TRANSFORMING COMMITMENT INTO PERFORMANCE

2012 Sustainable Electricity Annual Report

Sustainable Electricity
It's in our power™

Électricité durable
Nous avons le pouvoir™

Canadian Electricity Association

Association canadienne de l'électricité

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PURPOSE OF THE SUSTAINABLE ELECTRICITY REPORT

Sustainable Electricity is a sector-wide sustainability program implemented by the corporate utility members (generation, transmission, distribution) of the Canadian Electricity Association (CEA) – the authoritative voice of electricity in Canada. The goal of the program is clear: continual improvement of overall environmental, social and economic performance of the sector, minimization of adverse impacts, and enhancement of positive aspects of sustainable development.

This 2012 report, the fourth of the Sustainable Electricity program, documents the sustainable development performance of CEA member utilities from January 1, 2011 through to December 31, 2011. It outlines the overall quantitative performance trends as well as various initiatives underway at member utilities (The initiatives are indicative of continual improvements at individual member utilities, but do not necessarily reflect industry-wide standards or performance).

The information provided by member utilities for this report is independently verified by an external verifier – *Duerden and Keane Environmental Inc.* The verifier's statement from 2011 is included at the back of this report.

CHANGES FROM PREVIOUS REPORTS

There are two structural differences in this report from previous reports. First, on the cover page, the report now notes the year the information is published (2012) as opposed to the year reflective of performance (2011). While this has no substantive impact on the performance information profiled, it makes the report to stakeholders more recent and relevant for reference purposes. Second, this report introduces an innovative new Sustainable Development Index (SDI) outlining the overall sustainability performance of the sector in an easy-to-understand format. The SDI is a first for the Canadian industry, developed in collaboration with Dr. Blair Feltmate, University of Waterloo. This year's report includes information from all CEA corporate utility members, except Saskatoon Light and Power and the City of Medicine Hat. CEA expects Saskatoon Light and Power to report by fall 2012, and the City of Medicine Hat to report in the future.

Tree Planting near OPG's Twelve Mile Creek DeCew Generation Station.

SUSTAINABLE ELECTRICITY: A POLICY FOR SUSTAINABLE DEVELOPMENT-CORPORATE RESPONSIBILITY

The Canadian Electricity Association (CEA) and its member utilities are committed to sustainable development. For CEA members, this means "pursuing innovative business strategies and activities that meet the needs of members, stakeholders and the communities in which we operate today, while protecting and enhancing the human and natural resources that will be needed in the future."

CEA member utilities will continue to improve their overall sustainable development performance by committing to the following principles:

Environment: Minimize the adverse environmental impacts of our facilities, operations and businesses

Stewardship and Biodiversity: Manage the environmental resources and ecosystems that we affect to prevent or minimize loss and support recovery

Climate Change: Manage greenhouse gas emissions to mitigate the impact of operations on climate change, while adapting to its effects

Health and Safety: Provide a safe and healthy workplace for our employees and contractors

Workplace: Support a fair, respectful and diverse workplace for our employees and contractors

Communications and Engagement: Communicate with and engage our stakeholders in a transparent and timely manner

Aboriginal Relations: Communicate with and engage Aboriginal people in a manner that respects their culture and traditions

Economic Value: Provide economic benefits to shareholders, communities and regions in which we operate

Energy Efficiency: Produce, deliver and use electricity in an efficient manner while promoting conservation and demand-side management

Security of Supply: Provide electricity to customers in a safe, reliable and cost-effective manner to meet current and future needs

Participation in the Sustainable Electricity program is a condition of CEA membership. The CEA Sustainable Electricity program's Executive Council Chair is accountable for monitoring and reporting progress in implementing this policy on behalf of the CEA Board of Directors.

The CEA member utilities are accountable for implementing this policy within their organizations.

Originally Signed:

Chair, CEA Board of Directors — February 19, 2009

JOINT MESSAGE
FROM THE EXECUTIVES

Jim Burpee and Chris Huskilson.

It is our pleasure to present the fourth Sustainable Electricity Annual Report. While we're pleased with the progress and the continual improvement in performance seen last year, we are committed to pursuing and achieving even better results in the future – Canadians expect no less. In some instances, better results are also intrinsically linked to renewing our generation, transmission and distribution infrastructure. Renewal of our infrastructure, including further investments in low emission and automation technologies – renewable energy, carbon capture and storage, smart grid/meters, and greater conservation – will deliver positive environmental, social and economic results. We encourage our customers to partner with us to achieve our goal of continual performance improvement.

STRATEGIC CONSIDERATIONS

Electricity is an essential service. A reliable electricity system that is at the same time sustainable and affordable is crucial for economic growth and the prosperity of Canadians. We use electricity to power our businesses, hospitals, personal electronics, communications, and much more. In 2011, CEA member companies generated 309,950 GWh (net) of electricity – an increase of 4.6 percent from the previous year. As we look beyond 2011, challenges remain: infrastructure renewal, new emission reduction requirements from coal-fired generation, and retirements of experienced utility personnel. All must be addressed going forward.

There is no bigger challenge than infrastructure renewal and modernization. Electricity infrastructure must be reliable and capable of handling diverse generation and demand options, including renewable forms of generation and new smart grid applications. The sector needs governments and communities to partner in and support infrastructure renewal and modernization to ensure a reliable electricity system for future generations. This means timely approval of new projects, better investment conditions, and greater acceptance of electricity infrastructure by stakeholders and the general public. Bottom line: our electricity infrastructure is aging. Responsible and prudent investments cannot be postponed any longer, especially given the growing frequency and duration of electrical system outages for customers across the country.

The policy framework for the reduction of greenhouse gas (GHG) emissions remains a significant risk to the electricity sector. In 2011, the federal government published draft regulations for the reduction of GHG emissions from coal-fired generation under the *Canadian Environmental Protection Act (CEPA)*. CEA members are actively engaging the federal government to ensure this regulatory framework is developed in a manner that results in effective reduction in GHG emissions without unduly impacting the sector and ratepayers. Further integration of new lower-emitting forms of electricity, as well as carbon capture and storage in certain regions, can play a significant role in maintaining diversity of generation and decreasing the carbon footprint. Transmission inter-connections to transport renewable electricity from remote areas will also be crucial in the years ahead.

Along with the impending need for capital renewal, the sector must also address the need for skilled workers. CEA members are facing the prospect of a skilled-worker shortage at a time of industry renewal and expansion. The industry is working closely with government agencies, educational institutions, and community organizations to meet the human resources challenge and alleviate the shortage of qualified workers. CEA members are equally committed to retaining existing workers and ensuring that the workplace remains safe, diverse, and respectful.

PERFORMANCE OVERVIEW

Overall, the sustainable development performance of CEA member companies continues to improve. Air emissions continued to decrease due to a marked reduction in coal-based electricity generation in Ontario and in several other provinces. The decline in coal generation was offset by increased use of a combination of other fuel sources such as natural gas, hydro, nuclear and wind power. In addition, performance related to other environmental indicators such as priority spills, biodiversity, and compliance with existing laws and regulations improved relative to 2010. Progress was also made on several social indicators. However, health and safety performance declined, with increases in Lost-Time Injury Frequency and

Lost-Time Injury Severity Rates. In addition, CEA members experienced the loss of two employees as a result of fatalities. One employee died during a scheduled maintenance activity and the other in a commercial plane crash on the way to a work site. Safety of employees is a paramount concern and members are committed to further strengthening their safety culture and performance in this area. On economic performance, CEA members maintained infrastructure investment at levels on par with recent years, but it was not enough to contain the growing frequency and duration of electrical system outages for customers. As the Conference Board of Canada has noted in its assessment of electricity sector infrastructure, the sector needs to invest approximately $347.5 billion over the next two decades to renew and modernize electricity infrastructure in Canada.

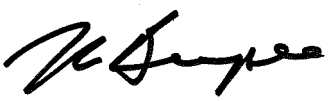
RESPONSE TO THE PUBLIC ADVISORY PANEL LETTER

Over the years, the Public Advisory Panel has made several recommendations related to air emissions, Aboriginal engagement, innovation and distributed energy systems. The Panel has also recommended further improvement in year-over-year member performance, particularly on the environment. CEA members are committed to continual improvement in performance. For example, over the past five years, carbon dioxide equivalent (CO_2 eq) emissions have declined by 30 percent, sulphur dioxide (SO_2) by 44 percent, and nitrogen oxide (NO_x) by 28 percent. These are major achievements for a sector driven by long-term capital investments. The sector will continue to invest in new hydro, wind, efficient gas turbines, carbon capture and storage, smart grid and automation technologies to further reduce its environmental impact. These investments and innovations will have a a profound effect on the future operation of the electricity system. CEA members recognize that continual improvement and innovation are keys to success, and look forward to working with the Panel to further investigate areas for improvement and overcome the barriers to greater innovation and sustainable development in the electricity sector.

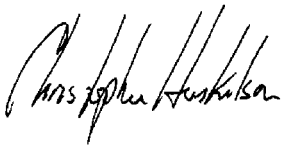
CONCLUSION

Overall, CEA members are continuing to make progress on sustainable development. We want to maintain areas of strength and make further improvements, including our performance related to system outages and reliability. As our residential and industrial customers continue to use more electricity to power their electronics and machinery, we need to ensure we're there for them. We want to deliver on that commitment, and we're seeking support from the public, policy makers and the regulators to help us build, maintain and operate a reliable, sustainable, and affordable electricity system. Canada's electricity sector is committed to delivering a renewed and modernized grid.

Sincerely,



Mr. Jim Burpee
President and CEO
Canadian Electricity Association



Mr. Chris Huskilson
President and CEO, Emera Inc.
Chair, CEA Board of Directors

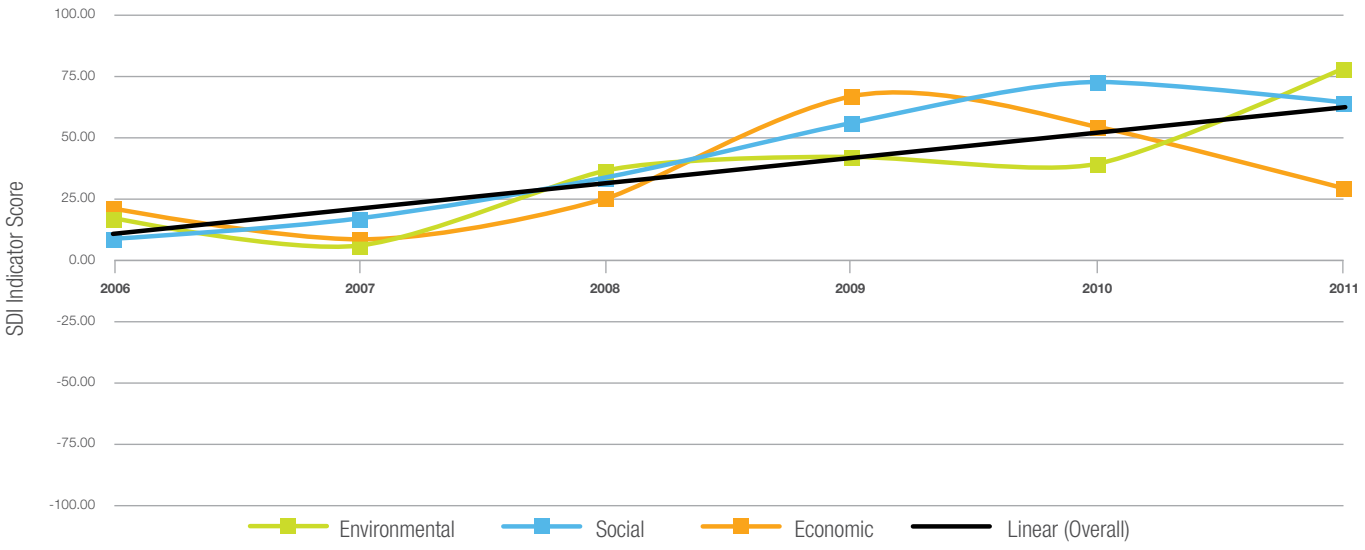
SUSTAINABLE DEVELOPMENT INDEX

Sustainable Development Performance (2006–2011)

For CEA member companies, the Sustainable Electricity program promotes best practices with respect to the three integrated components of sustainable development: environmental, social, and economic performance. The Sustainable Development Index (SDI) – a new tool developed by CEA with input from member companies and other stakeholders – provides an easy-to-interpret assessment of whether CEA member companies are collectively trending "better or worse" in their sustainable development performance over time.

As ***Figure 1*** illustrates, from 2006–2011, the overall sustainable development performance of CEA member companies showed continuous improvement.

FIGURE 1 Sustainability Development Index (SDI)



	2006	2007	2008	2009	2010	2011
High Scores	SO_2 Emissions	Lost-time Injury Severity Rate	Companies with Public Education Programs	Companies with Public Education Programs	Companies with Public Education Programs	CO_2 Emissions
	Energy Conservation	Energy Conservation	Infrastructure Investment	Infrastructure Investment	Energy Conservation	SO_2 Emissions
Low Scores	Priority Spills	Priority spills	SAIDI	Priority Spills	Priority Spills	SAIDI
	SAIFI	SAIFI	SAIFI	Charitable Donations	SAIFI	SAIFI

Note: The SDI is comprised of 24 indicators (for a complete list, see ***Table 1***). Annually, each indicator is assigned a score between +100 and –100, based on performance benchmarked relative to a 2004-05 baseline. The major categories of environmental, social and economic performance contribute one-third each to the SDI calculation.

The overall positive performance of CEA member companies from 2006 to 2011 will serve the sector well as it seeks to build new infrastructure and refurbish existing assets. The greater the degree to which the industry can maintain an ongoing track record of positive sustainable development performance, the greater the probability that governments and the public will continue to support the industry's ongoing license to operate.

Despite an overall positive SDI performance trend over the past six years, there has been a recurring theme of low scores regarding System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) rates, and priority spills. Accordingly, the industry will continue to focus efforts on improving performance in these areas in the future. While the sector is keen to deliver on its core mandate of delivering reliable, sustainable, and affordable power to Canadians, partnerships and support of stakeholders, policy makers and regulators will be important for ensuring this essential service is available on demand for customers across the country.

TABLE 1: SDI INDICATORS

Environment	Social	Economic
• NO_x emissions (tonnes) • NO_x intensity • SO_2 emissions (tonnes) • SO_2 intensity • CO_2 eq emissions (tonnes) • CO_2 eq intensity • Priority Spills • Sulfur Hexafluoride emissions (tonnes) • Implementation of Environmental Management Systems (percent)	• All Injury/Illness Frequency Rate • Lost-Time Injury Frequency Rate • Lost-Time Injury Severity Rate • Total value of annual company charitable donations ($) • Companies producing sustainability reports (percent) • Companies with public education programs (percent) • Companies with Aboriginal Relations group or positions (percent) • Companies with partnerships with Aboriginal Peoples (percent) • Companies with procedures for training and employment of Aboriginal Peoples (percent)	• Total capital expenditures on generation infrastructure ($/yr) • Total capital expenditures on transmission infrastructure ($/yr) • Total capital expenditures on distribution infrastructure ($/yr) • System Average Interruption Duration Index (hours) • System Average Interruption Frequency Index (per customer) • Total Energy saved through external energy conservation initiatives (MWh)

KEY
INDUSTRY CHALLENGES

INVESTING IN INFRASTRUCTURE

Canada's electricity system is aging and must be renewed to meet the needs of our modern economy. The renewal of the electricity system requires strong government policy commitment, timely regulatory approvals of projects, and regulator and public support. In a recent report, the Conference Board of Canada said,"investment in electricity infrastructure from 2011 to 2030 will total an estimated $347.5 billion (in current dollars)."[1] In 2011, CEA members across Canada invested approximately $9.2 billion in new generation, transmission, and distribution systems – an increase of 4.2 percent from 2010. There are several major projects underway, which together make up one of the largest expansions of electrical infrastructure in Canadian history. These investments will not only help ensure a reliable and modern electricity system, but will also pave the way for better environmental, social and economic outcomes for Canadians.

