commitment from top management. <input type="checkbox"/>	Energy manager accountable to energy committee representing all users, <input type="checkbox"/>	Key energy users receive regular and specific training. Brief awareness training provided to all energy users. <input type="checkbox"/>	Monitoring and targeting reports for individual areas based on sub-metering, but savings not effectively reported to user. <input type="checkbox"/>	Program of staff awareness and regular publicity campaigns. <input type="checkbox"/>	Same payback criteria employed as for all other investments. <input type="checkbox"/>
2	Un-adopted energy policy set by senior manager or senior departmental manager. <input type="checkbox"/>	Energy manager in post, reporting to ad-hoc committee but line management and authority unclear. <input type="checkbox"/>	Key energy users receive awareness training, also occasional system-specific training. <input type="checkbox"/>	Monitoring and targeting reports based on supply meter data. Energy unit has ad-hoc involvement in budget setting. <input type="checkbox"/>	Some ad-hoc staff awareness training. <input type="checkbox"/>	Investment using short-term pay back criteria only. <input type="checkbox"/>
1	An unwritten set of guidelines. <input type="checkbox"/>	Energy management the part-time responsibility of someone with only limited authority or influence. <input type="checkbox"/>	Key employees participate occasionally in awareness training. Some information passed informally to energy users. <input type="checkbox"/>	Cost reporting based on invoice data. Engineer compiles reports for internal use within technical department. <input type="checkbox"/>	Informal contacts used to promote energy efficiency. <input type="checkbox"/>	Only low cost measures taken. <input type="checkbox"/>
0	No explicit policy. <input type="checkbox"/>	No energy management or any formal delegation of responsibility for energy use. <input type="checkbox"/>	Energy users rely on their existing knowledge. <input type="checkbox"/>	No information systems. No accounting for energy consumption. <input type="checkbox"/>	No promotion of energy efficiency. <input type="checkbox"/>	No investment in increasing energy efficiency in the plant. <input type="checkbox"/>

APPENDIX 6

Energy Management Survey Results
(Presentation by Jim Farrell, HATCH Consulting)

Energy Efficiency Roundtable
Calgary, Alberta – February 2006

Energy Management Survey Results

Jim Farrell, Hatch Consulting

HATCH
CONSULTING

Overview

- ✓ Introduction
- ✓ Survey results
- ✓ Priority Areas
- ✓ Energy Management Matrix



HATCH
CONSULTING

Introduction

- ✓ Establish common framework of energy management activities
- ✓ Establish a common understanding of the barriers to implementation of energy efficiency projects

HATCH
CONSULTING

Energy Management

- ✓ *Our company has a signed directive/policy for improving energy efficiency or reducing energy costs that includes quantitative goals.*

Survey Results - NO

HATCH
CONSULTING

Energy Management

✓ Our site has energy reduction targets and key performance indicators to track progress against those targets

Survey Results - YES

HATCH
CONSULTING

Energy Management

✓ Our site has a person responsible for energy management in our plant and an energy management group or committee to coordinate activities in this area.

Survey Results - NO

HATCH
CONSULTING

Energy Management

- ✓ *Variations in energy use and efficiency (e.g. kWh per ton) from target in energy intensive cost centers for this site are reported and examined in shift, production or operations meetings.*

Survey Results - YES

HATCH
CONSULTING

Energy Management

- ✓ *Our site has a formal continuous improvement program that covers energy management issues.*

Survey Results - NO

HATCH
CONSULTING

Barriers to Implementation

✓ *Our site has completed an energy audit within the past two years and established energy consumption by major user and opportunities for savings.*

Survey Results - NO

HATCH
CONSULTING

Barriers to Implementation

✓ *Our site has completed a Process Integration study within the past two years.*

Survey Results - NO

HATCH
CONSULTING

Barriers to Implementation

- ✓ *Our site has a documented Energy Plan which includes short term projects (within the next year) and a strategic plan for the next 2 to 3 years, including projects identified in our energy audit and/or process integration study.*

Survey Results - NO

HATCH
CONSULTING

Barriers to Implementation

- ✓ *Financial analysis of energy saving projects considers life-cycle operating costs of the project and applies a value for the avoided carbon dioxide equivalent (CO_{2e}) emissions expected over the life-cycle of the project (if any).*

Survey Results - NO

HATCH
CONSULTING

Barriers to Implementation

- ✓ *At our site we have undertaken retrofits to improve plant energy efficiency, where these retrofits meet our payback criteria.*

Survey Results – YES

HATCH
CONSULTING

Barriers to Implementation

- ✓ *We have a series of projects that do not meet our corporate hurdle rate (payback) based on current energy prices, which cannot be justified financially*

Survey Results - YES

HATCH
CONSULTING

Barriers to Implementation

- ✓ *We have a series of projects that do not meet our corporate hurdle rate (payback) based on current energy prices, which we cannot get funded.*

