

Canadian Industry Program for Energy Conservation: The Voluntary Approach to Improving Industrial Energy Efficiency in Canada

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ABSTRACT

The Canadian Industry Program for Energy Conservation (CIPEC) leads the Canadian federal government's efforts to improve industrial energy efficiency in Canada. Delivered by the Industrial Programs Division of Natural Resources Canada's Office of Energy Efficiency (OEE), CIPEC was established in 1975, and is a unique and successful voluntary collaboration between industry and government that promotes energy efficiency within Canadian industry as a means of reducing energy use per unit of production, thereby improving the economic performance of Canadian industry, and helping Canada meet its climate change objectives.

Founded on the leadership of industry at all levels, CIPEC remains a unique example of what can be accomplished through voluntary cooperation when public- and private-sector interests converge. Initially developed for the mining and manufacturing sectors of Canadian industry, CIPEC expanded its reach in 2001 to include the energy producing and construction sectors. CIPEC's membership has grown to 26 sector Task Forces, covering 98 percent of secondary industrial energy demand in Canada and includes partnerships with almost 50 trade associations that represent more than 5,000 industrial companies. While expanding to include new sectors, CIPEC has also expanded to improve program delivery across the country by establishing regional Task Forces in western Canada; in Quebec to reach Francophone industries and most recently in Atlantic Canada.

In light of today's concerns about global climate change and greenhouse gas emissions, Canadian industry can point to CIPEC as having always been at the forefront of energy efficiency -- after almost 30 years, CIPEC has significant accomplishments to celebrate. This paper describes the unique CIPEC model -- its approach, its program elements and the impact CIPEC has had on industrial energy use in Canada. Concrete examples of company and sector level achievements are provided throughout the paper and examples of program information, most of which is available for download from www.oee.nrcan.gc.ca/cipec.

Background

Canada, as a modern industrialised nation, sits in a unique but challenging position when it comes to meeting its Kyoto Protocol commitments. Spanning almost 5,300 km from Pacific to Atlantic Oceans and covering nearly 4,600 km north to south (almost the distance between Montreal and London!), Canada is a northern country, occupying the second largest landmass in the world. Our relative abundance of natural resources has shaped our national development and underlies much of our economic prosperity. An abundance of relatively cheap energy sources, heavy reliance on energy-intensive resource development, combined with geographic factors and regional climatic differences make Canada, on a per capita basis, one of the world's largest energy consumers

The Canadian Industry Program for Energy Conservation (CIPEC) was founded in 1975 during the energy crisis when there were genuine concerns about the security of crude oil supplies across North America. Industry leaders began working with government to develop strategies for conserving this vital commodity in a sensible and pragmatic manner that would not impede industrial growth.

In the 1980s, rising energy costs superseded security issues as the main driver for energy conservation, and we also started to become aware of the relationship between our use of energy and environmental problems like acid rain. Since the early-1990s the global problem of climate change has been at the forefront of the energy-environment debate. The scientific consensus is that greenhouse gases produced by the combustion of fossil fuels significantly contribute to climate change and the problem of global warming through the greenhouse effect.

The Kyoto Protocol was ratified by the Government of Canada in December 2002 and came into effect February 16th 2005. Canada's commitment under the Kyoto Protocol is to reduce its greenhouse gas emissions by six percent below 1990 levels by the period between 2008 and 2012. This is a big challenge, and it's going to require hard work and innovative thinking right across the economy -- everyone will be expected to do their part, from the individual energy consumers, to the commercial and institutional sectors, to industry -- and using energy more efficiently is the best, most immediate and tangible way to contribute.

CIPEC Approach

CIPEC encourages industry involvement and raises awareness of energy efficiency measures and opportunities through regular sector and regional task force meetings, energy forums, communications products, technical tools, benchmarking and best practices studies and energy management workshops.