REGULATORY EFFICIENCY

Regulatory efficiency is crucial for the electricity sector. When conducting maintenance or building new power plants, distribution systems, or transmission lines, the electricity sector must meet a myriad of often duplicate federal and provincial regulations. The sector faces increasing costs in meeting the requirements of regulators and obtaining the permits required to construct and maintain infrastructure assets. The sector welcomes the recent *Responsible Resource Development* (R2D) strategy of the Government of Canada, which aims to integrate environmental assessments in collaboration with the provinces and improve some of the existing federal acts to provide greater regulatory certainty. An efficient regulatory environment is essential for meeting the electricity needs of Canadians and creating economic value for the communities in which CEA members operate.

CLIMATE CHANGE

Mitigating climate change remains a significant challenge and risk to the electricity sector. The sector must plan to adapt to the physical effects of climate change and continue in its efforts to reduce its own carbon footprint. On August 27, 2011, the federal government released draft regulations on limiting GHG emissions from existing and new coal-fired electricity generation starting in July 2015. Given the existing capital stock turnover cycle, and the lack of compliance mechanisms for meeting the regulatory requirements, implementation will not be without costs to the sector and to ratepayers. The sector will take both short-term and long-term action to reduce its carbon footprint through investments in renewable energy, clean coal, and other forms of generation. A flexible regulatory system that recognizes investments already made in new technologies – and the unique circumstances faced by some provinces – will be essential to maintaining a reliable, sustainable, and affordable electricity system for our customers.

ELECTRICITY DEMAND

Managing electricity demand growth is a continuing challenge. With economic and population growth, and the introduction of electric vehicles, electricity demand is expected to rise in several Canadian provinces. To moderate demand growth, CEA member companies are continuing to invest in energy efficiency and conservation initiatives through targeted residential and industrial customer programs. With the impending need to replace aging infrastructure, the sector is encouraging governments, communities, and consumers to actively participate in and support conservation efforts to help moderate demand growth.

HUMAN RESOURCES

Attracting qualified skilled workers to the electricity industry remains a challenge. The sector's workforce is aging, with a significant percentage of experienced and skilled personnel rapidly approaching retirement. According to the Electricity Sector Council's 2011 Labour Market Information Study[2], utilities will have to recruit over 45,000 new workers by 2016. CEA member companies are working diligently to raise awareness about electricity-related career choices among Canadians and foreign trained workers, and are ensuring that current employees have the skills and training required to maintain a reliable electricity system.

[1] Conference Board of Canada, *Shedding Light on the Economic Impact of Investing in Electricity Infrastructure, February 2012*
[2] Electricity Sector Council, *Power in Motion: Labour Market Information Study, 2011*

LETTER FROM THE PUBLIC ADVISORY PANEL

Mr. Chris Huskilson
President and CEO, Emera Inc.
Chair, CEA Board of Directors

Dear Mr. Huskilson,

The Public Advisory Panel members of the Sustainable Electricity program are pleased to submit this letter of advice to the Board of Directors of the Canadian Electricity Association (CEA). Our role is to present an informed point of view on the environmental, social, and economic performance of the electricity industry in Canada relative to the principles and the indicators that are the foundation of the program.

The Panel is encouraged by the positive developments over the past year both in the form and substance of the 2012 Sustainable Electricity Annual Report. With regard to the former, the inclusion of the Sustainable Development Index (SDI) adds considerably to the focus, clarity and ease of comprehension of the report. It provides both context and a sense of direction on the industry's progress in implementing sustainable development. The marked improvement in environmental performance in 2011, specifically with regard to both air emissions and priority spills, was encouraging. We look forward to seeing continuing progress in future reports through further industry investment in low emission generation technology, energy conservation, and spills containment programs.

The quality of the 2012 report is enhanced by the additional data provided in the analysis of results under each of the principles. This could be further improved by more detailed consideration of some of the issues raised. For example, while it is evident that positive steps are being taken to advance the industry's engagement of and relationships with Aboriginal Peoples, a more specific evaluation of the extent of the effort and results would help guide future programs. Similarly, it is difficult with data currently available in the report to gauge the magnitude of the industry's ongoing investment in renewable energy and conservation – and to evaluate its outcomes. While this data maybe confidential for business reasons, we encourage companies to share this information at an aggregated level.

The modest representation of female and minority groups in company management and governance bodies was noted with some concern. In light of the challenge the industry faces in attracting qualified, skilled personnel, as highlighted in the report, these groups represent a strategic resource for the future that needs to be cultivated now. Tracking and reporting progress in this area should be included in future reports, including the representation of Aboriginal Peoples in company management bodies.

Hon. Mike Harcourt.

Another opportunity to enhance subsequent reports would be to add detail as to how the Canadian industry meets international sustainable development standards and measures. Some members have committed to the ISO 26000 guidelines on social responsibility and are making sustainability filings based on the Global Reporting Initiative (GRI). Understanding how the overall CEA membership participates in and measures up to these and other relevant international standards, in addition to ISO 14001 Environmental Management Systems, would be beneficial to future reports.

The 2012 report highlights the increasing frequency of electrical system outages and their increasing duration. It also notes the Conference Board of Canada's $347.5 billion estimate for needed electricity industry infrastructure investment over the next 20 years. The Panel views the industry's infrastructure challenge as being closely linked with the other issues, from climate change through to demand-side management, human resource gaps, and regulatory efficiency. All require integrated, innovative, and sustainable solutions. While substantial additional financial resources will be needed, the character of the investments and how they will be developed and implemented will differ considerably from past practices.

The Panel was impressed with the company submissions for this year's Sustainable Electricity program awards. The variety and quality of the company presentations clearly evidenced the innovative potential of the industry and its increasing willingness to take on the challenges noted in this year's report. We look forward to more of these award submissions in the years ahead.

We anticipate further opportunities to discuss the issues raised in the 2012 report with the Board of Directors. In addition, we look forward to continuing our work with the industry on identifying the barriers to greater innovation and sustainable development.

Yours sincerely,

Hon. Mike Harcourt
Chair, Public Advisory Panel
CEA Sustainable Electricity program

CEA MEMBER PERFORMANCE
ENVIRONMENTAL

The electricity sector is committed to reducing its environmental footprint through investments in advanced technologies and enhanced environmental management practices.

Key Performance **HIGHLIGHTS**

90	COMPANIES WITH AN ISO 14001 EQUIVALENT EMS (PERCENT)	*3.2 percent decrease from 2010*
274	SO_2 EMISSIONS (THOUSAND TONNES)	*16.2 percent decrease from 2010*
143.6	NO_x EMISSIONS (THOUSAND TONNES)	*15.1 percent decrease from 2010*
1085	MERCURY EMISSIONS (KILOGRAMS)	*27.7 percent decrease from 2010*
97	ANNUAL PRIORITY SPILLS (NUMBER)	*9.4 percent decrease from 2010*
74.6	CO_2 eq EMISSIONS (MILLION TONNES)	*16.7 percent decrease from 2010*
893	CO_2 eq FOSSIL INTENSITY (TONNES/GWh)	*4.3 percent decrease from 2010*

Green indicates improved performance and orange indicates decreased performance (relative to 2010)

PRINCIPLE 1: ENVIRONMENT

Minimize the adverse environmental impacts of our facilities, operations, and businesses

Activities related to electricity generation, transmission, and distribution systems have varying levels of impact on air, land, and water. While electricity is a regulated essential service that must be available on demand, it is also of the utmost importance for CEA members to proactively manage their operations in an environmentally responsible manner in compliance with all applicable environmental laws and regulations. In fact, many companies exercise due diligence at all stages of their facility operations (design, construction, operation, maintenance, and decommissioning) to ensure that adverse environmental impacts are minimized and restorative activities are undertaken where needed.

ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

Environmental Management Systems (EMS) are a critical tool for managing environmental issues. As ***Table 2*** illustrates, by the end of 2011, 90 percent of CEA corporate utility members had an ISO 14001 or equivalent EMS in place (equivalent systems must cover all elements listed under ISO 14001). This is a slight reduction from 2010 due to the addition of one new member and a reporting error in 2010. Horizon Utilities Corporation, a local distribution company in Ontario, was the latest member to develop and externally certify its EMS. The few remaining companies without an EMS are expected to have their systems in place over the next two years.

TABLE 2: STATUS OF EMS IMPLEMENTATION

	2011	2010
ISO 14001 or equivalent Environmental Management System (EMS)	90 percent	93 percent
EMS audited by an external/internal auditor within the last three years	83 percent	89 percent

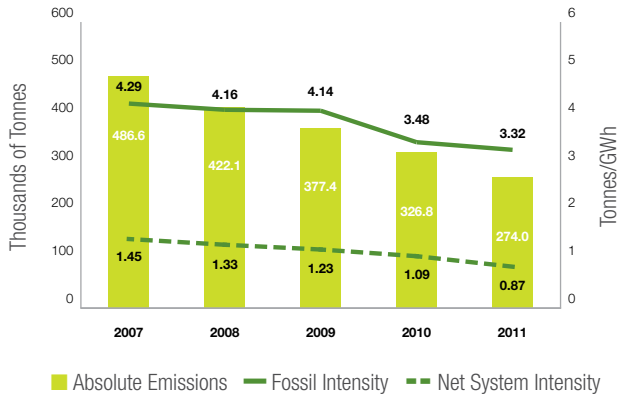
These systems help identify legal and regulatory requirements. In 2011, CEA members reported zero non-compliance fines for violating applicable federal/provincial/territorial laws and regulations, a reversal from the previous year. The number of non-compliance notices and orders also fell from 14 to six in 2011. While non-compliance orders and notices vary in offence from incidents of negative environmental impact to administrative violations, meeting legal obligations is considered a minimum performance requirement. The few companies that received notices and/or orders took immediate action to meet compliance requirements. For example, a member company that received a federal *Fisheries Act* notice for drawdown of water levels took immediate corrective measures to raise the water to appropriate levels – and subsequently established operating procedures to ensure it does not occur again.

In addition, CEA members work to resolve issues before they escalate into fines or charges. For example, as part of an improvement effort to mitigate Pickering nuclear station's impact on fish, and in response to the Canadian Nuclear Safety Commission's (CNSC) directive under the *Nuclear Safety and Control Act* to implement effective fish impingement/entrainment mitigation measures, Ontario Power Generation (OPG) installed a full net barrier across its surface water intake. After the second full cycle of operation, the fish protection net has furthered the goal of reducing impingement by 80 percent, and the CNSC has concluded that the barrier net is an effective fish deterrent system.

AIR EMISSIONS: OVERALL TRENDS

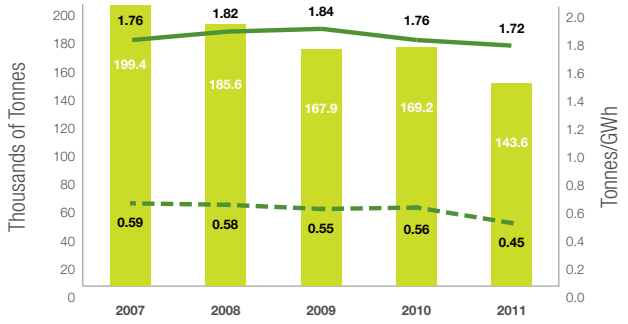
In 2011, CEA generation companies continued to make progress in reducing air emissions. SO_2 emissions declined by 16.2 percent from 2010 levels and 44 percent from 2007 levels. These reductions were specifically driven by a combination of coal unit shutdowns in Ontario, a transition to lower emitting fuels (including natural gas), and investments in pollution prevention technologies across the country. In fact, coal generation by CEA member companies fell by 19 percent relative to 2010, with OPG reducing its coal use by 67 percent and associated SO_2 emissions by 70 percent. TransAlta and New Brunswick Power also contributed significantly to the decline of SO_2 emissions. SO_2 emission intensity of fossil fuels (tonnes per unit of electricity produced) also decreased by 4.6 percent from 2010 levels as a result of coal unit shutdowns and use of facilities with higher combustion efficiencies ***(Figure 2)***. Similarly, NO_x emissions and emission intensity decreased by 15.1 percent and 2.3 percent respectively from 2010 levels ***(Figure 3)***. Again, OPG was a major contributor (64 percent reduction in NO_x emissions), as well as New Brunswick Power, TransAlta and SaskPower. This illustrates that less coal-based generation and investment in new, more efficient technologies will have a significant impact on air emissions reductions in the medium to long-term.

FIGURE 2 SO_2 Emissions and Intensity



Note: Intensity is based on net generation

FIGURE 3 NO_x Emissions and Intensity



Note: Intensity is based on net generation

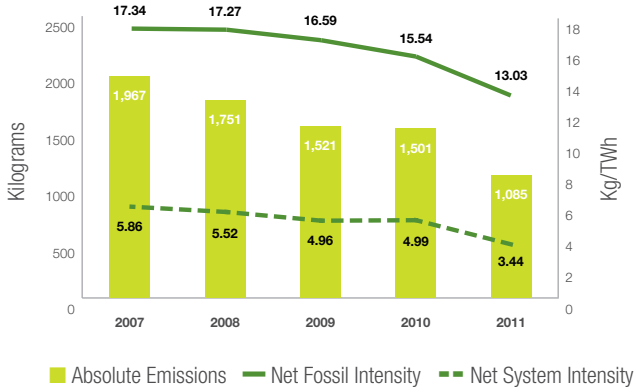
AIR EMISSIONS: POLICY FRAMEWORK

CEA and its members are continuing to work with federal, provincial, and territorial governments to further strengthen the regulatory framework for improving local air quality. The electricity sector was a leading participant in the Comprehensive Air Management System (CAMS) proposal developed by a multi-stakeholder group consisting of industry, government and environmental representatives over the past several years. Based on this multi-stakeholder proposal, the Canadian Council for Ministers of the Environment (CCME) agreed in 2010 to begin development of a new Air Quality Management System (AQMS) to address air quality in local communities. CCME directed government officials to develop the major elements of the system in 2011, with implementation beginning in 2013. The electricity sector remains committed to working with government and other stakeholders, but wants to ensure that the elements of the proposed AQMS are realistic, achievable, and consistent with the proposed GHG regulations.

Keephills Coal-Fired Power Plant, Alberta.

A regulatory system that is clear and achievable will have lasting benefits for communities and will ensure our customers continue to get reliable, sustainable, and affordable power. As the existing capital stock turns over, companies will begin investing in the best available technology that is economically viable. One such generating station is the Keephills 3 facility, commissioned by Alberta-based TransAlta and Capital Power Corporation in 2011. A super-critical coal-fired facility, it is one of the cleanest fossil fuel units, with advanced air quality control systems designed to reduce emissions of SO_2, NO_x, mercury, and particulate matter. The facility has a flue-gas desulphurization unit, low NO_x staged burners, a mercury emission control system that uses activated carbon injection (ACI), and a high efficiency particulate collection system system that uses fabric filters (baghouse), all of which has the potential to capture up to approximately 99 percent of particulate emissions. Investments such as this will continue as CEA members turn over their existing capital assets.

FIGURE 4 Mercury Emissions and Intensity



Note: Intensity is based on net generation

MERCURY

The electricity sector is responsible for about 28 percent of mercury emissions in Canada, and CEA member companies are making steady progress in reducing that share. Under the Canada-wide Standard for Mercury, most provinces have regulations in place for reduction of mercury from coal-fired power plants. Several CEA member companies are using ACI systems and sorbent injection systems to abate mercury releases. In 2011, Capital Power began using an ACI system to lower mercury concentration in flue gas emissions at its Genesee 1, 2, and 3 units in order to meet the province of Alberta's requirement to capture 80 percent of mercury emissions by January 1, 2013. Overall, mercury from coal-fired generation decreased by 28 percent in 2011 relative to the previous year ***(Figure 4)***.

CEA members are closely following the United Nations Environment Programme (UNEP) negotiations on developing a legally-binding instrument on mercury emissions, particularly from coal-combustion in developing countries. Canadian utilities are well positioned to share their experience on mercury research through national and international forums, and the sector expects developing and emerging economies to follow the standards Canada has established.