Survey Results - NO

HATCH
CONSULTING

Barriers to Implementation

- ✓ *We have considered third party financing options and available government funding to supplement internal financing for major energy projects.*

Survey Results - YES

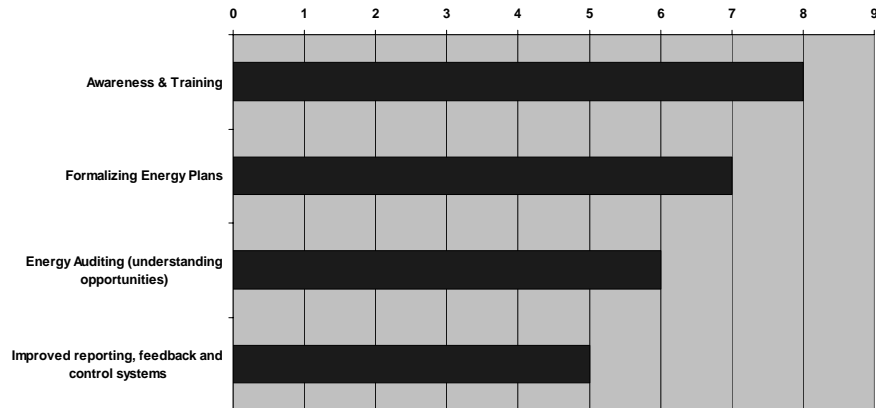
HATCH
CONSULTING

The Energy Management Matrix

	Energy Policy	Organizing	Skills & Knowledge	Information Systems	Marketing & Communicating	Investment
4	Energy policy, action plan and regular review have commitment of top management as part of a business & environmental strategy <input type="checkbox"/>	Energy management fully integrated into management structure. Clear delegation of responsibility for energy consumption. <input type="checkbox"/>	All energy users receive specific energy training integrated into other development activities. Workshops facilitate a sharing of knowledge. <input type="checkbox"/>	Comprehensive system sets targets, monitors consumption, identifies faults, quantifies savings and provides budget tracking. <input type="checkbox"/>	Communicating the value of energy efficiency and the performance of energy management within the organization and outside. <input type="checkbox"/>	Positive discrimination in favour of green schemes with detailed appraisal of all new-build & refurbishment opportunities. <input type="checkbox"/>
3	Formal energy policy but no active commitment from top management. <input type="checkbox"/>	Energy manager accountable to energy committee representing all users. <input type="checkbox"/>	Key energy users receive regular and specific training. Brief awareness training provided to all energy users. <input type="checkbox"/>	Monitoring and targeting reports for individual areas based on sub-metering, but savings not effectively reported to user. <input type="checkbox"/>	Program of staff awareness and regular publicity campaigns. <input type="checkbox"/>	Same payback criteria employed as for all other investments. <input type="checkbox"/>
2	Un-adopted energy policy set by senior manager or senior departmental manager. <input type="checkbox"/>	Energy manager in post, reporting to ad-hoc committee but line management and authority unclear. <input type="checkbox"/>	Key energy users receive awareness training, also occasional system-specific training. <input type="checkbox"/>	Monitoring and targeting reports based on supply meter data. Energy unit has ad-hoc involvement in budget setting. <input type="checkbox"/>	Some ad-hoc staff awareness training. <input type="checkbox"/>	Investment using short-term pay back criteria only. <input type="checkbox"/>
1	An unwritten set of guidelines. <input type="checkbox"/>	Energy management the part-time responsibility of someone with only limited authority or influence. <input type="checkbox"/>	Key employees participate occasionally in awareness training. Some information passed informally to energy users. <input type="checkbox"/>	Cost reporting based on invoice data. Engineer compiles reports for internal use within technical department. <input type="checkbox"/>	Informal contacts used to promote energy efficiency. <input type="checkbox"/>	Only low cost measures taken. <input type="checkbox"/>
0	No explicit policy. <input type="checkbox"/>	No energy management or any formal delegation of responsibility for energy use. <input type="checkbox"/>	Energy users rely on their existing knowledge. <input type="checkbox"/>	No information systems. No accounting for energy consumption. <input type="checkbox"/>	No promotion of energy efficiency. <input type="checkbox"/>	No investment in increasing energy efficiency in the plant. <input type="checkbox"/>

Benchmarking - Example

Number of Sites



Canadian Potash Mines – Areas of Greatest Opportunity (2003)

Conclusions

✓ Prioritization of items

HATCH
CONSULTING

Questions/comments?