CIPEC is truly a unique industry-government collaboration that has been touted as one of the most pragmatic and successful industry-government partnerships Canada has ever seen. CIPEC works because industry leads on what it knows best, and because government supports industry's efforts by providing needed services for the common good. CIPEC's mission is to:

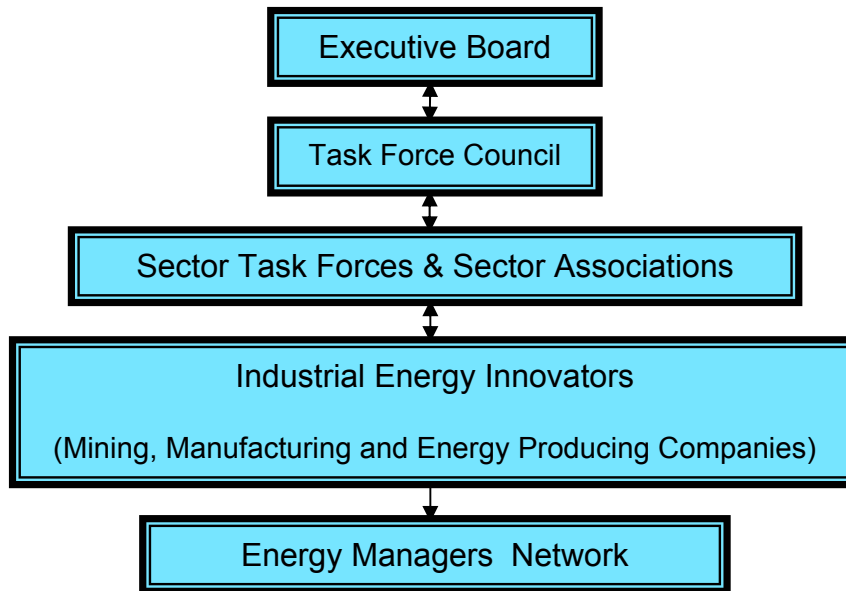
- Promote effective voluntary action which reduces industrial energy use per unit of production;
- Enhance industrial economic performance and competitiveness; and
- Help Canada meet its climate change objective (reduce GHG emissions to 6% below 1990 levels between 2008 and 2012).

CIPEC evolves to meet the needs of industry. In 1995, the Industrial Energy Innovators (IEI) initiative was established as a component of CIPEC that brought CIPEC from the sector level directly to the company level. In 2001, CIPEC forged into Western Canada with the establishment of a regional. In 2003, CIPEC expanded again to formally include the construction and energy producing sectors, in addition to mining and manufacturing sectors. The participation of small- and medium-sized enterprises is growing and CIPEC is continually developing new tools and services to meet the needs in industry.

As illustrated in Figure 1, CIPEC has now developed into a network of 26 sector taskforces, made up of representatives from associations and companies engaged in similar industrial activities (i.e. Food and Beverage Processing, Mining, etc...), more than 600 IEIs, and

almost 50 member industry and trade associations that represent more than 5 000 industrial companies and 98% of industrial energy demand.

Figure 1: CIPEC Structure



The overall strategic direction and leadership for CIPEC is provided by its Executive Board, which is made up of senior executives from sector-representative companies. By lending their time, vision and influence, Executive Board members create an effective channel through which communicate the importance of improving energy efficiency and reducing GHG emissions at the company level.

The Chairpersons from each of the sector task forces make up the CIPEC Task Force Council, whose responsibility it is to operationalise the strategic direction identified by the Executive Board. The Task Force Council also provides a common forum for sectors to share ideas and recommend ways to address common needs and co-ordinates the overall activities of Task Forces.