PRIORITY SPILLS

CEA tracks spills that are classified as priority spills – defined as liquid spills that contain petroleum products or polychlorinated biphenyls (PCBs), and spills that enter a body of water – given their potential for adverse environmental impacts. The electricity sector employs many petroleum-based products in its electrical equipment, and spills result from extreme weather conditions, aging transformers, and incidents of vandalism. While companies are proactive in managing these spills through regular inspection, assessment, and replacement of aging equipment, spills do occasionally occur. In such situations, companies respond according to all applicable procedures and regulatory requirements to ensure a proper cleanup and minimize any adverse environmental impacts.

In 2011, there were 97 priority spills – a 9.4 percent improvement from 2010 levels ***(Figure 5)***. These spills were mainly attributable to transformer and other substation equipment failures and vandalism, including several cases of bullet holes in transformers. In each case, companies took immediate action to remediate the affected sites and remove contaminated soil. As part of spills containment, companies review past events to determine root causes to inform ongoing improvement in their processes and practices. For example, AltaLink uses a secondary soil containment feature in all new transformer installations. CEA members will continue to look for improvements in spills management to minimize or prevent adverse environmental impact.

FIGURE 5 Annual Priority Spills

PCB MANAGEMENT

Polychlorinated biphenyls (PCBs) are a group of organic compounds historically used as coolants and lubricants in transformers, capacitors and other electrical equipment. Due to their potential adverse impacts when released into the environment, PCBs require special handling, storage and disposal measures. In Canada, the federal government banned the production of PCBs and restricted the manner in which they can be used and stored. The PCB regulations were enacted in September 2008, and further amendments to the regulations were published in March 2010 to minimize the risks posed by the use, storage, and release of PCBs into the environment. These regulations established deadlines and prohibitions on the release, manufacture, import/export, sale, destruction, and use of products containing PCBs. CEA PCB Task Group is currently working on new metrics to track performance against the federal PCB requirements. These new metrics will be published in next year's Sustainable Electricity Annual Report.

SUPPLY CHAIN MANAGEMENT

Supply chain management is a growing issue in the electricity sector, as utilities are increasingly implementing frameworks to ensure greater efficiency and environmental responsibility throughout their supply chain. It is a trend that is taking place in many other economic sectors in Canada, because a significant portion of any company's environmental footprint is associated with its supply chain. CEA member companies have taken notice, and many are either in the process of redesigning their procurement policies and evaluation tools or have already done so. For instance, Ontario Power Generation partnered with Ryerson University to develop a tool to evaluate suppliers objectively from an environmental standpoint, which they now use to screen suppliers. As the electricity sector becomes increasingly sustainable, its suppliers will be expected to follow suit in their consideration of environmental impacts.

Minimizing the Environmental Impacts of Electricity Sector Operations

BC Hydro Upgrades Fort Nelson Generation Station: In 2011, BC Hydro converted its simple cycle 47 megawatt (MW) Fort Nelson natural gas station into a 73 MW combined cycle generation turbine (CCGT) station. It did so by installing an upgraded dry low-emissions (DLE) gas turbine, heat recovery steam generator (HRSG), and a steam turbine driven generator (STG) system. The new combined cycle plant is one of the most efficient and environmentally friendly ways to generate electricity using natural gas. While demand for electricity is expected to rise in the Fort Nelson region, BC Hydro expects a further reduction in NO_x emissions by 10 to 15 percent per MWh due to this upgrade.

Brookfield Renewable Energy Group Commissions Comber Wind Project: Brookfield has successfully completed the development of two wind power projects in Essex County, Ontario. Gosfield Wind, a 51 MW wind farm in Kingsville, began operating in September 2010. Comber Wind, an adjacent 166 MW wind farm in Lakeshore, began full commercial operations in November 2011. With an installed capacity of 216 MW, the combined Comber-Gosfield operation is now the largest wind farm in Canada, producing enough electricity to power more than 70,000 homes. Comber-Gosfield Wind farms feature 94 2.3 MW turbines, 2 transformer stations, 197 landowner leases, 15 permanent jobs, and a new operations and maintenance facility.

ENMAX Starts Construction of the Shepard Energy Centre: In 2011, ENMAX began constructing the Shepard Energy Centre in southeast Calgary. When completed in 2015, it will be Alberta's largest natural gas-fired facility. Using combined cycle gas turbine technology, Shepard will add 800 MW of electricity to the provincial power grid. Relative to similar coal-fired plants, Shepard is expected to produce less than half the CO_2 emissions, as well as lower SO_2 and NO_x emissions. Shepard will be built closer to the Calgary area, reducing the amount of lost electricity due to long-distance transmission. Shepard will also use reclaimed water piped from the city's Bonnybrook Wastewater Treatment Plant.

Nova Scotia Power Integrates its Environmental Management System (EMS): In 2011, NS Power began amalgamating its separate EMS into a single system covering all areas of company operations. The consolidated EMS will allow NS Power to more efficiently manage environmental risks by supporting integration between business units, streamlining processes, allowing for autonomy across divisions, and providing a common place for all employees to access information electronically. Work to amalgamate these systems continues and the consolidated EMS will be rolled-out to employees throughout 2012.

The new steam turbine generator, and other auxiliary systems, at the Fort Nelson Generating Station.

Construction of the Comber Wind Farm.

Toronto Hydro Creates New Electric Vehicle Infrastructure Section: As part of its commitment to environmental sustainability and to ensuring a reliable electricity grid, Toronto Hydro formed an Electric Vehicle Infrastructure group under its Asset Management Department to focus on the emerging electric vehicle industry and its impact on the distribution grid. The group will conduct a variety of activities to study how distribution equipment is affected by electric vehicle charging patterns, while at the same time educating customers about the vehicles.

TransAlta Reaches a New Milestone in Wind Power: In 2011, TransAlta reached a new milestone in completing the first full year of 1,000 MW of wind capacity, making it the largest generator of wind power in Canada. In March, 2011 TransAlta received approval from the Government of Quebec to build New Richmond Wind Facility located in the province's Gaspé Peninsula. At an estimated cost of $205 million, New Richmond will add another 68 MW of capacity. New Richmond is expected to achieve commercial operation in the fourth quarter of 2012 and is contracted under a 20-year Electricity Supply Agreement with Hydro-Quebec Distribution.

PRINCIPLE 2: STEWARDSHIP AND BIODIVERSITY

Manage the environmental resources and ecosystems that we affect to prevent or minimize loss and support recovery

Ecosystem protection and biological diversity are important considerations for the electricity sector. On a lifecycle basis, electricity generation, transmission and distribution operations have varying levels of impact on our ecosystems and biodiversity. However, CEA member companies are taking action to understand, minimize, and manage potential environmental impacts associated with their operations through collaboration with government, conservation authorities, aboriginal groups, academia, and other stakeholders. For example, AltaLink is currently working with the University of Alberta to conduct research of Ferruginous Hawks (FEHA) residing within the native grassland areas of Southern Alberta and Saskatchewan, where wind farm and corresponding transmission line developments are being proposed. The research will investigate home range usage, human disturbance influences, and mortality causes in order to assist in positioning new transmission lines in a manner that reduces negative impacts on these birds. In addition to collaborative efforts with stakeholders, member utilities are proactively taking due diligence measures at all stages of their operations to ensure that adverse impacts on ecosystems and biodiversity are minimized and restorative/recovery plans are implemented, where necessary.

In 2010, CEA members committed to tracking their performance on biodiversity against a series of indicators supported through a business declaration under the UN Convention on Biological Diversity. In the second year of reporting against those indicators ***(Table 3)***, CEA members continue to improve their performance in all areas, including: analysis of corporate activities on biodiversity; management coordination of issues related biodiversity; communication of challenges and achievements on biodiversity; engagement of suppliers; and improved partnerships with stakeholders. Historically a weak point, companies are also engaging suppliers on biodiversity issues as part of their approach to environmental protection. While these indicators do not directly measure the impacts on species and their habitat, they provide key insights into how companies are managing biodiversity issues in their daily activities.

Along with these efforts, the electricity sector continues to work closely with the federal government and other stakeholders to improve the regulatory framework around species conservation and environmental assessment. CEA is encouraged by the federal government's recent Responsible Resource Development (R2D) initiative, which aims to provide greater regulatory clarity under existing federal species conservation acts. The electricity sector supports all efforts and partnerships to achieve real and meaningful conservation objectives to protect our ecosystems and reduce biodiversity loss.

TABLE 3: INTEGRATION OF BIODIVERSITY CONSIDERATIONS INTO COMPANY ACTIVITIES

	2011	2010
Analyze corporate activities with regard to their impacts on biodiversity	73 percent	62 Percent
Responsible individual within the company to steer all activities in the biodiversity sector and report to the Management Board	53 percent	45 percent
Measurable biodiversity objectives that are monitored and adjusted every 2–3 years	50 percent	48 percent
Publish activities and achievements on biodiversity in an annual report	63 percent	62 percent
Inform suppliers about the company's biodiversity objectives and engage them to integrate similar objectives	30 percent	14 percent
Explore the potential for cooperation with stakeholders with the aim of deepening dialogue and improving the corporate management system vis-à-vis biodiversity	70 percent	55 percent

Managing the Impact on Ecosystems and Biodiversity

FortisAlberta Implements an Avian Protection Plan: FortisAlberta's Avian Protection Plan (APP) is a program designed to reduce impacts on raptors and migratory birds and minimize operational risks that result from bird interactions with distribution power lines. The program includes numerous components including electrocution and collision risk assessments, nest management, conservation actions, and employee training and awareness. In 2011, FortisAlberta completed an avian electrocution risk assessment in southeast Alberta. This area is considered a core breeding range for the Ferruginous Hawk, an endangered species. By prioritizing work in this area, FortisAlberta is aligned with strategies in the current Alberta Ferruginous Hawk Recovery Plan. Approximately 600 individual poles and five areas were identified as having the greatest relative risk to raptors, based on a set of pre-determined criteria.

FortisBC Works in Partnership with Columbia Power and BC Hydro to Understand the Tiny Fish Species: A threatened species, the Umatilla dace is a tiny fish that lives in select rivers in southeast British Columbia. In 2011, FortisBC partnered with Columbia Power Corporation to expand the geographic scope of Umatilla dace research that BC Hydro initiated in the Columbia watershed. Supplementary research on the Kootenay River has furthered the understanding of the juvenile habitat of this fish. While it was previously assumed that the Umatilla dace preferred higher-velocity, shallow, cobble habitat, new research shows that the Umatilla dace also uses silty, flooded vegetation. Understanding, observing, and recording species in their natural habitat is essential for understanding and managing threatened species. Using a collective approach, these companies are helping to close the information gap for this tiny fish.

Hydro One Collaborates on a New Approach to Protecting Butternut Trees: In 2011, Hydro One formed a partnership with the Forest Gene Conservation Association (FGCA), Nottawasaga Valley Conservation Authority (NVCA) and Trees Ontario to undertake a pilot project establishing a butternut orchard. Butternut trees have been classified in Ontario as endangered species (due to a fungal infection). The pilot project will identify resistant ("healthy") butternut trees and graft branches onto black walnut rootstock in a nursery orchard. This partnership agreement will provide butternut clones to compensate for the removal of retainable butternut along transmission corridor and will also provide a source of pure butternut trees in the event that other retainable butternut trees need to be removed for future projects. The first set of butternut saplings, which have been genetically tested to ensure that they are not hybrids, will be planted in May 2012 to begin establishing the butternut orchard.

Research indicates that lips of Umatilla dace turn red when they are spawning. Picture Credit: Louise Porto/Crystal Lawrence, AMEC.

Nova Scotia Power Collaborates on the Atlantic Coastal Plain Flora: The Atlantic Coastal Plain Flora (ACPF) is a group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens, and estuaries. Some of the plants are unique to Nova Scotia and most of them are confined to the Tusket River watershed. In 2011, NS Power and the Department of Natural Resources (DNR) signed a collaborative agreement to monitor 10 lakes identified as critical habitat in the ACPF Recovery Strategy for the next five years. Permanent monitoring transects have been established on ten lakes, and the results of this monitoring project will feed directly into the recovery strategy for these rare plant species.

Ontario Power Generation Plants Address Biodiversity through Tree Planting: OPG, in collaboration with its conservation partners, planted close to 500,000 native trees and shrubs in 2011. This brings the total plantings over the last decade to nearly 5 million native trees and shrubs on over 2,400 hectares of ecologically significant lands. OPG plantings are targeted to expand forested areas and connect woodland patches to help promote the recovery of wildlife at risk in the heavily fragmented landscapes of southern Ontario. This cumulative effort also addresses both climate change adaptation and mitigation by enhancing the resiliency of woodland ecosystems to withstand the effects of climate change, while naturally sequestering carbon dioxide to mitigate global warming.

TransAlta Protects Bats at Wolfe Island Wind Facility: At the Wolfe Island wind facility in Ontario, TransAlta developed a research program to evaluate practical measures that could lessen the effects of operating wind turbines on bats. The research involved a reduction of rotor speed through operational control on selected turbines when bats are most active, including night time hours and during low wind conditions. The mortality rate for bats at Wolfe Island is below the adaptive management threshold identified in the site's monitoring plan. TransAlta proactively initiated this research to build on its previous bat research at the Summerview wind facility in Alberta.

PRINCIPLE 3: CLIMATE CHANGE

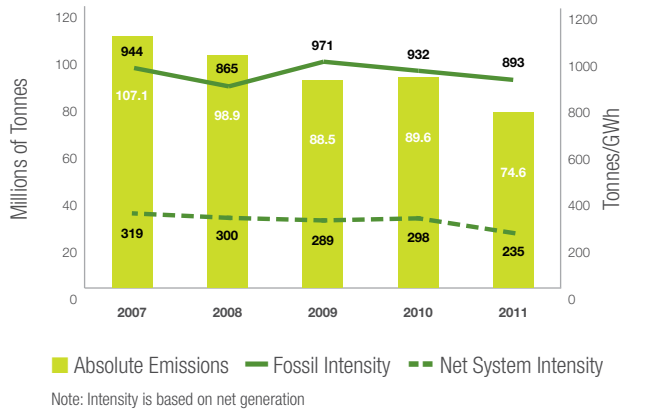
Manage greenhouse gas emissions to mitigate the impact of operations on climate change, while adapting to its effects

MANAGEMENT OF GREENHOUSE GASES

While almost 80 percent of electricity in Canada is generated through low or non-emitting fuel sources, efforts to reduce GHG emissions in the electricity sector remains a priority for CEA members. The electricity sector is currently responsible for about 14 percent of national GHG emissions, and that percentage continues to decline. Utilities have and continue to make significant investments in new generation options such as large hydro, clean coal, and renewables to reduce their overall carbon footprint. These investments include projects like the 1000 MW Mica Generating Station (Units 5 and 6) upgrades in BC and the 438 MW Lower Mattagami expansion hydro-electric project in Ontario. The industry is also pursuing carbon capture and storage (CCS) technologies in Western Canada, but policy, economic, and technical challenges remain for commercializing clean coal technologies. The 110 MW (net) Boundary Dam 3 CCS demonstration project in Saskatchewan, expected to become operational in 2014, is the only major clean coal initiative in the electricity sector in Canada. CEA members across Canada are investing or partnering with independent power producers in wind generation, which currently accounts for 5,403 MW of installed capacity in Canada. In 2011, CEA members either generated or purchased nearly 10,000 GWh of electricity from wind and other renewable sources.

Increased use of natural gas, integration of wind power, and coal unit shutdowns/conversions in Ontario are having a significant impact in reducing GHG emissions in the electricity sector. For example, Ontario Power Generation is already in the process of seeking environmental approvals to convert Atikokan Generating Station from coal to 100 percent biomass. The Thunder Bay Generating Station is also being converted from coal to dual fuelling capacity on natural gas and biomass. Driven by these factors, overall CO_2 eq emissions declined by 16.7 percent to 74.6 million tonnes (MT) in 2011 ***(Figure 6)***. This represents approximately 90 percent of electricity sector GHG emissions in Canada. The remaining 10 percent of GHG emissions in the electricity sector is contributed by small electricity generators, including power producers in other industrial sectors. CO_2 eq intensity of net fossil generation also decreased to 893 tonnes/GWh from 933 tonnes/GWh in 2010. While the year-over-year trend will likely fluctuate in the short term, new investments in lower emitting generation and coal unit shutdowns/decommissioning over the medium to long-term will further reduce the sector's contribution to Canadian GHG emissions.