HATCH
CONSULTING

APPENDIX 7

Relevant Sector Comparisons
(Presentation by Jim Farrell, HATCH Consulting)

Energy Efficiency Roundtable
Calgary, Alberta – February 2006

Relevant Sector Comparisons

Jim Farrell, Hatch Consulting

HATCH
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Overview

- ✓ Introduction
- ✓ Mining Sector – MAC
- ✓ Pulp & Paper Sector
- ✓ Upstream Oil & Gas
- ✓ Steel Sector – Gerdau

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CONSULTING

Mining

- ✓ MAC Completed energy benchmarking project (underground and surface) in 2002
- ✓ Established Large (Site Wide) Energy Audit program – through contribution agreement – 2003 through 2005
- ✓ Led to Energy Team Leader program – cost shared external expert – becoming part of the Energy Team

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Towards Sustainable Mining: Energy and GHG Emissions Management Indicators

- Updated TSM Indicators to establish more specific and quantitative criteria for energy and GHG performance and a framework for stepwise evolution towards a world class benchmark for energy/GHG management systems
- Key elements of the criteria setting process were:
 - Ensure criteria are challenging but achievable;
 - Integrate criteria with business planning process;
 - Supplement company level criteria with facility level criteria;
 - Review of clarity and auditability of criteria for internal and external assurance.

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TSM Energy Use and GHG Emissions Management Indicators

- Six indicators to report on MAC member progress:
 - Energy Use Management Systems
 - Energy Use Reporting Systems
 - Energy Intensity Performance
 - Greenhouse Gas Emissions Management Systems
 - Greenhouse Gas Emissions Reporting Systems
 - Greenhouse Gas Emissions Intensity Performance

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- Specific Measures for Energy Use and GHG emissions management:
 - **Formal system and strategies in place**, including written senior management endorsement, accountability, roles and audits.
 - **Comprehensive inventory and public reporting** of energy use and GHG emissions using recognized inventory methodology.

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Energy and Emissions Intensity Performance Indicators

- Specific measures for energy use and greenhouse gas performance
 - Energy intensity improvement target of at least one percent per annum formally endorsed by senior management.
 - GHG intensity improvement target of at least one percent per annum formally endorsed by senior management.

Net GHG Emissions = Direct Emissions + Indirect Emissions - Offsets

Management Performance Indicators Assessment System

- Each indicator is assessed on a 1 to 5 scale:
 - 1. No action has been taken; no systems/targets in place.**
 2. Some actions, but sporadic and not fully documented; systems/processes planned and being developed, targets in place but not being achieved.
 3. Systems/processes are developed and implemented, targets are being achieved.
 4. Integration into management decisions and business functions, performance exceeds targets.
 5. Excellence and leadership.

Level 1

- **No formal energy use management systems** in place.

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Level 2

- **Basic systems in place for energy use management** which must include the following elements:
 - written senior management commitment
 - facility level Energy Leaders
 - facility level monitoring infrastructure that measures consumption of energy with a level of disaggregation by major process activity (e.g. mill, smelter, refinery, etc.)
 - aggregation of facility level measured data into a facility level database

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Level 3

- **Formal systems in place for energy use management** which achieves all of Level 2 criteria and must include the following elements:
 - standard quantification and estimation methodologies are used to convert energy data to comparable energy information
 - clear accountability for energy use assigned to operational managers
 - the facility or plant management system and operators control energy use
 - company level Energy Leader
 - energy system integrated within an operational management system
 - company level energy database
 - Energy awareness included in training programs

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Level 4

- **Integration into decision making:** In addition to the formal system for energy use management criteria achieved in Level 3, the following elements have been integrated into the process:
 - energy management integrated into business planning
 - regular verification of energy use management system

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Level 5

- **Excellence and leadership:** To achieve this level the company must achieve all Level 4 criteria, and is recognized as a leader for integrating energy use management into a broader sustainable business strategy. For example :
 - procurement policies and supply chain management incorporates energy efficiency criteria
 - investments in research, development and demonstration of technologies and processes that reduce energy consumption
 - participation with our COI to improve energy efficiency (e.g., community events, environmental non-government organizations, government energy efficiency programs ...)

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Towards Sustainable Mining Target

TSM Target requires:

- Formal energy management system and GHG emissions reduction strategy in place.
- Comprehensive energy use and GHG emissions inventory, public reporting using recognized inventory methodology.
- Energy intensity improvement target of at least one percent per annum.
- GHG intensity improvement target of at least one percent per annum, net of any quantified and accredited offsets.

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Future: Minerals and Metals Energy Management Capacity Building

- Cost-shared Large Energy Audits: expert consultant to audit facility for an extended period to identify energy efficiency opportunities.
- Cost-shared Energy Team Leader: expert consultant to become part of the energy management team for an extended period to identify energy efficiency opportunities
- Government support for energy metering at operations *"If you cannot measure it you cannot manage it"*

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Future: Minerals and Metals Energy Management Capacity Building

- Fiscal and regulatory options to create a favorable environment to make energy efficiency investments and reduce GHG emissions
- Strategic research on wide range of energy sources that can reduce GHG emissions -- no fuel or technology should be ignored:
 - Wind power at remote sites
 - Geothermal energy from underground mines
 - Hydrogen fuel cells for mine equipment