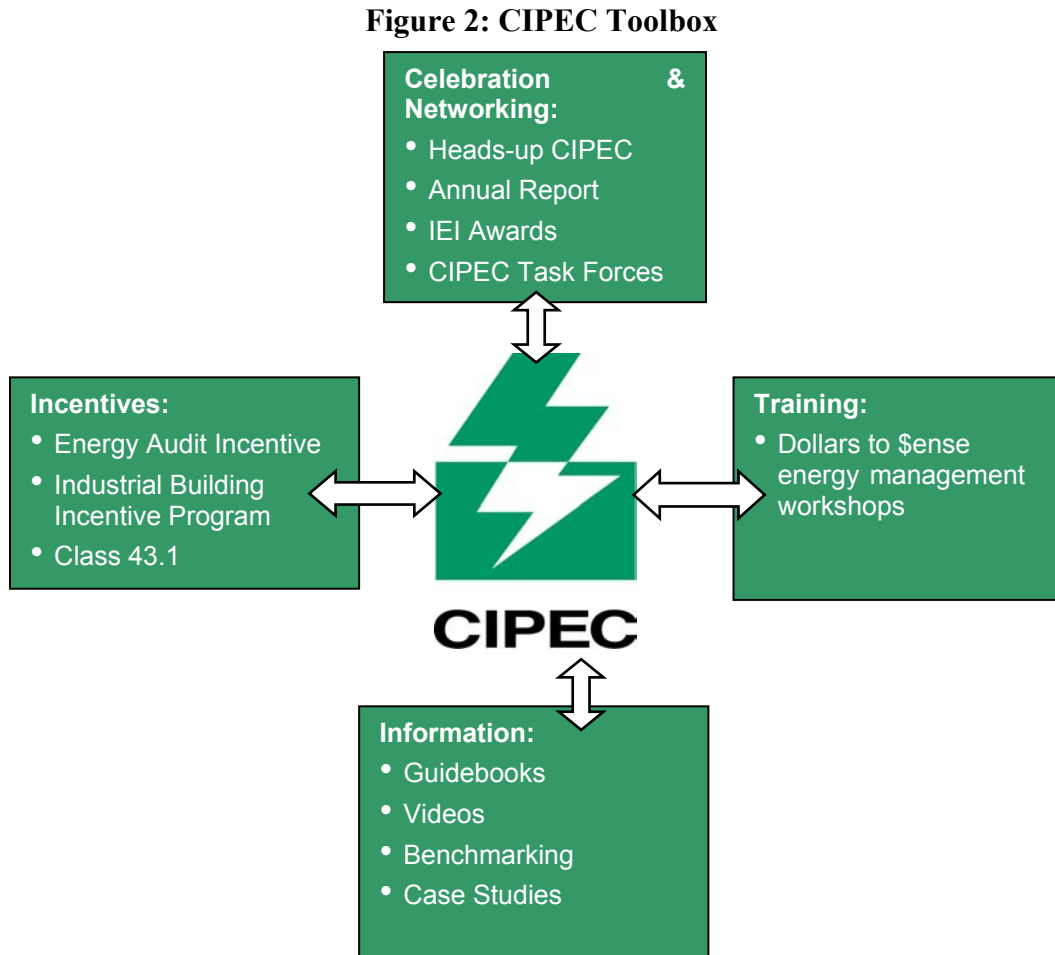
At the heart of the program lie the sector Task Forces which act as focal points for: identifying energy efficiency potential and improvement opportunities; identifying challenges and hurdles toward improving energy efficiency; establishing sector efficiency targets; and developing and implementing plans and agendas for achieving those targets.

Canadian industrial companies can register as IEs, thereby making a public commitment to energy efficiency and supporting for Canada's goal of reducing GHG emissions. Through their affiliation with CIPEC, IEI companies learn of significant energy savings opportunities, receive valuable energy management products and services, and are given special opportunities to showcase their success in energy efficiency and support for Canada's goal of reducing GHG emissions.

Program Elements: The CIPEC Toolbox

CIPEC is not a magic wand — membership alone will not make you an energy efficiency success story. CIPEC offers a number of practical tools and services to build the capacity within Canadian industry to identify energy efficiency opportunities, establish goals, develop and implement action plans, promote accomplishments, and reap the rewards.