FIGURE 6 CO_2 eq Emissions and Intensity



Note: Intensity is based on net generation

To enable electricity companies to plan investments for the future, it is important that the federal government provide greater regulatory and policy certainty on GHG reduction requirements. In August 2011, the federal government published its draft regulations for the *Reduction of Carbon Dioxide Emissions from Coal-Fired Generation of Electricity* in Canada Gazette I. The regulations, to be implemented under *CEPA*, will come into effect on July 1, 2015. CEA members are actively engaging the federal government to ensure this regulatory framework is developed in a manner that results in effective reduction in GHG emissions. The sector remains concerned about the need for alignment of the proposed regulation with air pollutant policies and existing provincial regulations. It is essential that government provides greater flexibility for meeting this regulatory requirement to ensure that customers and communities are not adversely impacted through higher electricity rates, which are already expected to rise further to reflect infrastructure investment requirements.

OPG employee monitors biomass test burn at Atikokan Generating Station.

The electricity generation sector is facing significant opportunities and challenges. Across the country, electricity generators are investing in renewable technologies (hydro, wind, biomass, solar) and other low-emitting generation sources. These investments will continue as we aim to further reduce our carbon footprint and meet new federal regulations on GHG emissions.

The CEA Generation Council plays an important strategic role in ensuring the policy environment is conducive to the success of Canada's electricity generators. The Council, through its many task groups, manages issues related to investment in generation infrastructure, as well as environmental and health issues linked to generation. The Council is leading CEA's response to the federal government's Responsible Resource Development Plan and Bill C-38, which incorporates changes to the *Canadian Environmental Assessment Act, Fisheries Act, Species at Risk Act*, and *National Energy Board Act*.

Looking forward, the Generation Council is becoming increasingly engaged on water issues, on climate change adaptation, and on distributed generation and its impacts on the grid. Member generators will also play a strategic role of growing importance in garnering support for electricity infrastructure requirements in Canada.

Colin Clark, Chair, CEA Generation Council
Chief Technical Officer,
Brookfield Renewable Energy Group

SaskPower's Boundary Dam Integrated Carbon Capture and Storage Demonstration Project

SaskPower is committed to continuous improvement of its environmental performance and to leading the way in reducing air emissions from its coal-fired facilities. At the forefront of this initiative is SaskPower's Boundary Dam Integrated Carbon Capture and Storage Demonstration Project in Estevan, Saskatchewan. It is the world's first and largest commercial-scale carbon capture and storage project. The $1.24 billion government-industry partnership between the Government of Canada, Government of Saskatchewan, SaskPower and private industry will convert the coal-fired Unit #3 at the Boundary Dam Power Station into a reliable, long-term producer of 110 megawatts of clean base-load electricity that will reduce CO_2 emissions by 90 percent. The captured CO_2 will be used for enhanced oil recovery or will be stored in a deep saline formation through the Petroleum Technology Research Centre's Aquistore Project.

SaskPower successfully evaluated various carbon capture technologies, and selected Cansolv Technologies Inc. as the provider of the CO_2 and SO_2 capture technology. Supplied through a Cansolv/SNC-Lavalin joint venture, Cansolv's process is a two-stage, post-combustion capture system incorporating Cansolv's proprietary amine based SO_2 and CO_2 capture technology. The technology will greatly reduce GHG emissions by capturing one million tonnes of CO_2 per year.

Construction on the Carbon Capture plant (located just west of the Boundary Dam Power Station) began in May 2011. SNC-Lavalin – a world-leading engineering and construction firm – will oversee the detailed engineering, procurement, and construction activities for the project. SaskPower, working with Stantec Consulting, is the overall project manager and will be responsible for the Boundary Dam Unit #3 rebuild and all of the CO_2 capture balance of the plant systems. During the peak of construction in 2012, there will be approximately 450 construction personnel on-site, increasing to approximately 650 during the Unit #3 Boundary Dam rebuild. The facility is expected to become operational in 2014.

PROJECT BENEFITS

- A pathway toward economically and environmentally sustainable power generation
- One million tonnes/year of GHG emission reductions from an existing power station
- A domestic, integrated, commercial scale carbon capture utilization and storage project
- A demonstration project for the development of sound regulation and policies; and
- Growth in Saskatchewan's GDP by more than $700 million, and production of ongoing benefits associated with fuel purchases and enhanced oil recovery of $788 million

CO_2 and SO_2 Absorber Construction at the Boundary Dam Integrated Carbon Capture and Storage Demonstration Project.

CLIMATE CHANGE ADAPTATION

Most sectors, including the electricity sector, will have to adapt to climate change. Research indicates that climate change is already having a measurable impact in Canada through permafrost degradation, reduced ice and snow cover, coastal erosion, forest fires, and temperature fluctuations. Exposure to extreme weather events could impact the reliability and resiliency of generation, transmission, and distribution networks. Seasonal variability of precipitation, temperature, evaporation, lake levels and their divergences from normal ranges are the key elements of concern.

Several CEA members have initiated steps to develop specific strategies to understand the impacts and deal with the potential vulnerabilities. CEA members continue to work closely with organizations such as the Ouranos Consortium, the University of Waterloo (Climate Change Adaptation Project: Canada), the WeatherWise Partnership, the Institute of Electrical and Electronics Engineers (IEEE), and the Pacific Climate Impacts Consortium (PCIC) to further advance the understanding of climate impacts and develop appropriate standards for existing and new electricity infrastructure. As ***Table 4*** illustrates, CEA members are increasingly taking measures to assess their vulnerability to climate change and developing plans to adapt to its impacts.

TABLE 4: INTEGRATION OF CLIMATE CHANGE ADAPTATION ISSUES

	2011	2010
Companies with plans in place to adapt to the impacts of climate change	50 percent	45 percent
Companies that conduct research or analysis to assess its potential vulnerability to climate change and to identify adaptation strategies	50 percent	28 percent
Companies that identify/publish activities and achievements in reference to adaptation in the company's annual, environment, and/or corporate social responsibility report	47 percent	34 percent
Companies that explore the potential for cooperation with institutions, non-governmental organizations, and/or government institutions with the aim of deepening dialogue and continuously improving the corporate management system vis-à-vis climate adaptation	47 percent	38 percent

WeatherWise Partnership: Extreme Weather Resiliency

Formed in 2011, the WeatherWise Partnership is a group of over 50 public, private, and not-for-profit organizations from across the Toronto region that have begun working together to better protect the region's residents, organizations, infrastructure, and environment from extreme weather. Effective strategies to ensure business continuity in a future of more frequent and extreme weather events require a holistic approach. Not only has this issue been identified as a risk by many electric utility sector companies, it has also been identified as the primary stakeholder concern in the face of extreme weather events.

The Partnership, which includes representatives from the three levels of government and other sectors including financial, insurance, transportation, telecommunications, energy, housing, legal, real estate, and engineering, has identified the continuation of electrical power during extreme weather events as its first priority. They understand the essential nature of electricity for their operations. Representatives from electricity generation (OPG), transmission (Hydro One), distribution (Toronto Hydro), as well as the Independent Electricity System Operator (IESO), Ontario Power Authority (OPA), and the Ontario Ministry of Energy formed a core project team to discuss a holistic approach to managing the risks associated with extreme weather as it pertains to the electricity sector.

The members of this core team have identified the prerequisites required from climate science staff and other stakeholders to conduct effective assessment of risk and determine whether the residual risk is within the company and stakeholders' tolerance. The core project team has been working closely with climate scientists to identify at a regional level worst-case credible scenarios, with stakeholders to help them understand and characterize their risk appetite, and with government officials at all levels. The outcome will be a common understanding of relevant risks, appreciation of the adequacy of existing design and operational controls, an assessment of the residual risk and risk appetite of stakeholders, and steps necessary to close the gap. Since most of Ontario's infrastructure is designed for the extremes of the past, it is important to look to the future and re-evaluate risks associated with electrical services.

Storm related damage caused by freezing rain in Newfoundland.
Picture credit: Newfoundland Power.

CASE STUDY: ENVIRONMENT

BC HYDRO LEADS THE WAY ON ELECTRIC CAR INFRASTRUCTURE

Electric vehicle Direct Current fast charging demonstration by BC Hydro.

BC Hydro, along with other Plug-in BC Working Group members (the B.C. Government and the City of Vancouver), is working to deliver the B.C. Electric Vehicle (EV) smart infrastructure project, a concerted effort to increase EV adoption in B.C. The project aims to deploy a public network of EV charging stations to address the lack of EV recharging infrastructure – one of the major barriers to EV adoption. By providing a public recharging service that approaches the convenience of gas stations in terms of refueling time and locations, this network will provide a safety net for EV usage that will boost consumer confidence and encourage its adoption. The project also aims to increase the public awareness and market profile of EVs and contribute to a positive urban design in station locations.

The introduction of this new transportation infrastructure presents an opportunity to depart from urban patterns long established by gas vehicles and their associated infrastructure. The EV smart infrastructure project will result in the deployment of 1,000 electric vehicle charging stations, including 30 Direct Current fast chargers, while establishing a level of utility grid integration that minimizes adverse impacts. DC fast charging is a type of high-powered, public charging station that offers near full recharging of EVs within 25 to 30 minutes. The project is designed to be scalable and will cover three main scenarios: at home, at work, and on the go (public). In 2011, as part of the project planning phase, BC Hydro developed the Electric Vehicle Fast Charging Stations Planning Framework for the deployment of electric vehicle fast charging stations in urban areas and along highways. The framework establishes a systematic approach for infrastructure deployment, making the planning process replicable in other regions. As a result, the development of the framework was co-funded by Natural Resources Canada and other utilities.

Approximately 90 percent of electricity in BC is hydroelectric, making the transition to electric vehicles a true near-zero emission solution. Transportation is responsible for 36 percent GHG emissions in BC, with half coming from passenger vehicles. The Lower Fraser Valley, a region east of the Metro Vancouver area, has been designated by the Canadian Council of Ministers of the Environment as one of three regions in Canada with severe smog problems. Vehicular traffic in the Metro Vancouver area is a main contributor to air pollution in this region. The project has the potential for economic stimulation on many levels, including infrastructure deployment for the construction industry; market adoption for technology providers such as battery chargers, EV component suppliers and integrators, and new demands for renewable electricity supply.

The size of this project will be sufficient to facilitate the training and education of the electrical trade and engineering community on the deployment of EV charging infrastructure. The City of Vancouver has paved the way with building code by-laws that require EV charging infrastructure for new residential developments, but further work is required to develop implementation guidelines.

LOOKING FORWARD

Important next steps for this framework include:

- **Site selection analysis:** examining site locations in urban areas and highways to determine specific station locations and design issues;
- **Publicly-owned land station type:** working with local authorities to determine rights-of-way and permitting issues;
- **Branding:** developing a specific brand based on the demographics applicable to the desired geographic reach;
- **Fully-subsidized business model:** working with BC Hydro to determine the initial business models for station ownership and operation.

The framework developed in the B.C context covers much of the groundwork that would apply to a wide variety of jurisdictions. The station location work would have to be recreated for each jurisdiction based on local mapping and an understanding of local conditions. However, the station type and business model sections would only require minor modifications to respond to local conditions. As a result, this framework can provide a quickly deployable roadmap for EV infrastructure in any region ready to take on the challenge.

CEA MEMBER PERFORMANCE
SOCIAL

The electricity sector's sustainable development strategy includes nurturing quality relationships with its employees and external stakeholders. The sector strives to ensure that it provides a safe and respectful workplace for employees, while building quality relationships with Aboriginal people and communities in the vicinity of its operations.

Key Performance **HIGHLIGHTS**

2.02	ALL INJURY/ ILLNESS FREQUENCY RATE (INJURIES PER 200,000 HOURS)	*3.8 percent decrease from 2010*
0.74	LOST-TIME INJURY FREQUENCY RATE (LOST-TIME INJURIES PER 200,000 HOURS)	*12.1 percent increase from 2010*
14.81	LOST-TIME INJURY SEVERITY RATE (LOST-TIME INJURIES PER 200,000 HOURS)	*8.0 percent Increase from 2010*
100	COMPANIES WITH EMPLOYEE WELLNESS SUBSIDIES/ INVESTMENTS (Percent)	*3.6 percent increase from 2010*
97	COMPANIES WITH SUPPORT FOR VOLUNTEER INITIATIVES (Percent)	*3.8 percent increase from 2010*

Green indicates improved performance and orange indicates decreased performance (relative to 2010)

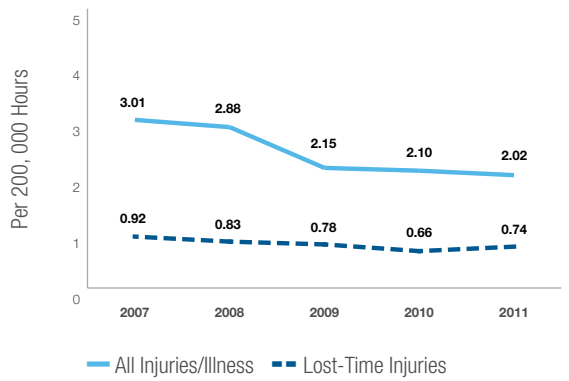
PRINCIPLE 4: HEALTH AND SAFETY

Provide a safe and healthy workplace for our employees and contractors

Canadian utilities have a long-standing commitment to continual improvement of their safety performance and to protecting the well being of their employees, contractors and the general public. They have aimed to achieve the highest level of safety performance through leadership at the executive and operational levels as well as through the implementation of safety management systems based on national and international occupational standards. Other safety initiatives have included employee and contractor training, improved communications, and incident investigation processes to promote lessons learned. In addition, utilities work collectively through the CEA Occupational Health and Safety Committee (OHSC) to share best practices and develop strategic priorities to improve the overall safety performance in the electricity sector.

In 2011, CEA member utilities had both successes and challenges on health and safety. While the All Injury/Illness Frequency (AIF) Rate improved for the fifth consecutive year, Lost-Time Injury Frequency Rate and Lost-Time Injury Severity Rate increased slightly following several years of continual improvement. This is primarily attributable to an increase in non-electrical injuries that resulted in lost days. In addition, there were two tragic employee fatalities in 2011. One employee lost his life performing scheduled maintenance work, and another died during a commercial plane crash while enroute to a work site in Northern Canada. The CEA and its members regret the tragic loss of life of the workers involved in these separate incidents.

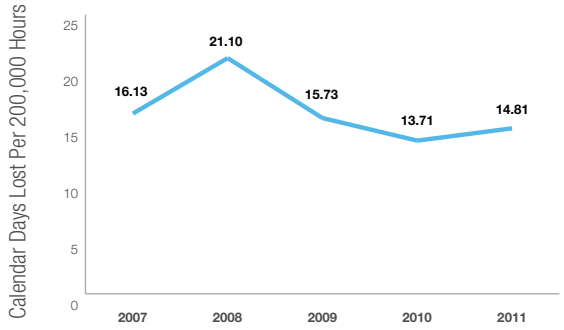
FIGURE 7 All Injury/Illness & Lost-Time Injury Frequency Rates



SAFETY PERFORMANCE: ALL INJURY/ILLNESS FREQUENCY RATE

In 2011, AIF Rate was 2.02 injuries per 200,000 hours worked, a decrease of 3.8 percent from 2010. Since 2007, the rate has decreased by 32.9 percent ***(Figure 7)***. This continual improvement in AIF Rate is attributable to many initiatives including a focus on injury-prevention programs, enhanced safety training and education, and risk control procedures.