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Pulp & Paper

- ✓ Active CIPEC/PAPTEC Task Force
- ✓ Workshops/TF Meetings/Energy Conservation awards – Annually
- ✓ Regional events across Canada

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Pulp & Paper

- ✓ Program metrics:
 - ✓ No. of Industrial Energy Innovators
 - ✓ No. of Dollars to Sense workshop participants
 - ✓ No. of energy audits completed
 - ✓ No. of PI studies completed

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Upstream Oil & Gas

- ✓ Best Practice – Key performance indicator – benchmarking project
- ✓ Compressor efficiency program
- ✓ Case study development
- ✓ Customized Dollars to Sense workshops
- ✓ Energy management forums

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Upstream Oil & Gas

- ✓ Program metrics
 - ✓ IEI's
 - ✓ Workshop participants
 - ✓ Audits completed

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Summary

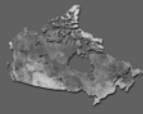
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Questions/comments?

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APPENDIX 8

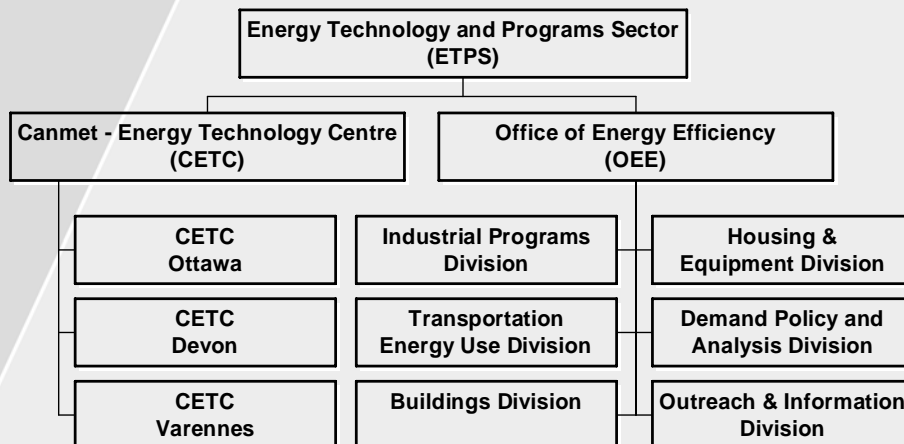
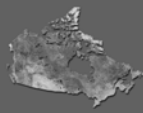
Improving Energy Efficiency in the Nitrogenous Fertilizer Sector CIPEC: One-Stop
Shopping on Energy Management
(Presentation by Miranda Williamson, CIPEC)

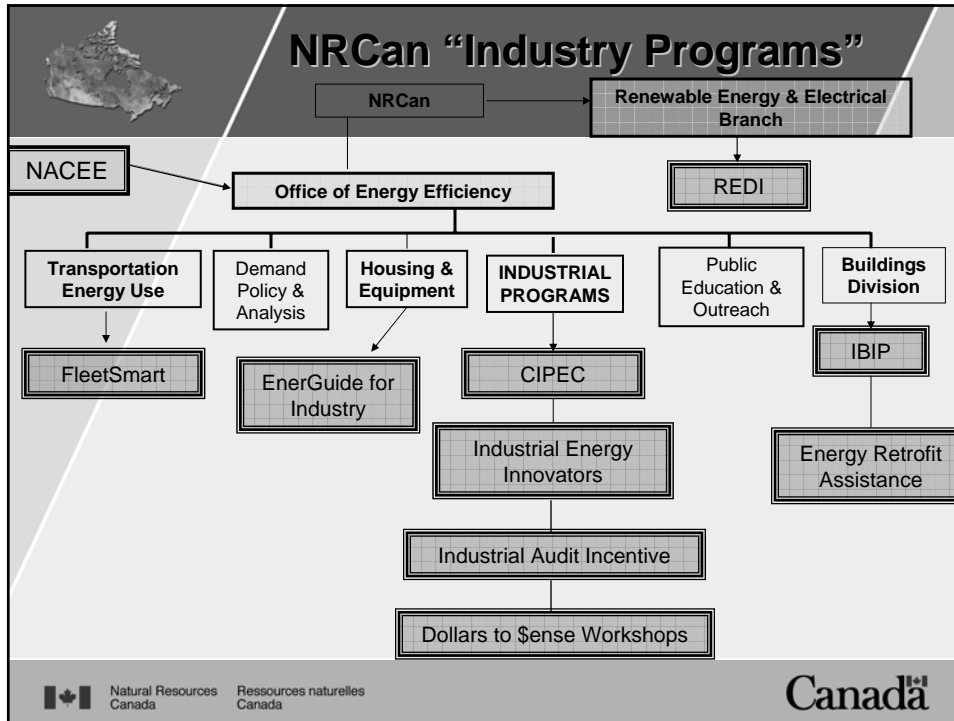


Improving Energy Efficiency in the Nitrogenous Fertilizer Sector

CIPEC: One Stop Shopping on Energy Management

Miranda Williamson
Office of Energy Efficiency, Natural Resources Canada
Energy Efficiency Roundtable
February 22, 2006