The CIPEC toolbox illustrated in Figure 2 depicts the main elements of the CIPEC toolbox, which are described in further detail below.



Celebration & Networking Opportunities

Task Forces, as described above, are the lynch pin of success of CIPEC. These groups that meet between 2 and 6 times a year serve as networking meetings for industry to discuss its challenges and devise strategies to overcome them. Participants hear directly from other industries and technical experts about new technologies and processes that can help them save money.

Industry learns from itself, and CIPEC celebrates the successes and innovative strategies of industry through its bi-weekly online newsletter *Heads Up CIPEC* that is distributed free of

charge in English and French to 10 000 readers twice a month and keeps readers in Canada's industrial sectors up to date on technical information, CIPEC members' energy efficiency accomplishments, and the programs and activities of Natural Resources Canada's Office of Energy Efficiency.

Each year, CIPEC publishes a report that outlines the energy efficiency accomplishments of Canadian Industry. CIPEC annual reports profile more than 20 industrial sectors, noting their energy intensity improvements, targets and challenges. The CIPEC Annual Report also features industrial companies as "success stories" to demonstrate what is possible when it comes to improving energy efficiency in Canada's industrial sector by:

- identifying unique or creative processes through investments in new technology
- improving operating practices
- implementing effective employee awareness campaigns
- raising the profile of energy conservation within corporate boardrooms

In the face of escalating energy costs, these successful companies prove that what is good for the environment is also good for their bottom line.

Information

IPD produces a variety of technical guidebooks and publications that contains a wealth of information to help companies reduce their energy intensity and greenhouse gases through "low cost-no cost" measures. These publications range from general guidelines, such as the *CIPEC Energy Efficiency Planning and Management Guide* to sector specific best practices, such as the *Foundry* and *Brewery Sector* guidebooks. Guidebooks have also been produced for specific energy using systems such as the *Motor Systems Guidebook* and *Boiler Efficiency Guidebook* and videos on detecting compressed air leaks and using variable speed drives.

In addition to general guidebooks and publications, IPD launched its Industrial Benchmarking and Best Practices Program in 2001, at the request of Canadian industry. The program offsets the cost of hiring a consultant to collect and analyze business data, emphasize productivity, and assess energy-use and greenhouse gas (GHG) performance. Energy Benchmarking involves the collection and analysis of energy-related data and information that is then used to develop indicators that enable industrial companies to assess the energy efficiency, productivity, and emissions performance of their operations against 1) those of similar operations in the same sector (both in Canada and abroad); 2) those with a theoretical state-of-the-art plant; 3) the industry leader for each area demonstrating "best practice;" or 4) itself, using defined levels of practice or performance as targets and monitoring trends over time. The belief is that benchmarking studies lead to the implementation of practices that improve energy efficiency/energy use by industry.

For example, by developing a "model" Kraft pulp mill, the benchmarking program has identified considerable potential for cost-effective energy-saving measures in existing pulp and paper mills, as well as best practices and a systematic approach for achieving those savings (Francis, D.W., Towers, M.T., and Browne, T.C, 2004). These tools now serve as the basis for a short course on energy efficiency presented by the Pulp and Paper Technical Association of Canada. A similar benchmarking study in the mining sector has identified potential savings of

\$49 million per year in above-ground operations and \$30.8 million per year in underground operations.

To date, benchmarking studies have been completed for the: mining (above & below ground), dairy (fluid milk processing), cement, pulp and paper, construction (road building), textiles (wet processing sector) and auto-parts manufacturing sectors to name a few. These latter two benchmarking studies are presented in Panels 6 and 3 respectively, of this conference. Most of the publications are available for download from the CIPEC web site at: www.oeenrcan.gc.ca/cipec

Incentives

CIPEC has not traditionally offered incentives for industry, since most of the projects just make good business sense. However, in 2001 the OEE launched the Industrial Energy Audit Incentive initiative, which cost shares an energy audit with an IEI company, 50% to a maximum \$5,000. This program was designed to help smaller industrial companies, who do not have the in-house resources to identify opportunities for energy savings that can have a dramatic impact on the bottom line.