FIGURE 8 Lost-Time Injury Severity Rate



SAFETY PERFORMANCE: LOST-TIME INJURY FREQUENCY & LOST-TIME SEVERITY RATES

Since 2007, the CEA member companies have improved their performance on Lost-Time Rates due to a continuous commitment to safety initiatives. However, both the Lost-Time Frequency Rate and the Lost-Time Severity Rate did increase slightly in 2011.The Lost-Time Injury Frequency Rate for all utilities was 0.74 injuries per 200,000 hours, a 12.1 percent increase from 2010 ***(Figure 7)***. The Lost-Time Injury Severity Rate also increased to 14.81 calendar days lost per 200,000 hours worked, an 8.0 percent increase over 2010 ***(Figure 8)***. The common sources of these injuries were overexertion, struck-against injuries (an injury where an employee impacted a stationary object), and falls at the same elevation – as opposed to direct electrical contact.

With significant numbers of skilled workers approaching retirement, ensuring the health and safety of new workers will be a challenge. Companies continue to invest in initiatives to maintain a strong safety culture and ensure that employees and contractors are well trained. CEA member utilities are continuing to address workplace electrical safety through the implementation of CAN/ULC S801, *Standard on Electrical Utility Workplace Electrical Safety for Generation, Transmission, and Distribution*. The majority of utilities are using this standard as the basis for their electrical safety programs.

PROVIDING A SAFE AND HEALTHY ENVIRONMENT FOR THE PUBLIC

CEA members are committed to promoting safety in the communities in which they operate. While all utilities are committed to the reduction of public contact with electrical equipment, eliminating public electrical contacts altogether remains a challenge. Members actively promote public safety in their communities through initiatives such as classroom presentations, special safety events, and media campaigns. In fact, many CEA member companies allocate significant resources to public safety awareness, including power line safety, dangers of metal theft, water and thin ice at hydro-electric reservoirs, and meter reader safety.

The OHSC introduced a number of new pilot indicators to track commitments to reducing public electrical contacts. According to those indicators, 100 percent of member companies had a public electrical education program and a commitment to ongoing partnerships with external agencies that contribute to the prevention of public electrical safety incidents. In 2011, there were two cases of public electrical accidents compared to five in 2010.

In addition, CEA members are collectively and individually working with the first responder community (police, fire, paramedics) to raise awareness and promote electrical safety. In collaboration with the Royal Canadian Mounted Police (RCMP), CEA members produced a safety awareness video to educate law enforcement, fire, and emergency medical services personnel about safety around high voltage electrical utility systems. The objective of the video, entitled "**Electricity... The Invisible Killer**" is to increase the level of awareness of first responders about high voltage electrical equipment and facilities hazards that require additional cautionary measures when responding to emergencies. The goal is to reduce the number of incidents of injury to first responders in emergencies involving high voltage electrical hazards. A web portal – electricity.ca/theinvisiblekiller – is available for police, fire and emergency medical services to obtain more information.

Protecting the Health and Safety of Employees, Contractors and the Public

FortisBC Celebrates Significant Safety Milestones: In 2011, three FortisBC employee groups celebrated significant safety milestones. Two employee groups at Warfield operations and one in South Slocan achieved 1,000 days without a Lost-Time Injury. This equals almost three years and more than 650,000 person-hours of work. Company-wide, FortisBC also experienced the lowest number of Lost-Time incidents on record. These improvements occurred at the same time that total exposure hours increased. Although significant, the company's focus remains on achieving zero injuries.

Maritime Electric Implements a Public Safety Campaign: Maritime Electric is dedicated to public education in all aspects of its business. In 2011, the company implemented a corporate strategy for public safety initiatives. The strategy includes a voiced radio campaign along with four public safety presentations aimed at the public. The presentations include "The Shocking Truth", aimed at grade six students in the province, electrical safety for first responders, electrical safety at home, and work and power line hazard awareness.

Nalcor Energy – Churchill Falls Introduces New Green Hat Policy: Safety is a daily priority for Nalcor Energy at Churchill Falls, where the standard hard hat color is white. In 2011, this branch of Nalcor Energy's operations introduced a corporate-wide Green Hard Hat policy for new employees. New employees have the potential to be exposed to a significant number of hazards and this initiative is aimed at reducing those hazards. Under the program, all new employees must wear a green hard hat for one year to increase their visibility. This allows experienced employees to more readily identify new workers and help them become familiar with policies, procedures, and general safety practices around the workplace.

Newfoundland Power continues to support their communities by offering electrical safety to firefighters throughout the province.

Newfoundland Power Introduces the Safety Leader(s) Among Us Award Program: The Safety Leader(s) Among Us Award Program was initiated in January 2011. This award is presented on a nomination basis to any individual or group of employees who have demonstrated dedication and leadership in Health & Safety. Monthly Safety Leaders are selected based on demonstrated commitment and leadership as seen by supervisors, employees, contractors, and/or the general public. This program profiles the individual(s) and the accomplishment(s) via a monthly employee newsletter.

Oakville Hydro Implements a New Safety System: In 2011, Oakville Hydro committed to implement an Occupational Health and Safety Management System (OHSMS) across its business. This multi-year program not only enhances the safety culture at Oakville Hydro but also establishes a support system to sustain this culture. In collaboration with Springboard Management, Oakville Hydro has tailored a 'best in-class' OHSMS (based on CSA Z1000 principles). In addition, Oakville Hydro developed and rolled out a comprehensive communications plan, named 'Stayin' Alive' Safety Program, across the corporation. The program recently won the Pinnacle Award from the Canadian Public Relations Society.

TransCanada Develops a Contractor Safety Management Program (CSMP): CSMP was developed to prevent and mitigate occupational health and safety risks associated with the use of contracted services on

New employees, identified by green hard hats, are mentored in safety practices by experienced personnel in white hard hats.

TransCanada projects, facilities, and worksites. It contributes to TransCanada's on-going due diligence efforts and ensures compliance with applicable safety legislation, regulations, and codes. The overall objectives of this program are: to define the roles and responsibilities of the company and prime/general contractors' management; to define the minimum contractor safety objectives to be met at each phase of the project management process; and, to describe a proactive and planned strategy to manage contractor safety to ensure continuous improvement in safety performance for all contracted services.

PRINCIPLE 5: Workplace

Support a fair, respectful and diverse workplace for employees and contractors

Attracting and retaining a diverse workforce reflective of the communities in which they operate is a priority for CEA member companies. Member companies strive to have an inclusive workplace where all employees are treated with respect, and without discrimination, harassment or violence. Among the largest employers in Canada, utilities are committed to complying with all federal/provincial/ territorial employment laws and regulations, and are actively working to reach the goal of having a representative workforce. In 2011, 97 percent of members indicated that they have anti-discrimination and anti-harassment programs, and all companies had internal venues to report such incidents. However, there are areas for continual improvement, notably, representation of female and minority groups in company management and governance bodies. Currently, only about one quarter of senior executives are female, and many companies do not track minority group representation at the management level.

Employee wellness is also a priority. Nearly all CEA member companies have employee wellness initiatives, including: on-site fitness facilities or fitness re-imbursement programs to maintain physical and mental well being; family assistance programs to provide counselling and referral services; illness prevention and knowledge awareness programs (on-site flu shot clinics, blood pressure and cholesterol screening, smoking cessation); flexible work hours; and community volunteerism. ***Table 5*** provides an overview of performance in these areas.

TABLE 5: EMPLOYEE WELLNESS INITIATIVES

	2011	2010
Employee wellness subsidies/ investments	100 percent	97 percent
Reimbursements for fitness facilities/ programs	77 percent	72 percent
Employee illness prevention and knowledge awareness programs (e.g. onsite flu shot clinics, cholesterol screening, smoking cessation)	97 percent	93 percent
Employee newsletter or intranet site communication	100 percent	100 percent
Confidential family assistance programs (e.g. counseling services)	100 percent	100 percent
Support for employee volunteer initiatives	97 percent	93 percent
Flexible working hours	93 percent	93 percent

In addition to employee wellness, employee professional development through apprenticeship programs, workshops, online learning, and other opportunities remains important. In 2011, CEA members spent an average of just over 200 hours on trade/technical/safety related training for field employees. Some of the training programs included safety training, customer service training, project management, power engineer apprentice, and certified maintenance personnel apprentice.

While retaining existing skilled workers will always remain an important consideration, continuously strengthening the electricity workforce capacity through recruitment of new skilled employees will be crucial as the sector continues to evolve and transition to new ways of producing and delivering electricity. The trend toward greater integration of renewable generation, conservation, and smart grid applications will place more emphasis on the measurement, communications, and information technologies – and require more adaptable and highly-skilled employees. Transitioning effectively to this new workforce will require a combination of knowledge retention, training, development programs, succession planning, and focused employee recruitment/retention programs. Given this growing challenge, CEA member companies are working diligently to support skills training of existing and new employees (through initiatives such as tuition re-imbursement programs), and to raise awareness about electricity-related career choices to attract students, foreign-trained workers, and non-traditional communities to jobs in the industry.

Attracting Skilled Workers to the Electricity Sector

CEA member companies are committed to attracting and retaining the human assets necessary to enable the transformation of the physical assets of the electricity system in Canada. The electricity industry is entering a period of transformation that will bring about the necessary expansion, refurbishment, and modernization of Canada's electricity system. This transformation will expand the human resource needs of the industry. According to the Electricity Sector Council's 2011 Labour Market Information Study, baby boomers comprise 36 percent of the existing electricity sector workforce, and over 18,000 of these individuals are expected to retire by 2016. In addition to the need for replacement workers for pending retirements, new human capital is required to support transformation of the system. In total, the study reports that employers in the electricity sector will have to recruit *over 45,000 new workers – almost 48 percent of the current workforce* – by 2016.

CEA member companies have established plans and programs to help manage pending workforce shortages and recruitment challenges. Strategic partnerships have been formed with educational institutions to develop course curricula, provide internships, and expand training and certification programs that will help fill the skills pipeline. Efforts are underway to increase awareness about electricity-related career choices, and to attract underrepresented segments of the population plus foreign trained workers to the electricity workforce. Faced with competition for these resources from other sectors of the Canadian economy, electricity industry human resource professionals are working individually and collectively through CEA's Human Resource Committee to shape the future of their companies through innovative people strategies.

Investing in Employee Diversity and Well Being

Hydro One Provides Employee Support Through the Care Management Program (CMP): Through the CMP, Hydro One provides support to employees absent from work for greater than five days due to a medical condition or disease via a third party provider. The purpose of this program is to build on "best practice disability management" that ensures that, regardless of the origin of the injury or disease, employees receive the right care at the right time for the best possible outcome. Internal expert resources are utilized within Hydro One to support all parties throughout the process. Aggregate data collected from this program is utilized to determine health and wellness requirements and to develop future programs for employees.

Hydro Ottawa Supports New Immigrant Workers: In 2011, Hydro Ottawa financially supported the Ottawa Community Immigrant Services Organization (OCISO), a non-profit organization that assists immigrants and refugees with settlement and integration. Hydro Ottawa is a member of Hire Immigrants Ottawa Public Sector Working Group, which works to ensure skilled immigrants are able to contribute fully to the future of Ottawa. Ongoing diversity and inclusion training is being provided to Hydro Ottawa employees to build a strong workforce. Hydro Ottawa's recruitment strategy targets skilled immigrants with the commitment of posting employment opportunities on the Ottawa Job Match careers board, which focuses on helping employers access internationally qualified candidates as well as providing post-hiring support for managers and employees.

TransCanada employees at the Head Office, Calgary, Alberta.

Finance employees at Ontario Power Generation.

Manitoba Hydro Introduces Project SEARCH: In 2011, Manitoba Hydro introduced new programming for people with disabilities. Project SEARCH is a unique transition program for high school students with an intellectual disability. It is unique in that students are fully embedded in business operations for the duration of their last year of high school, providing a workforce alternative before they formally graduate. Students start and end their day in a classroom (located at Manitoba Hydro) where they learn employability skills. Between class time, students learn job skills while participating in a variety of work experience rotations. Individualized work experience placement occurs based on each student's experiences, strengths and skills. Students are given support with accommodations, adaptations and on-the-job coaching provided by the program. The program is targeted for students whose main goal is employment. Students graduate high school at the conclusion of the 10-month program.

Nalcor Energy – Newfoundland and Labrador Hydro Formalizes its Commitment to Diversity: In 2011, Nalcor Energy formally established a company-wide Diversity Council with a key advisory role, reviewed key external designated groups/associations for potential future partnerships, created a framework for a multi-year training and awareness campaign, and identified a joint proposal with industry partners to gain funding in order to enhance industry awareness in the education system. The company will continue to implement its diversity action plan in 2012 and beyond with emphasis on training and awareness. It will also conduct a review of policies and facilities to identify unintended impediments and continue monitoring strategy improvement opportunities.

PRINCIPLE 6: COMMUNICATION AND ENGAGEMENT

Communicate with and engage our stakeholders in a transparent and timely manner

Meaningful and timely engagement of stakeholders is a growing priority for CEA member companies. Member companies regularly interact with Aboriginal Peoples, land owners, suppliers, and other stakeholders on a variety of electricity specific issues including new infrastructure development, environmental impact management, energy conservation, and public electrical safety. Companies use various means to communicate with and engage stakeholders, including face-to-face town hall meetings, classroom presentations, traditional and social media, company annual reports, and partnerships with local community organizations.

An effective engagement strategy is especially important when planning and developing new electricity projects. Meaningful engagement provides CEA members an opportunity to share information about the proposed projects, including potential environmental, social and economic impacts. These discussions regularly contribute to better outcomes as communities work in partnership with companies to ensure projects are carried out with minimal adverse impacts. CEA member companies are increasingly using consultation and public engagement to acquire invaluable local community knowledge to help them manage project impacts, risks, and challenges. As ***Table 6*** illustrates, CEA member companies are increasingly developing processes for identifying stakeholder concerns and ensuring there are policies in place to engage stakeholders in local communities.

TABLE 6: STAKEHOLDER ENGAGEMENT INITIATIVES

	2011	2010
Companies with a formal stakeholder engagement policy or documented process	77 percent	66 percent
Companies with a process for identifying stakeholder concerns and opportunities	93 percent	70 percent
Companies that have a permanent stakeholder advisory committee or group	57 percent	55 percent
Companies with a process in place to ensure continual improvement of stakeholder engagement	70 percent	52 percent

Partnering with Communities and Stakeholders

ATCO Power Establishes the Sheerness Community Environmental Advisory Committee (SCEAC): The Advisory Committee was established at ATCO Power's Sheerness facility to engage nearby residents and other interested community members. The SCEAC acts as a sounding board for new plans and has been instrumental in ensuring the Sheerness facility continues to operate with community concerns in mind. This allows ATCO Power to better understand current issues of importance to the community, to communicate changes in operations to community members, and to receive feedback.

Horizon Utilities Commits to ISO 26000 Standard on Social Responsibility: In 2011, Horizon Utilities became one of the first Canadian local distribution companies to adopt the International Organization for Standardization's guidelines on Social Responsibility (IS0 26000). The standard outlines specific core subjects, issues, and expectations concerning human rights, labour practices, environment, and community involvement. Following a review of policies and practices to ensure conformance with the standard, Horizon has made a formal commitment to implement the standard throughout the organization.

Toronto Hydro Starts Conversations on Energy Conservation at Community Events: As part of its customer education strategy, Toronto Hydro attended 57 community events in 2011 to spread the word about energy conservation. Providing a platform for open dialogue, Toronto Hydro staff talked about conservation and demand management programs, offered energy saving tips, and answered questions about electricity consumption and hydro bills. In addition, Toronto Hydro street teams interacted with more than 45,000 people in 2011, distributing over 26,000 coupon booklets and generating more than 370 peaksaver energy conservation sign-ups.

PRINCIPLE 7: ABORIGINAL RELATIONS

Communicate with and engage Aboriginal Peoples in a manner that respects culture and traditions

CEA member companies value partnerships with Aboriginal Peoples and are committed to engagement based on established rights, trust, and respect. While the level of Aboriginal engagement varies across the country, many CEA members are working collaboratively with Aboriginal Peoples to achieve better environmental, social, and economic outcomes.