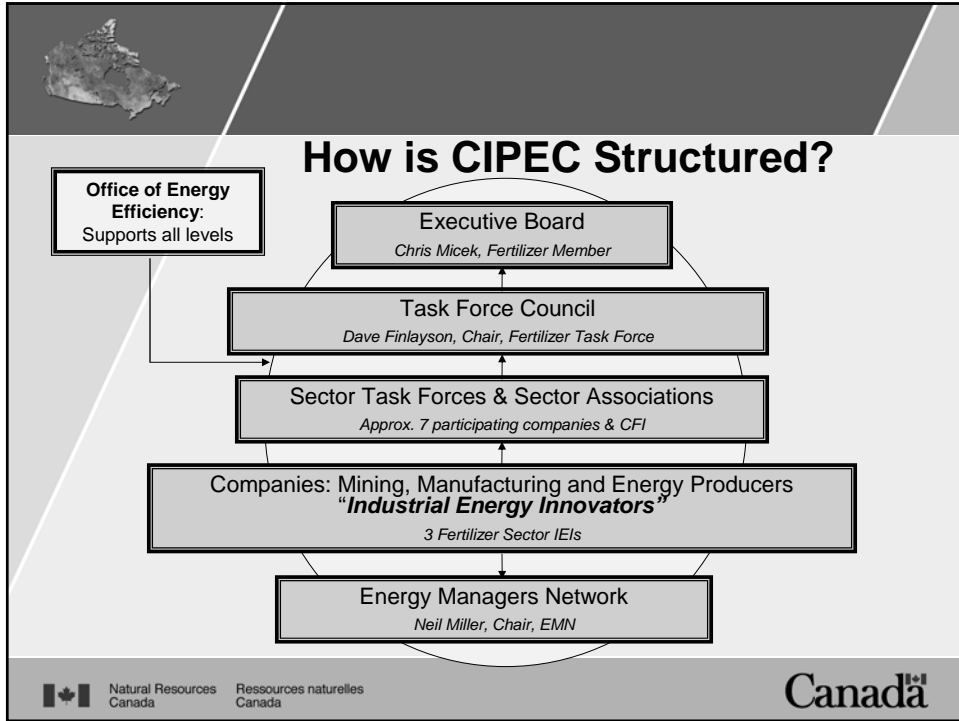




Canadian Industry Program for Energy Conservation (CIPEC)

- A unique industry-government partnership since 1975
- Encourages adoption of energy efficiency as a tool to:
 - Cut costs
 - Improve productivity
 - Reduce emissions
- Provides information, advice, training, incentives and celebration
- Overall CIPEC target: to improve energy intensity by 1% annually from 1990-2005

Natural Resources Canada / Ressources naturelles Canada



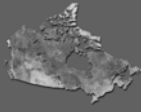
Industrial Energy Innovators Company Level Program

- Voluntary company-level commitment, from executive level, to improve energy efficiency and reduce GHG emissions
- To date >500 Canadian companies are listed with NRCan as IEIs

<u>IEIs</u>	<u>Non-IEIs</u>
▪ All Canadian divisions of PCS	▪ Canadian Fertilizers Ltd.
▪ All Mosaic's Canadian sites	▪ Simplot Canada Ltd.
▪ Agrium Inc.	▪ Sherritt International
	▪ Terra International
	▪ SaskFerco

Benefits of Being an Innovator

- Access to financial support
- Discounts for EE workshops and access to customized workshops
- Coverage in CIPEC newsletter and Annual Report



How to Become an Innovator

1. Submit letter to Chair of CIPEC Executive Board
2. Establish energy efficiency targets
3. Quantify base-year energy consumption
4. Report annually on measures implemented, results achieved

(Name)
Chair, CIPEC Executive Board
Canadian Industry Program for
Energy Conservation
Office of Energy Efficiency
Natural Resources Canada
580 Booth Street, 18th Floor
Ottawa ON K1A 0E4

Dear *(Name)*:

Our company, *(company name)*, supports voluntary initiatives that lead to energy and cost savings and that assist the Government of Canada in meeting its interational commitment to reduce greenhouse gas (GHG) emissions.

To demonstrate this support, our company wishes to become an Industrial Energy Innovator and participate in the Canadian Industry Program for Energy Conservation (CIPEC). We agree to provide a base-year quantification of energy consumption and related GHG emissions as well as energy efficiency targets. We also agree to submit a report to CIPEC annually that provides a summary of our energy efficiency plans and outlines the measures implemented and progress achieved toward reducing energy consumption and GHG emissions.

We wish to register our facility *(or facilities)* at *(location or locations)* as an Industrial Energy Innovator and to appoint *(name, title and coordinates)* as our company liaison for this initiative.