50% × [Total Cost of Audit (excluding GST, HST and PST) - Other Incentives] ≤ \$5,000	
Example:	
Total energy audit cost excluding GST, HST and PST is \$12,000.	
A local utility is providing an audit incentive of \$4,000.	
50% × [\$12,000 - \$4,000] = \$4,000	
Therefore:	Company's contribution: \$4,000 NRCan's contribution: \$4,000

A recent audit of a Schneider Food's plant in Kitchener, Ontario, for example, uncovered hundreds of thousands of dollars in potential savings — savings that are also possible at other Schneider plants. Some of the measures recommended by the audit could be implemented at no cost, producing instant savings, and others would pay for themselves in less than a year.

Companies can even work with an energy service company to finance capital projects without impacting your cash flow or borrowing money. This is done through a mechanism known as energy performance contracting. An energy service company conducts an audit of your operations, identifies opportunities for savings, and then undertakes retrofit projects using its own finances. The energy service company recovers its investment over the next few years through the resulting savings in energy costs. At the end of the contract, your company keeps all the ongoing savings generated by the project.

The OEE also offers the Industrial Building Incentive Program that is aimed at offsetting the incremental cost of designing an energy efficient industrial facility by offering up to \$80,000 to companies who design a building that is at least 25 percent more efficient than prescribed by Canada's Model National Energy Code for Buildings. This 25 percent improvement is broken down as 10 percent from process improvements and 15 percent from building envelope improvements.

And finally, the Government of Canada has created a provision in the tax law, that accelerates the depreciation of energy efficient equipment. IPD acts as the technical authority for projects applying to the Class 43.1 Capital Cost Allowance.

Energy Management Training

Many companies also take advantage of the Office of Energy Efficiency’s popular “Dollars to \$ense” energy management workshops. These workshops take you through the entire energy management cycle, from identifying opportunities for reducing energy consumption to designing and executing an energy action plan. They can be tailored to a company or sector’s specific needs.

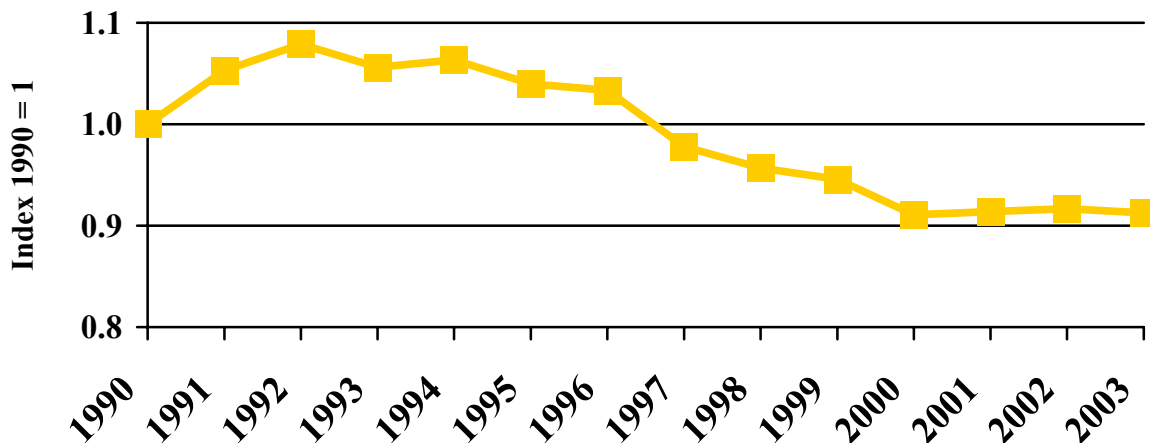
Bombardier Aerospace recently used the “Dollars to \$ense” program to guide the development and implementation of an action plan that has reduced electricity consumption at its deHavilland site by a full 10 percent, natural gas consumption by 2 percent and water consumption by 15 percent. Think about it — one workshop sparks 10 percent in savings.