Open communications, information exchange, partnership, and collaboration are essential elements of company interactions with Aboriginal Peoples. These efforts, particularly during project planning and development, have allowed companies to foster positive working relationships with Aboriginal Peoples that result in mutual benefits and innovative solutions. Some of the partnership arrangements developed over the past five years have included joint ventures, workforce development through education and skills training, community development, sustainable Aboriginal procurement strategies, environmental stewardship, and use of traditional knowledge in project planning and construction. These initiatives have led to significant benefits for both companies and local Aboriginal Peoples and communities. As companies across the country undertake major capital projects to renew and modernize their infrastructure, potential economic opportunities for Aboriginal Peoples will be significant.

As ***Table 7*** illustrates, CEA member companies are continuing to work closely with Aboriginal Peoples. A growing number of companies now have senior Aboriginal relations positions and are including Aboriginal Peoples in project planning and development, employment, and business partnerships.

TABLE 7: ABORIGINAL RELATIONS

	2011	2010
Companies with an Aboriginal relations group or senior Aboriginal advisory positions	74 percent	69 percent
Companies with procedures for requiring early consultation or engagement with Aboriginal communities during project planning and development	96 percent	96 percent
Companies with business partnerships with Aboriginal communities	100 percent	100 percent
Company with procedures or practices to ensure training & employment opportunities for Aboriginal Peoples	87 percent	83 percent

The above figures are based on 77 percent of companies that indicated Aboriginal Relations to be a relevant issue for company activities.

Construction of Capital Power's Quality Wind Project in collaboration with Aboriginal businesses.

Engaging Aboriginal Communities in Meaningful Partnerships

Brookfield Renewable Energy Group Establishes a Partnership with 'Namgis First Nation: Brookfield and 'Namgis First Nation established Kwagis Power LP to develop a 45 MW run-of-river hydroelectric project on the Kokish River on northeast Vancouver Island. All 'Namgis First Nation ventures are governed by principles of respect for culture, land, aquatic resources, and sound management. The project will generate clean, renewable energy, diversify the local economy, and strengthen the 'Namgis First Nation on whose traditional territory the project is being developed. Construction began in spring 2012 with commercial operation anticipated by mid-2014.

Capital Power Partners with First Nations Businesses for Quality Wind Project: In 2011, Capital Power undertook extensive discussions with several Aboriginal groups regarding construction of the 142 MW Quality Wind Project located near Tumbler Ridge in northeastern British Columbia. Capital Power used an inclusive procurement process to award six contracts to Aboriginal companies, which provided almost 50 percent of the labour during the first year of construction. Among the companies engaged were Duz Cho Construction, owned by the McLeod Lake Indian Band, and Dunne-za Ventures, owned by the West Moberly First Nations. Both companies have extensive knowledge of local geotechnical and surface conditions. This led to a significant improvement in road design and erosion and sediment control methodologies.

FortisBC Supports Aboriginal Skills Training: In 2011, FortisBC developed a customer service training program with the Prince George Nechako Aboriginal Employment and Training Association and Essential Skills for Aboriginal Futures. More than half of the 20 graduates, who faced substantial barriers to employment, are working at FortisBC. FortisBC is also participating in the Aboriginal Business Lead Exchange program sponsored by the Industry Council for Aboriginal Business. This mentorship program pairs young professionals and industry leaders with Aboriginal communities. Both Aboriginal and non-Aboriginal participants learn about each other's workplace, as well as social and cultural environments.

Hydro One Supports Opportunities for Young Aboriginals: Recognizing the potential of the youngest and fastest growing sector of the population in Ontario, Hydro One has launched a number of initiatives that offer opportunities and support to First Nations and Métis youth in the province. These include a Stay-In-School initiative piloted in partnership with the Sioux Lookout Area Management Board; the launch of the inaugural First Nations, Métis, and Inuit scholarship and Summer Internship Initiative; and an annual scholarship award for an Aboriginal Masters student studying Public Policy and Administration at Ryerson University. Hydro One also runs an annual Summer Student Outreach Program where 10 percent of summer positions are designated for Aboriginal students.

Ontario Power Generation (OPG) Works to Build Capacity in Aboriginal Communities: OPG is working with Aboriginal Peoples in many Ontario communities to build capacity and ensure that potential First Nation and Métis employees, including those working on OPG projects, attain the appropriate skill sets and competencies to enter into meaningful partnerships and employment. Capacity building is included in every OPG project involving an Aboriginal partner. In certain cases, this may include training to allow an Aboriginal worker to obtain High School equivalencies or participate in apprenticeship programs. OPG projects, including Lac Seul, Lower Mattagami, Mattagami Lake Dam, New Post Creek and Little Jackfish, all have capacity building components for Aboriginal Peoples.

CASE STUDY: SOCIAL

MANITOBA HYDRO WUSKWATIM PROJECT PARTNERSHIP: SOCIAL-ECONOMIC CONTRIBUTION

Aerial view from upstream of the spillway, powerhouse and completed main dam. Crews on site will flood less than 0.5 square kilometers of land and bring the water level to the final elevation.

Socio-economic monitoring continued to yield information regarding the impacts of the Wuskwatim hydro-electric project on the economy, including direct and induced employment and business opportunities. Wuskwatim is a 200 MW generating station under construction on the Burntwood River, 45 km southwest of Thompson in Nisichawayasihk Cree Nation (NCN) traditional territory, downstream of Wuskwatim Lake at Taskinigup Falls. Wuskwatim, the first new hydroelectric facility to be built in Manitoba since the completion of Limestone in the early 1990s, will produce clean, renewable hydroelectric power to help meet Manitoba's future domestic needs and provide energy to export customers. The planning and development of the Wuskwatim Generation Station exemplifies Manitoba Hydro's ongoing commitment to sustainability and First Nations engagement. It is a multi-faceted project that incorporates responsible actions to address environmental, social and economic issues. The generating station is being developed by the Wuskwatim Power Limited Partnership (WPLP), an entity involving NCN and Manitoba Hydro.

Both partners have played essential roles in the planning and construction of Wuskwatim. Manitoba Hydro's vision was to construct a new generating station in an environmentally sensitive, economically viable, and socially conscientious manner. NCN approached the project with the objective of maintaining traditional use of the land while providing the community with the economic benefits of being a partner in the development and operation of a hydroelectric generating station.

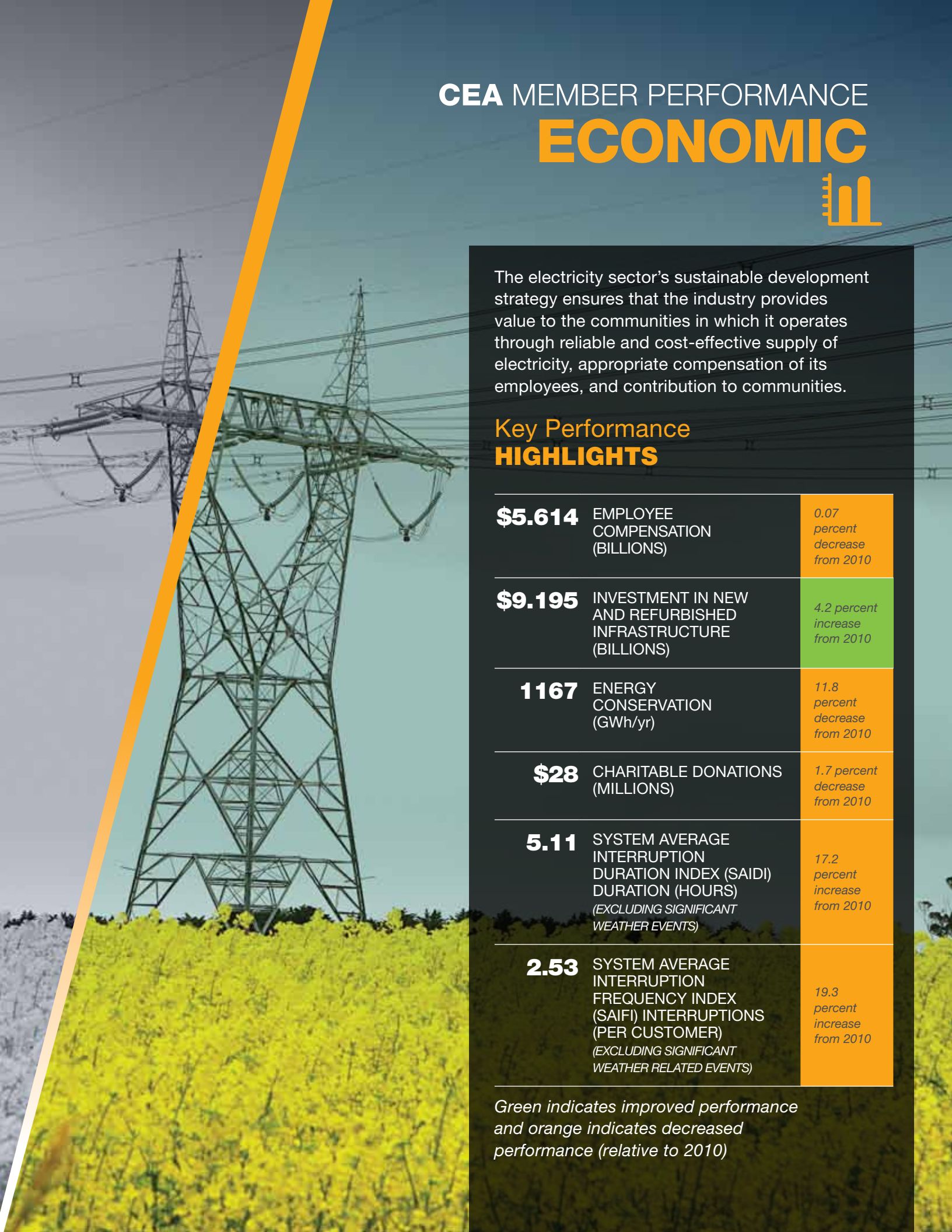
Manitoba Hydro is managing construction of the project on behalf of WPLP and will be responsible for the operation and maintenance of the generating station. Manitoba Hydro and NCN jointly developed Wuskwatim as a low head, 200MW "run-of-river" station rather than capturing the full 350 MW potential at the site in order to minimize local environmental impacts. As a result, the construction of Wuskwatim will cause less than one-half of one km^2 of flooding. The $1.3 billion generation project is scheduled for completion in 2012. By the end of 2010/11 fiscal year, about 80 per cent of the concrete had been placed with most structures now complete. As in past years, 2010/11 monitoring activities were performed in accordance with prescribed legislation, permits and authorizations, as well as the Wuskwatim Project Development Agreement signed between Manitoba Hydro and NCN.

After five years of construction activities, socio-economic monitoring continued to provide information on impacts resulting from the project. The project continues to contribute significantly to Manitoba's economy in terms of employment, labour income and tax revenues. From the start of construction until the end of March 2011, WPLP has purchased almost $144 million in goods and services from Northern Manitoba Aboriginal businesses, including $136 million and $2.8 million from NCN and Thompson based businesses respectively, of which $20.5 million was spent in the 2010/11 fiscal year.

A second survey of indirect and induced impacts was undertaken with the assistance of Aski'Otutoskeo Ltd., NCN's monitoring company, with the support of NCN's Implementation Office staff. Businesses in Thompson and Nelson House were surveyed and it was found that the intensive construction activity undertaken in 2010/11 resulted in project employment peaking at just over 1,050 workers– slightly lower than the previous year peak. Aboriginal workers continue to be a significant part of the workforce, comprising 39 percent of all hires from construction start to March 2011.

Numerous measures are in also place at Wuskwatim to support the retention of northern and Aboriginal employees at the job site and to ensure that sensitivity and respect for local culture is demonstrated throughout construction of the project. Activities include on-site cultural awareness training for employees, voluntary counseling services, and cultural ceremonies held at key construction milestones. For example, to commemorate the flow of the Burntwood River through the Wuskwatim structure in August 2010, a special river closing ceremony was held. Organized by the cultural coordinator for the project, the ceremony acknowledged NCN's respect for the land and water and Manitoba Hydro's commitment to develop projects in cooperation and consultation with local people by incorporating Aboriginal aspects and considerations.The event was attended by NCN Elders, Chief, and Council members plus Manitoba Hydro representatives and featured a pipe ceremony, sweat lodge and spiritual offerings at the river's edge.

Photo Source: Mark Kosamovic KYP Website.



CEA MEMBER PERFORMANCE
ECONOMIC

The electricity sector's sustainable development strategy ensures that the industry provides value to the communities in which it operates through reliable and cost-effective supply of electricity, appropriate compensation of its employees, and contribution to communities.

Key Performance **HIGHLIGHTS**

$5.614	EMPLOYEE COMPENSATION (BILLIONS)	*0.07 percent decrease from 2010*
$9.195	INVESTMENT IN NEW AND REFURBISHED INFRASTRUCTURE (BILLIONS)	*4.2 percent increase from 2010*
1167	ENERGY CONSERVATION (GWh/yr)	*11.8 percent decrease from 2010*
$28	CHARITABLE DONATIONS (MILLIONS)	*1.7 percent decrease from 2010*
5.11	SYSTEM AVERAGE INTERRUPTION DURATION INDEX (SAIDI) DURATION (HOURS) *(EXCLUDING SIGNIFICANT WEATHER EVENTS)*	*17.2 percent increase from 2010*
2.53	SYSTEM AVERAGE INTERRUPTION FREQUENCY INDEX (SAIFI) INTERRUPTIONS (PER CUSTOMER) *(EXCLUDING SIGNIFICANT WEATHER RELATED EVENTS)*	*19.3 percent increase from 2010*

Green indicates improved performance and orange indicates decreased performance (relative to 2010)

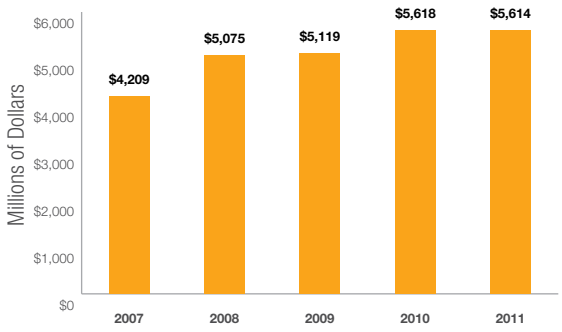
PRINCIPLE 8: Economic Value

Provide economic benefits to shareholders, communities and regions in which the industry operates

The electricity sector is a significant contributor to the economic growth of Canada and the well being of Canadians. CEA members will continue to invest in providing this vital service, but appropriate conditions for infrastructure investment and community support will be imperative in the future. While these investments may increase the price of electricity for consumers, they will also provide a solid foundation for providing reliable and sustainable electricity that is essential to the economic growth of our communities. As CEA members work toward delivering on this key mandate, they also contribute to the local economies in many other ways, including employee compensation, payments to investors and governments, donations to local charities, and other long-term community investments.

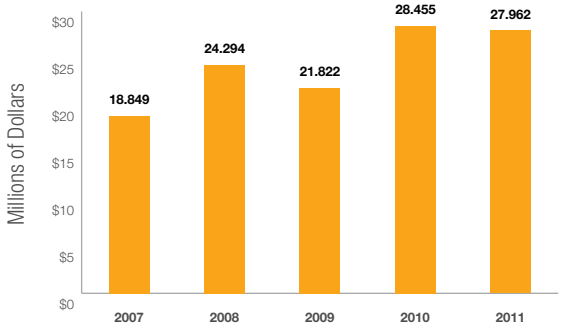
In 2011, total employee compensation at CEA member companies remained on par with 2010 levels, totaling $5.6 billion ***(Figure 9)***. Appropriate compensation provides a substantial transfer of wealth back to the communities in which member companies operate through employee purchases of goods and services. CEA member companies also contributed approximately $28 million to registered charities across the country (three percent of annual profit) in 2011 ***(Figure 10)***. These contributions were provided to the United Way, environmental initiatives and organizations, arts and culture, safety and injury prevention programs, youth initiatives, local hospitals, and to other local community activities. In addition, many companies went beyond direct monetary donations by encouraging their employees to engage in outside volunteer activities during work hours.

FIGURE 9 Annual Employee Compensation



Note: Total compensation includes T4s and T4As

FIGURE 10 Annual Charitable Donations



Shepard Energy Centre construction site. View of Downtown Calgary.