Sincerely,

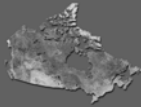
(Name and title)

cc: Minister of Natural Resources
580 Booth Street, 21st Floor
Ottawa ON K1A 0E4



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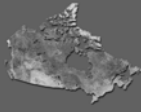
Our Toolbox

- Networking Opportunities
- Information and Awareness
- Financial Support
- Employee-Training Assistance
- Technical Advice
- Research and Development Resources



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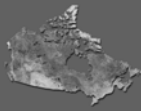
Networking Opportunities Fora for Sharing Information

- Task Force meetings
 - CFI's Manufacturing and Environment Sub-committee
 - CFI's GHG Committee
- Energy Managers Network
 - Learning network for industrial energy efficiency practitioners
- Sector Energy Days
 - Conference focusing on sector-specific energy management issues



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Information and Awareness CFI/OEE Work with the Nitrogenous Sector

Nitrogen Data Strengthening

- Resolve the current energy efficiency/intensity reporting issues for the sector

Nitrogen Benchmarking

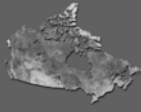
- Energy efficiencies and CO2 emissions
- Comparisons with competing countries
- Awareness of Best in Class Technology
- Differences in reporting/calculation methodologies

Energy Efficiency Roundtable



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Information and Awareness Publications & Support

Industry Publications/Media

- Heads Up CIPEC (newsletter >10,000 readers), CIPEC Annual Report
- Energy Efficiency Guides: Motor Systems; Boilers and Heaters; Planning and Management
- Compressed Air DVD; Variable Frequency Drive DVD
- Case studies: Bitumar, Syncrude, Maple Leaf Foods

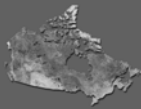
Employee Energy Efficiency Awareness Days

- Employee Awareness Tool Kit: posters, factsheets, guidebook, stickers
- Provide support for increasing energy efficiency awareness among your employees



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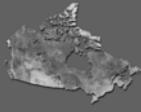
Information and Awareness Alternative Financing

- *Energy Performance Contracting - a turnkey service that responds to typical needs such as aging infrastructure, an inefficient process and wasted energy*
- Services:
 - capital investment
 - project management
 - construction
 - engineering and design
 - energy maintenance
 - specialized employee training
- Addresses: lack of time, capital, internal expertise and the need to manage cash flow and risk
- Innovative Financing Kit includes an introduction to innovative financing, case studies, income tax issues related to EPC and other financing information



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Financial Support Industrial Energy Audit Incentive

- 50% of audit cost, to a max. of \$5,000
- May be stacked with utility funding
- Typical cost savings of 10-15% with 0-2 year paybacks
- Companies determine audit contractor, audit scope
- 4 fertilizer facilities have taken advantage of the incentive
- Energy Management Services Directory



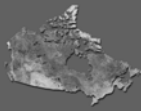
<http://oee.nrcan.gc.ca/providers/>



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Financial Support Process Integration

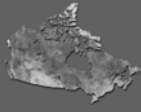
- Determine energy saving opportunities within process and utility systems
- Cover 50% cost of a study to a max of \$75,000; determine PI scope and PI consultant
- CETC-Varenes labs perform a technical review of proposals
- Process Integration can lead to:
 - 5 % increase in steam production efficiency (little or no investment)
 - A further 10-15 % reduction in steam consumption (1-2 year payback)
 - A further 5-10 % reduction in steam consumption (2-4 year payback)
- 2 fertilizer plants participated
- Engaged in a PI market research study



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Financial Support Combustion Efficiency

Computational Fluid Dynamics

- ID opportunities for improving combustion performance
 - Increase furnace productivity
 - Increase product quality
 - Reduce specific fuel consumption
- Cover 50% cost of a study to a max of \$30,000
- CETC-Ottawa equipped to do studies or can hire your own contractor

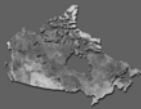
****Need Beta Testers for Boiler Efficiency Calculator****



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Financial Support Building Incentives

Energy Retrofit Assistance

- Helps industrial companies improve their warehouses and office buildings
- Retrofit Planning Incentive: 50% of costs up to \$25K
- Retrofit Project Incentive: 25% of costs up to \$250K

Industrial Building Incentive Program (IBIP)

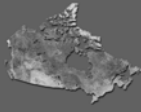
- Up to \$80K for Industrial Energy Innovators
 - Offsets design costs
- Design must be 25% more energy efficient than Model National Energy Code for Buildings



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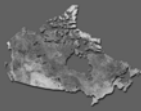
Financial Support Renewable Energy Deployment Initiative for Industry (REDI)