Another company — a foundry in Ontario — saved three-quarters of a million dollars as a result of participating in a customized Dollars to \$ense workshop. A recent study found that industrial companies that have participated in the Dollars to \$ense workshops have together saved more than three petajoules of energy and reduced greenhouse gas emissions by the equivalent of 184 840 tonnes of carbon dioxide per year, the principal greenhouse gas (Habart and Associates Consulting Inc. 2003).

The impact: Trends in Aggregate Energy Use

In 2003, CIPEC industries employed almost 3.5 million Canadians, contributed almost \$289 billion (in 1997 dollars) to the Canadian economy and accounted for almost 30% of total Canadian GDP. Of this, approximately 83% came from the Mining, Manufacturing and

Figure 3: Normalized Energy Intensity for Total CIPEC (1990=1)



Construction (MM&C) industries while only 17% came from energy producing industries. Industrial energy savings related to effective energy management practices totalled approximately \$3.4 billion in 2003, which is equivalent to providing energy to all homes in a city twice the size of Toronto for one year. Energy intensity (Energy Use/GDP) for Total CIPEC industries was 8.7% lower in 2003 compared to 1990, which translates to a 0.7% average annual improvement in energy intensity, as illustrated in Figure 3. This improvement can be attributed to a shift in the structure of the Canadian industrial sector to less energy intensive industries (e.g. electrical and electronics sectors); to an increase in the capacity utilisation of industry (i.e. operating closer to “full load”); and good energy management that has made Canadian industry more energy efficient. As a result of this energy intensity improvement between 1990 and 2003, GHG emissions for Total CIPEC are 27.8 Mt lower in 2003.

Between 1990 and 2003, CIPEC’s MM&C industries improved their energy intensity by an average of 1.8% per year (which is almost double their energy intensity improvement target of 1% per year), and their direct energy-related GHG emissions were 4.4% below 1990 levels. Given that the most immediate way to reduce greenhouse gas emissions is through improved energy efficiency, it’s not surprising that CIPEC has become the focus of industry’s response to climate change.

Conclusion

So what is the secret behind this program? What has kept industry at the table for the past 30 years? The fact is that managing and using energy as efficiently as possible makes good business sense — companies become more energy efficient, cut costs, and boost profitability. This is what is often referred to as the win-win-win agenda, or the “triple bottom line” of improved energy efficiency, strengthened competitiveness and reduced greenhouse gas emissions. There is literally no downside. Waste of any kind, including energy waste, just makes no sense from a business perspective.

“I can tell you from personal experience that good energy management can help Canadian industry save money, stay competitive, boost profits and contribute to a cleaner, healthier environment” says Douglas Speers, Chair of the CIPEC Executive Board and president of EMCO Corporation, one of Canada’s leading distributors and manufacturers of building materials for the construction industry.

The increased demand for publications, combined with the strong turnout at workshops, information sessions and task force meetings is a sign that improved energy management is becoming a priority for more and more industrial companies.

Effective energy management involves a combination of organizational, behavioural and technical change. There are literally dozens of industrial companies from coast to coast in this country that are saving money, improving their competitiveness and contributing to Canada’s climate change goals through good energy management.

Part of the mandate at the Office of Energy Efficiency is to support and aid industries that want to strengthen and expand their commitment to energy efficiency. This all fits within Canada’s focus on reducing greenhouse gas emissions. The recent ratification by Canada of the Kyoto Protocol has underscored the government’s commitment to take action

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