TransAlta's Horseshoe hydro facility located near Exshaw, Alberta.

Making a Difference in the Communities

BC Hydro Supports Community Organiazations and Charities: In fiscal year 2011, BC Hydro supported community-based organizations and registered charities with $1 million in donations and $1.5 million in sponsorships including $135,000 awarded through scholarships and endowments to B.C. students. BC Hydro also continues to support the BC Hydro Employees Community Services (HYDRECS) Fund, an employee- and retiree-managed fund that supports Canadian charities in the health and social services sector, and the BC Hydro Power Pioneers Association, a group of over 5,000 BC Hydro retirees.

Ontario Power Generation (OPG)'s Corporate Citizenship Program (CCP): In 2011, OPG's CCP supported over 1,200 small grassroots charitable and not-for-profit initiatives, including student awards across host communities. This included 118 grassroots environmental initiatives, 171 educational partnerships, 826 community partnerships, and 89 Aboriginal-related initiatives. The CCP supports community partnerships in the areas of environment, education, and community. Innovative initiatives that are consistent with the company's principles are considered.

SaskPower Invests in Community Events and Activities: Based on strategic priorities and values, SaskPower provides approximately $1.5 million in annual monetary support to non-profit organizations across the province. These contributions fund and support hundreds of provincial events, activities, and initiatives in the areas of community involvement, education, diversity, and the environment.

BC Hydro outreach representative speaks to children at the safety booth at the community open house in Campbell River in September 2011.

Toronto Hydro employees at a community event.

PRINCIPLE 9: ENERGY EFFICIENCY

Produce, deliver and use electricity in an efficient manner while promoting conservation and demand-side management

CEA member companies understand the importance of energy conservation and are committed to doing their part. According to surveys conducted by the CEA Customer Council, Canadian distribution utilities have invested nearly $3 billion in energy conservation programs in the last two decades – saving enough electricity to power Canada's 683 hospitals for two years. This investment in conservation is also equal to reducing GHG emissions by 5.6 Mt of CO_2 eq across Canada – the equivalent to taking 1 million vehicles off the road. CEA member utilities remain the best source of energy conservation programming for residential, industrial, and commercial customers compared to government, retail, and other sectors of the economy. However, barriers to new investments in conservation remain, including regulatory support and funding for new program delivery to end-users of electricity. These barriers must be overcome in the years ahead; as these investments can also moderate the short-to-medium term capital required for new infrastructure development and can help develop a culture of conservation.

Canadian electric utilities engage in and promote energy efficiency because it is good for customers, good for the environment and good for businesses. In addition to contributing to the bottom line of household budgets, cost-effective energy efficiency increases the competitiveness of business and industry by reducing energy overhead and input costs. Canada's electric utilities are on the frontlines of helping businesses reduce their electricity costs through a variety of programs tailored to meet the needs of the full business spectrum – from small corner stores to large industrial operations.

Canadian electric utilities have long been leaders in delivering energy efficiency and have pioneered the introduction of energy saving products and programs. In 2011, energy saved through external conservation programs totaled 1167 GWh. In addition, CEA members continued to make progress on internal energy efficiency through investments in their own facilities and buildings. Some of the programs include specifying energy efficiency of new buildings, retrofitting existing buildings, procuring energy efficient equipment (such as computers), and upgrading the efficiency of turbine runners and transformers. In the future, it will be essential for utilities and stakeholders to develop innovative ways to design energy conservation programs, control costs, enhance energy literacy, and work collaboratively with relevant parties.

Created to reduce energy consumed by old, inefficient, and often empty refrigerators and freezers, Manitoba Hydro's Refrigerator Retirement Program aims to remove 38,000 units from Manitoba Homes over the next 2.5 years.

The CEA Customer Council fosters collective action on issues of strategic importance to utilities and customers, with a focus on the delivery of value to electricity customers. Collectively, the Council focuses its attention on gaining greater insight and understanding about what matters to customers and responding to their changing needs. Through its focus on delivering greater value to customers, the Council supports both the CEA and its current discussions around the value of electricity to Canadians. In addition, through policy and program initiatives and advocacy to the federal government, the Council promotes the efficient use of electricity nationwide.

As a forum for strategic discussions on issues that can influence and define customer expectations and utility service delivery capabilities, the Council regularly engages thought-leaders and experts from other industries. Through the annual CEA Public Attitudes survey, the Council gauges public opinion on a national basis about customer satisfaction, customer priorities, and issues and actions relating to energy efficiency. Outside of formal meetings, the Council also supports the sharing of best practices relating to customer service operational issues, energy efficiency, plus experiences and new developments relating to customer service technologies, operations and practices.

Michael Mulcahy, Chair, CEA Customer Council
Executive Vice-President, FortisBC

Creating a Culture of Energy Conservation

Manitoba Hydro Launches the Power Smart Refrigerator Retirement Program: In 2011, Manitoba Hydro launched the Power Smart Refrigerator Retirement Program. Since the launch of the Program, over 9000 refrigerators and freezers had been collected, resulting in electricity savings of approximately 15 GWh. Manitoba Hydro pays an incentive of $40 for working refrigerators or freezers that are 15 years or older, and includes free in-home pick up. The program aims to remove 38,000 units from Manitoba homes over approximately 2.5 years. This will reduce energy consumption by approximately 30 GWh. It is expected that proper decommissioning and recycling of appliances will also result in preventing over 3,700 tonnes of metal, plastic, and glass from ending up in landfills.

Northwest Territories Power Corporation (NTPC) Focuses on Conservation: Helping customers understand their electricity bill, how they use energy, and how they can reduce their usage were key areas of focus in 2011. The NTPC continued its power monitor-lending program, which responds to customers in thermal generation communities by installing monitors to help them identify electricity usage patterns. This program, along with useful energy conservation tips, has helped customers manage their energy use.

SaskPower Introduces A Refrigerator Recycling Program: In 2011, SaskPower developed a province-wide program to encourage customers to save energy and money by recycling their old inefficient refrigerators and freezers. SaskPower offered free collection, free recycling, and a $50 incentive to motivate customers to permanently decommission their inefficient appliances. In four months, SaskPower collected 6,458 appliances, resulting in over 8 million kilowatt-hours (KWh) of electricity savings and 1 MW of demand reduction. A total of 2,017 kg of Ozone Depleting Substances (ODS) from CFC insulation foam and CFC refrigerants were permanently retired. The total reduction of GHGs from retiring these ODS accounted for 14,010 tonnes of CO_2 equivalent.

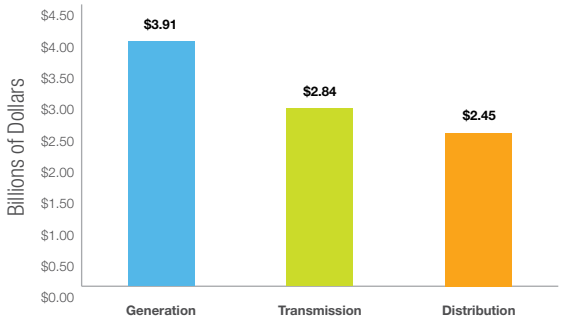
PRINCIPLE 10: SECURITY OF SUPPLY

Provide electricity to customers in a safe, reliable and cost-effective manner to meet current and future needs

Ensuring a sustainable electricity system to meet current and future electricity supply needs is a major pre-occupation of CEA member companies. Utilities must constantly plan in order to ensure there is a reliable electricity system in place to meet the daily demands of customers. This includes maintaining and refurbishing existing assets and investing in new infrastructure. In 2011, CEA members invested approximately $3.9 billion in generation, $2.8 billion in transmission, and $2.4 billion in distribution equipment, for a total investment of approximately $9.2 billion – a 4.2 percent increase from 2010 ***(Figure 11)***. While this is still lower than the investment required to meet the Conference Board of Canada's forecast annual requirement for infrastructure renewal, there are still many major projects under construction or awaiting regulatory approval. CEA members require government and stakeholder support of these investment efforts to ensure a reliable electricity system for generations ahead.

CEA members are working to maintain security and reliability of supply. For example, ENMAX Corporation in Calgary continued with its two-year initiative on downtown cable replacement – a $66 million project to replace four 138 kV underground transmission cables in downtown Calgary. Replacement of the 30-year-old cables is necessary to maintain electrical reliability and accommodate demand growth in the city's core. The contrast in electricity consumption between a square kilometre of downtown Calgary and that of a square kilometre of residential area is significant – in fact, almost one quarter of the city's entire electrical load is concen¬trated in the downtown core. These types of investments to replace existing infrastructure are urgently needed and the electricity sector wants to work with governments, regulators, and communities to ensure investments take place in a timely manner to maintain reliability.

FIGURE 11 2011 Investments in New and Refurbished Infrastructure ($ Billions)



ENMAX Corporation's Calgary Downtown Cable Replacement Project.

Ensuring A Secure Supply of Electricity to Canadians

BC Hydro's Interior to Lower Mainland Transmission (ILM) Project: The ILM Project will expand the capacity of BC Hydro's transmission system to bring clean energy from the north and south to the Lower Mainland and Vancouver Island. The ILM Project, which is the largest expansion to BC's transmission system in the last 30 years, includes a new 500 kV transmission line that extends 250 km between the Nicola substation near Merritt and the Meridian substation in Coquitlam. At an estimated cost of $709 million, the ILM Project is planned to be in service by January 2015. During its three years of construction, the ILM Project is expected to create economic opportunities for local vendors and suppliers and generate about 450 person-years of employment.

Columbia Power Corporation Expands Waneta Hydroelectric Plant: The Waneta Expansion will see the addition of a second powerhouse downstream of the Waneta Dam on the Pend d'Oreille River. The expansion will share the existing dam's hydraulic head and generate power from flow that would otherwise be spilled. The design has been permitted for two Francis turbine units to produce up to a combined maximum capacity of 335 MW. Output from the units will be stepped-up to 230 kV at the powerhouse and delivered to BC Hydro's Selkirk Substation through a new 10 kilometre transmission line.

Newfoundland Power Invests in Rattling Brook Hydroelectric Development: Newfoundland Power's Rattling Brook Hydroelectric Development produces approximately 78 GWh of energy. In 2011, the company replaced the 105-meter long timber stoplog spillway with a modern concrete Piano Key Spillway – a first for a utility in North America. The old spillway was operated by individually removing timber stoplogs, often during very poor weather conditions. The new spillway requires no operator interaction and has thereby increased employee safety and the safety of surrounding embankment dams. It has eliminated inefficiency associated with the old spillway and production at Rattling Brook is expected to increase by 1.24 GWh. The timber used in the old spillway was treated with creosote and has been disposed of in an environmentally sound manner at the nearby waste management facility.

Nova Scotia Power Begins Construction of a Biomass Cogeneration Facility: In 2011, Nova Scotia Power began construction of a biomass co-generating station and associated facilities with an anticipated nominal generating capacity of 60 MW on the site of the NewPage Port Hawkesbury (NPPH) mill. The facility will be fueled by biomass and it will contribute toward compliance of the Nova Scotia Renewable Energy Standards (RES) and is expected to supply approximately 3 percent of Nova Scotia's electricity needs. Completion of the facility I slated for 2013-2014.

New Rattling Brook Piano Key Spillway.

Steam turbine and the generator at the biomass cogeneration unit at NewPage Port Hawkesbury (NPPH) mill.

TransCanada Continues Construction of the Cartier Wind Project: In 2011, TransCanada continued construction of the five-stage 590 MW Cartier Wind Energy project in Québec. The Montagne-Sèche project and phase one of the Gros-Morne wind farm became operational in 2011. The final phase, Gros-Morne phase two is expected to be operational in December 2012. These are the fourth and fifth Québec-based wind farms of Cartier Wind Energy, which are 62 percent owned by TransCanada.

Yukon Energy Adds More Hydro Capacity to Displace Diesel: Yukon Energy commissioned the Aishihik third turbine, a 7 MW hydro generator for the existing Aishihik hydro plant, which until recently was limited to two 15 MW hydro turbines. The new generator will displace diesel that might otherwise be needed during peak times of the day. The Aishihik third turbine project is expected to save Yukon Energy $1.2 million or more per year in diesel costs and reduce GHG emissions by an estimated 3,800 tonnes annually.

SMART GRID IMPLEMENTATION

Utilities across the country are taking action to automate the electrical grid and metering systems which will enable time-of-use pricing for electricity and encourage the consumption of electricity in off-peak hours. The implementation of Smart Meters is enabling customers to actively manage their energy choices, adopt new energy conservation solutions, and benefit from an electricity grid that is modern, safe and reliable. Although there are significant benefits, the installation of Smart Meters has raised concerns among some customers, such as the potential exposure to harmful radio frequencies. However, according to Health Canada, the signals emitted by smart meters are of relatively low power, similar to that of cell phones and wireless internet routers.

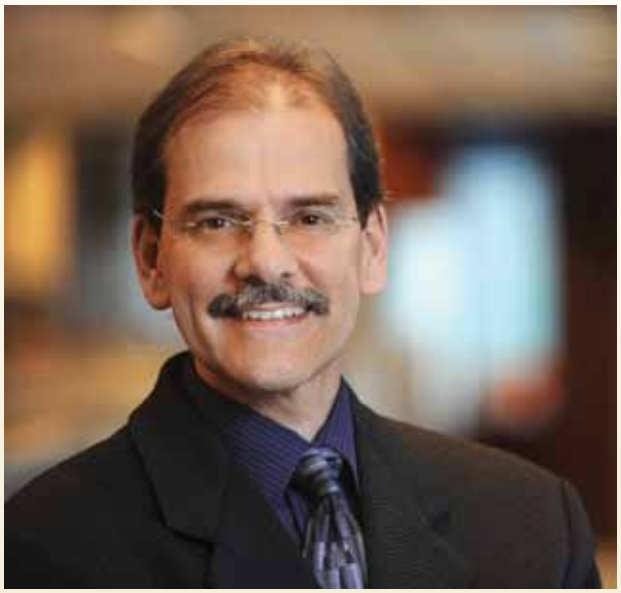
Implementing Smart Meters to Better Serve Our Customers

EPCOR Evaluates AMI Infrastructure Deployment: EPCOR is currently evaluating the acquisition of an Advanced Metering Infrastructure (AMI) solution for implementation over a 3-year period. AMI is considered a cornerstone of EPCOR's technology roadmap and overall future Smart Grid vision. Projected benefits include lower operating costs for meter reading and meter operations, improved customer service through accurate meter data for billing and power quality investigations, improved system planning and reliability, increased safety for employees and residents, and a reduction of EPCOR's environmental footprint.

Hydro One Continues to Implement Smart Meters and Time-of-Use Pricing: Ontario is one of the first jurisdictions in North America to equip every home and small business with a Smart Meter, enabling the widespread introduction of increased price transparency through Time-of-Use (TOU) pricing. Over one million Hydro One customers were transitioned to TOU prices in 2011. Along with the switch to TOU prices, customers can now manage their electricity by accessing their hourly electricity consumption as soon as the day after they use it. As more consumers shift their patterns of consumption to take advantage of lower off-peak prices, a more efficient use of existing grid infrastructure and generation assets can occur.

Saint John Energy Invests in Smart Meters: As of 2011, Saint John Energy had 5,800 installed Smart Meters as part of its AMI system. These meters enable Saint John Energy to remotely read consumption, monitor voltage levels, and report outages back to the operations centre. Future capabilities will include load control and the ability to read water and gas meters. A major benefit of the AMI system is its inherent outage management capabilities, which support quick identification of problems and initiates responses based on an analysis of incoming AMI data. This will help to expedite response to power interruptions and contribute to efficient restoration.

FortisAlberta Power Line Technician Pete Patton installs an automated meter.



The pace of technological change in the electricity distribution industry has increased steadily over the past decade, and distribution planners and operators are constantly looking for solutions that will deliver real value in terms of operational efficiencies, current asset maximization, better reliability, and expanded customer satisfaction. Not every technology developed by the vendor community will be successful and utility operators need a variety of mechanisms to help determine which ones are worth piloting and eventually integrating into their full system. The CEA Distribution Council provides one such mechanism for collaboration among utilities.