- Provides incentives for space, water and process heating/cooling systems using renewable energy
- Up to 50% of cost for feasibility studies
- Covers implementation costs
 - Up to 25% of eligible costs for solar air or solar water heating systems
 - Up to 15% of eligible costs for biomass combustion systems until Mar. 31, 2006 (up to 10% of project cost afterwards)
 - Maximum of \$80K per application and \$250K per organization



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Employee Training-Assistance Dollars to \$ense Workshops

- 3 different workshops
 - 16 participants from fertilizer sector
- Developing a fourth workshop on financing
- 33% discount for Industrial Energy Innovators
- Can be customized to meet your sector or company's needs
- Held a mini customized workshop in Winnipeg in Nov. 04



Customized Textiles Workshop:

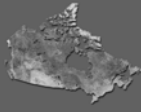
« enjoyed the entire day – it has left me with numerous ideas for improvement! »

David Savage, Lincoln Fabrics



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Employee Training-Assistance FleetSmart



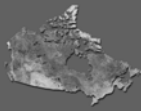
- Assists fleet managers, owners and operators to reduce fuel costs and vehicle emissions through energy efficiency
- Program participants have access to:
 - FleetSmart workshops (Fuel Management 101 and SmartDriver for Highways or for Forestry)
 - FleetSmart Tool Kit
 - SmartDriver Instruction Guide
 - Heavy Vehicle Fuel Consumption Calculator



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Technical Advice Class 43.1 & CRCE

- Engineering and scientific authority for Class 43.1 and CRCE
- Provide free prior opinions on the technical eligibility of energy conservation projects & renewable energy projects to qualify for tax write-offs

Class 43.1

- ACCA rate - 30% declining balance
- applies to equipment used in systems generating electricity and/or producing heat for industrial processes by:
 - recovering & re-using thermal waste
 - using renewable energy sources
 - using specified-waste fuels
 - using cogeneration

Canadian Renewable and Conservation Expense (CRCE)

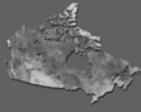
- applies to intangible (soft) costs for Class 43.1 projects; e.g., feasibility studies and regulatory compliance
- can be fully expensed in the year incurred or carried forward indefinitely



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Technical Advice EnerGuide for Industry

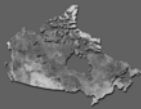
ENERGUIDE

- Provides industry with information to purchase energy-efficient off-the-shelf industrial equipment
- Offers Web-based information to help equipment buyers:
 - compare the energy performance of products, and
 - select the most energy-efficient model that meets their needs
- Provides energy-saving tips for the purchase, operation and maintenance of energy-efficient equipment



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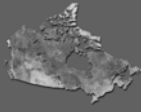
R&D Resources CANMET Energy Technology Centres (CETC)

- CETC works with Canadian companies to develop and deploy advanced technologies that will reduce environmental impacts
- Maintains 3 world-class laboratory facilities
- Cost-sharing programs to assist companies in R&D:
 - Industrial Energy Research and Development
 - Emerging Technologies Program



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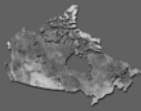
Budget 2005

- Changes to the Capital Cost Allowance System
- Enhanced Incentives for Efficient Energy Production
 - Wind Power Production Incentive
 - Renewable Power Production Incentive
- Partnership Fund



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Budget 2005

Changes to the Capital Cost Allowance System

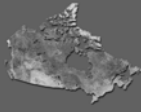
Goal: to stimulate the use of clean generation technologies

1. Additions to Class 43.1 Eligible Assets
 - Assets acquired during the next seven years will be eligible for the new 50 % CCA rate
 - a) Distribution equipment used in district energy systems if the energy is produced using cogen equipment
 - b) Equipment used to produce biogas from farm manure



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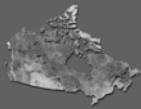
Canada



Budget 2005

Changes to the Capital Cost Allowance System

2. Increase to CCA rates to more accurately reflect their useful life
 - Combustion electricity generation turbines – from 8% to 15%
 - Electricity transmission and distribution assets – from 4% to 8%
 - Oil and gas transmission pipelines – from 4% to 8%, and 15% rate for compression and pumping equipment on such pipelines
 - Cables used for telecommunications infrastructure – from 5% to 12%

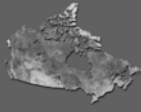


Budget 2005

Changes to the Capital Cost Allowance System

3. Creation of a New CCA Class (new 50% CCA rate)
 - To qualify equipment must be purchased between Feb. 23, 2005 and Dec. 31, 2011
 - a) High-efficiency cogen systems (72% system efficiency)
 - b) Renewable energy generation systems including wind turbines, small hydroelectric facilities, equipment for recovering biogas from a landfill and equipment for converting biomass to bio-oil





Budget 2005

Enhanced Incentives for Efficient Energy Production

Renewable Power Production Incentive

Goal: to encourage the installation of up to 1500 MW of renewable generating capacity from sources other than wind

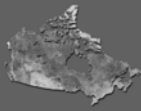
- Incentive of 1¢/kWh during the project's first 10 operational yrs
- Committed \$97 million over 5 yrs and \$886 million over 15 yrs
- Eligible projects must be commissioned between April 1, 2006 and March 31, 2011
- Final program details and eligibility criteria will be announced by April 1, 2006
- Equipment used will be eligible for enhanced CCA provisions



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Budget 2005

Enhanced Incentives for Efficient Energy Production

Wind Power Production Incentive

Goal: to stimulate the installation of 4000 MW of wind power capacity (original target: 1000 MW set in 2001)

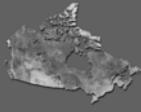
- Incentive of 1¢/kWh for eligible wind projects (\geq 500 kW capacity or 20 kW capacity in northern or remote locations) commissioned before April 1, 2010
- Increase by \$200 million over the next 5 yrs and by \$920 million over the next 15 yrs
- Wind turbines will be eligible for enhanced CCA provisions



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Budget 2005 Partnership Fund

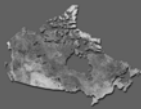
Goal: to support large project-specific investments for green power at the federal, provincial and territorial levels

- Subsumes and expands the Opportunities Envelope established in 2003
- Initial capital base of \$250 million to be increased by \geq \$50 million/yr for the next 5 yrs pursue cost-effective green projects to lower GHG emissions
- Project examples include CO₂ capture, storage and collection systems, large-scale use of landfill waste for power generation and clean coal technology



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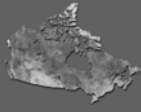
Benefits of Getting Involved in CIPEC

- Over the past 5 years, the increase in energy consumption among non-CIPEC participants was **more than double** that of CIPEC participants
- Direct access to our programs, tools and services
- Show leadership in energy efficiency at the sector and company level
- Opportunity to tailor an energy efficiency program for the fertilizer sector



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Thank You!

Miranda Williamson, Senior Industry Officer
Industrial Programs Division, OEE

(613) 996-7744

E-mail: miwillia@nrcan.gc.ca

Web site: oee.nrcan.gc.ca/cipec



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APPENDIX 9

Canadian Fertilizer Institute Energy Efficiency Roundtable
Evaluation Form
February 22, 2006
Calgary Airport Delta Hotel
Calgary, AB

1. We gave this as our vision for the day:
To develop an industry strategy for continuous improvement on energy efficiency and GHG performance in the nitrogenous fertilizer sector.

How successful was today in taking a step toward this vision? Please provide comments.

2. Do you have any other comments on how we might move this strategy forward?
3. Would it be valuable to hold a similar event like this next year to revisit the strategy and/or its implementation?

If so, would you come?

- Yes
 No

Are there others whom we should invite?

In what region/city should we hold it?

If no, why not?

4. What would you like to see for next steps to facilitate energy efficiency improvements at individual sites?
- A half-day session tailored to your site to examine and compare your data and your performance relative to the Canadian industry
 - Regional sessions (i.e. Western and Ontario)?
 - Enhancement of the energy benchmarking reports so as to provide more information and context around the numbers
 - Information sessions focused on various opportunities identified through the energy benchmarking report
 - Customized energy management workshops for operations staff at a sector level
 - Energy Efficiency Tip sheets:
 - Technical/equipment opportunities
 - Operational practice opportunities

**Canadian Fertilizer Institute Energy Efficiency Roundtable
Report - February 22, 2006**

- Energy Management opportunities
 - Best practice guides
 - Other suggestions? _____
5. Was this an effective format for this kind of workshop?
6. Any further comments or suggestions?

Thank you for your comments!

APPENDIX 10

Energy Efficiency Roundtable – Survey Results Canadian Fertilizer Institute February 22, 2006

Q1. How successful was today in taking a step toward a vision?

- Appropriate info has been put together to start the vision process. A definitive target has been reached.
- Very successful. We did not flesh it out in specific detail, but certainly did put a framework in place to guide us to step 2 and came away with a specific target and timeframe.
- Yes, working towards a meaningful plan.

Q2. Any other comments on how to move this strategy forward?

- CFI/CIPEC continue fleshing out details to meet targets outlined.
- The details need to be filled in now with specifics on the road map to take us to the final goal.
- The next session should be more encompassing of specifics and have more industry attendees.

Q3. Regarding a similar event in the future:

- The majority felt it would be valuable to hold a similar event next year and would attend such an event.
- A suggestion for a further session to flesh out the specifics was noted.
- It was felt that extending the invitation to technical specialists from facilities would enhance the meeting, particularly if it is a more technical discussion.
- Most noted that Ottawa, Calgary, or Edmonton would be a good location for the next meeting.

Q4. What next steps would you like to see for facilitating energy efficiency at individual facilities?

- It was agreed that items such as half-day site tailored sessions, customized workshops and energy efficiency tip sheets would be useful, but these should be determined once a fully developed sector plan is in place.