The Council has been tracking Smart Grid projects and trends for a number of years. The Council funds the CEA Standards Management Committee's Smart Grid standards work, published a smart grid overview paper in late 2010, and facilitates an ongoing information exchange between industry and government as well as industry and stakeholder groups such as Plug n' Drive Ontario, Smart Grid Canada and the Electric Power Research Institute (EPRI). By sharing information openly, Council members learn from the experiences of their peers and apply that knowledge to their own unique circumstances.

Denis Chartrand,
Chair, Distribution Council
Hydro-Québec Distribution

SERVICE INTERRUPTIONS TO CUSTOMERS

Many factors contribute to service interruptions, including aging infrastructure, contact with trees (vegetation management along rights-of-ways), and damage to power lines and equipment caused by high winds, lightning and other adverse weather events. In 2011, when significant events such as severe weather (hurricanes) were factored in, SAIDI for customers served was 6.16 hours per year, an increase of 19.1 percent over the 2010 levels ***(Figure 12)***. SAIFI, which measures the average number of interruptions per customer, also increased to 2.63 from 2.20 in 2010, an increase of approximately 19.5 percent ***(Figure 13)***. Excluding those significant weather events, SAIDI was 5.11 hours per year and SAIFI was 2.53 interruptions per customer, 17.2 percent and 19.3 percent increases respectively. These rates illustrate the need for unimpeded access to clear vegetation to protect power lines and the urgent need for investment in new and existing infrastructure in order to increase system reliability.

In the immediate term, companies are investing in new technologies such as Geographic Information System (GIS), Automatic Vehicle Locator (AVL) systems, and outage management systems to enhance outage communication and assist with power restoration. In 2011, SaskPower installed AVL's in nearly 755 transmission and distribution trucks to schedule and dispatch work remotely. The AVL allows field workers access to the same information they would have in their office and provides several safety features for field crew.

FIGURE 12 System Average Interruption Duration Index (SAIDI)

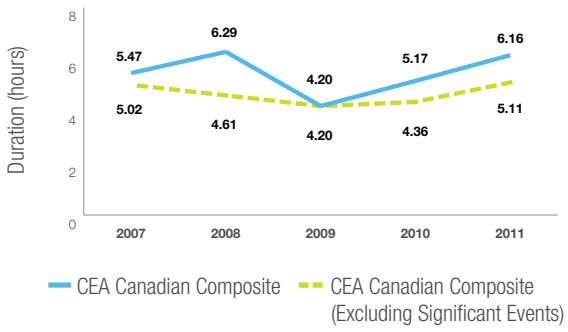
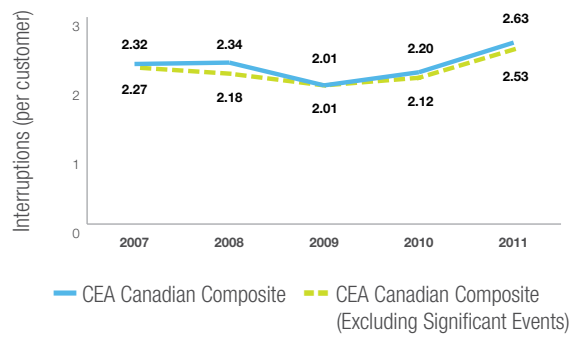


FIGURE 13 System Average Interruption Frequency Index (SAIFI)



Reliability is a critical deliverable of the Canadian electricity system, and grid operators are continuously looking for ways to improve. Following the 2003 east coast blackout, the North American Electric Reliability Corporation (NERC) was given an expanded mandate and a new set of tools to minimize the probability of another widespread, cascading event. The reliability standards developed through this process are based on industry expertise and approved by provincial regulators in Canada and the Federal Energy Regulatory Commission (FERC) in the United States. In an era of aging infrastructure and capital investment requirements that are increasing each year, it is critical that standards are designed to maximize reliability while minimizing cost. Regulators can set expectations for reliability, but it is utility engineering expertise that knows how to achieve results in the most efficient manner.

The CEA Transmission Council, through its Regulatory Development Task Group (RDTG), ensures that this utility leadership is not overlooked by working with all stakeholders, including NERC, FERC and provincial regulators to set achievable expectations for the standards development process, allow regional flexibility and maximize reliability gains at the least cost.

Mike Marsh, Chair, Transmission Council
Vice-President, Transmission & Distribution, SaskPower

EMERGENCY PREPAREDNESS

Ensuring sound operation of the electricity system is critical for the Canadian economy. If physical and information technology facilities, networks, services, and assets are disrupted or destroyed, serious impacts can occur to the health, safety, security, and economic well-being of Canadians. Facilities of CEA members are crucial for supporting other elements of Canada's critical infrastructure. Without electrical power, the functioning of each of the critical infrastructure sectors, including public safety, healthcare and finance, would be significantly compromised.

CEA members are proactively developing and maintaining emergency preparedness plans. Ninety-seven percent of CEA members have pandemic and natural disaster plans, and 86 percent have business continuity plans in place. This is a significant level of commitment from CEA members to ensure the security and supply of electricity to Canadians from coast-to-coast.

OPG has forged strong working relationships with provincial, regional and municipal emergency organizations. Pictured: new City of Pickering firefighters receiving training at OPG's fire training facility located at Wesleyville near Port Hope, Ontario.

ATCO Electric crews replace a power pole damaged by the Slave Lake Wildfires.

Emergency Management of Operations

ATCO Electric Responds to Slave Lake Wildfires: In spring 2011, wildfires in Northern Alberta forced the evacuation of Slave Lake and a number of other communities in the area. A total of 773 power poles were destroyed and another 312 were damaged. In addition, 83 transformers and 72 pedestals were lost, as were numerous streetlights and pieces of specialty equipment serving oilfield customers. Under its Emergency Response Plan, ATCO Electric acted immediately to establish command centers and organize response teams. Within a few hours of the fire entering town, power was restored to the airport, all hotels, and the municipal operating centre. ATCO Electric crews were on the ground in Slave Lake the following day, and service was restored within 10 days – as opposed to the months originally estimated. Health, safety and environment remained the number one priority throughout this emergency. Over the period, roughly 50,000 work hours were completed without a lost-time injury.

Ontario Power Generation Takes an All Hazards Approach to Emergency Management: OPG is working to minimize the occurrence of unexpected events and to be prepared to address them when and if they occur. In 2011, the Emergency Management & Business Continuity (EMBC) and the Enterprise Risk Management (ERM) divisions collaborated on defining what an All Hazards Approach means to OPG. The All Hazards Approach describes an organizational approach to Emergency Management. This approach ensures that hazards and risks are identified, mitigation is implemented, plans and preparations are made, response is invoked if an incident occurs, recovery efforts are made, and post-incident residual impacts are managed. Processes are also in place to learn from relevant events (e.g. the Fukushima nuclear incident in Japan).

CASE STUDY: ECONOMIC
FORTISALBERTA'S STORM HARDENING PROGRAM

A spring storm in southern Alberta causes significant damage to a FortisAlberta power line.

As owner and operator of over 60 percent of Alberta's total electricity distribution network, FortisAlberta's focus continues to be on delivering safe and reliable electricity to almost half a million residential, farming, and business communities. Overall changes in weather have impacted the reliability of FortisAlberta's distribution system, with extreme events often involving unprecedented wind and heavy spring snowstorms that stress critical system components. FortisAlberta's current design model follows a reliability-based design, which determines the most cost-effective solution for providing power to customers without significantly increasing the price to deliver and maintain electricity. 2010 and 2011 proved to be extreme years for winter storms in Alberta, as the southern part of the province was hit with many severe events causing significant outages.

FortisAlberta employs a Geographic Information System (GIS) and planning and mapping software to focus and effectively deliver asset management programs. The use of intelligent mapping software confirmed that many of the areas impacted by these storms involved power lines that met design standards but failed during excessive, abnormal loading conditions on a wide variety and vintage of feeders. Most of these occurrences involved isolated "pockets" of customers who had a history of outages related to extreme weather events. Having the ability to view these localized outages provided reliability improvement solutions that helped to establish FortisAlberta's Storm Hardening program, which is aimed at improving the system's ability to withstand similar events in the future.

Although areas impacted by these extreme events were originally designed to meet code, the company is taking a different approach to evaluation thanks to software that is able to pinpoint sections of power lines with a history of extreme weather events. The application of geographic mapping provides planners with clear visuals of the location, extent, and severity of these localized, storm-prone areas. In some cases, planners are considering new mitigation approaches that include substantially increasing safety factors when rebuilding sections of line plagued with extreme events. Alternatively, these troubled lines may be removed entirely and customers may be fed from another source to improve reliability. Leveraging intelligent mapping data also provides planners with visibility of other outstanding work required on a feeder. This enables bundling of other related work to be performed at the same time, eliminating the need for additional scheduled outages in the future.

The Storm Hardening program at FortisAlberta has introduced efficiencies by eliminating costly emergency work repairing damaged lines, combining other planned work into one project and eliminating outages caused by extreme climate events. Power Line Technicians have been trained to report on the root-cause as opposed to employing a "break-fix" approach to outages caused by extreme weather. Information related to each distribution circuit is regularly updated within FortisAlberta's GIS model, allowing timely and efficient business decisions to be implemented.

LOOKING FORWARD

The Alberta Utilities Commission initiated a proceeding to change the current rate-setting model for gas and electric distribution utilities in Alberta to Performance Based Regulation (PBR). Adopting a PBR model provides a long-term opportunity to reduce the time and costs associated with the current regulatory process. To ensure success within a PBR model, utilities must continually look for efficiencies and productivity improvements. Efficiency gains through the use of technology will be critical in many circumstances.

2012 CEA SUSTAINABLE ELECTRICITY AWARD WINNERS

In May 2012, the Sustainable Electricity program's Public Advisory Panel evaluated awards applications by CEA corporate utility members. CEA would like to congratulate all of this year's award winners.

COMPANY OF THE YEAR:

Ontario Power Generation Inc.

Ontario Power Generation was recognized for its exemplary performance in: Aboriginal engagement; efforts to minimize its environmental footprint; giving back to communities through the Corporate Citizenship Program; promoting health and wellness; achieving zero injuries; and, fiscal responsibility in project financing, such as the Lower Mattagami Project that is currently underway.

COMPANY OF THE YEAR:

Horizon Utilities Corporation

Horizon Utilities Corporation was recognized for its ongoing efforts to become an industry leader on sustainable development. In 2011, Horizon continued on a path to sustainability by: striking an executive level committee to oversee sustainability efforts; earning ISO 14001:2004 certification; committing to ISO 26000 guidelines; and receiving a GRI "A+" application level, assured by Ernst & Young, for the second year in a row.

ENVIRONMENTAL COMMITMENT AWARD:

SaskPower

SaskPower was chosen winner of the Environmental Commitment Award in recognition of the Boundary Dam Integrated Carbon Capture and Storage Demonstration Project. The $1.24 billion public/private partnership will see the full integration of a rebuilt coal-fired generation unit with carbon capture technology into the operation of a commercial power station, resulting in low-emission electricity and carbon dioxide (CO_2) for enhanced oil recovery operations or storage in deep saline aquifers. This leading-edge project will determine the technical, economic, and environmental performance of carbon capture, utilization, and storage (CCUS) technology.

SOCIAL RESPONSIBILITY:

Yukon Energy Corporation

Yukon Energy Corporation was selected as the winner of the Social Responsibility Award for stakeholder engagement for "Let's Talk – Yukon's Energy Future" resource planning charrettes. The resource planning charrettes were held across the territory to engage stakeholders, energy experts, youth, educators, media, and the general public for three days of information sharing, discussion, inspiration, and planning. The output from this process will guide the development of the Yukon Energy's resource plan for the next 20 years.

ECONOMIC EXCELLENCE:

New Brunswick Power Holding Corporation

New Brunswick Power was selected as the winner of the Economic Excellence Award for the "PowerShift Atlantic" initiative. Launched in 2010, PowerShift Atlantic is a collaborative research project led by New Brunswick Power in partnership with Saint John Energy, Maritime Electric, Nova Scotia Power, New Brunswick System Operator, the University of New Brunswick, the Government of New Brunswick, and the Government of Prince Edward Island. This program is piloting technology that shifts energy supply to specific appliances in homes and commercial buildings in order to optimize wind generation.

CEA VERIFIER'S STATEMENT

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March 5, 2012

Re: 2011 Sustainable Electricity Independent Verification Assurance Statement

Sustainable Electricity is a mandatory industry-wide sustainable development program developed and implemented by the electric utility members of the Canadian Electricity Association (CEA). The program seeks out synergies between the three factors of 'sustainability' – environment, social, and economic – enabling the electricity sector to take a holistic approach to managing its activities.

The Independent Verification process is a core element of the Sustainable Electricity program and is conducted by an independent, qualified assessor, in accordance with CEA independent verification protocols. This is to attest that Duerden & Keane Environmental Inc. (D&K) successfully completed on-site independent verification of the following CEA member companies in 2011:

Alta Link, ATCO Electric, ATCO Power, BC Hydro and Power Authority, Columbia Power Corporation, ENMAX Corporation, EPCOR, FortisAlberta, FortisBC, and TransCanada.

In accordance with the verification protocols, D&K Environmental Inc. utilized the following framework to ensure data integrity and conformance with the program requirements.

The Scope of the Verification:

- The degree of adherence to the CEA Policy on Sustainable Development - Corporate Responsibility
- Consistency and accuracy of information provided to CEA on key performance indicators
- Conformance with CEA's requirement for an ISO 14001 consistent Environmental Management System (EMS)

Verification Procedure:

- Interviews with senior company executives on the strategic direction/issues related to sustainable development, as well as their commitment to the principles of the Sustainable Electricity program
- Interviews with select working-level company representatives to verify information provided to CEA
- Document reviews and cross referencing of information for consistency and accuracy (e.g. annual reports, websites, information reported to government agencies)
- Review of data collection procedures
- Testing of calculations performed for specific key performance metrics
- Review of environmental management system elements and procedures, including internal/external audits and minutes from management reviews

Verifier Conclusions:

- High-level of understanding and commitment to the principles of the Sustainable Electricity program by senior company executives and working-level personnel
- A high level of consistency between information provided to CEA and published in other reports

- Some minor deficiencies in reporting, which can be rectified through additional guidance in the next reporting cycle
- Significant conformity with the implementation of the CEA EMS requirement

To ensure all companies conform to the requirements of the Sustainable Electricity program, the same verification approach will be utilized at the following CEA member companies (in the order of scheduled external verifications):

- Capital Power Corporation
- TransAlta Corporation
- Yukon Energy Corporation
- Northwest Territories Power Corporation
- SaskPower
- Saskatoon Light and Power
- Manitoba Hydro
- Ontario Power Generation
- Hydro One Inc.
- Toronto Hydro-Electric System Limited
- Horizon Utilities Corporation
- Oakville Hydro
- Brookfield Renewable Energy Group
- Hydro Ottawa
- Maritime Electric Company Limited
- New Brunswick Power Holding Corporation
- Newfoundland Power
- Nalcor Energy
- Saint John Energy
- Nova Scotia Power Inc.

We would like to thank CEA for the opportunity to perform the verifications in 2011, and we look forward to the next round of verifications in 2012.

For Duerden & Keane Environmental Inc.,

Colin Duerden
B.Sc., Ph.D., EP-EMS(LA), EP-CEA

Sue Keane
B.Sc., M.Eng., EP-EMS(LA), EP-CEA

ELECTRICITY SECTOR
AT A GLANCE

Environment	2007	2008	2009	2010	2011	Percentage Difference 2010–2011
Total Gross Annual SO_2 Emission (tonnes)	486,559	422,112	377,384	326,824	274,017	-16.2
Total Gross Annual NO_x Emission (tonnes)	199,407	185,552	167,907	169,169	143,553	-15.1
Total Gross Annual Mercury Emission (kilograms)	1,967	1,751	1,521	1,501	1,085	-27.7
Total Gross Annual Direct CO_2 eq Emissions from Fossil Generation (tonnes)	107,147,272	98,896,801	88,535,560	89,560,741	74,622,484	-16.7
Number of Priority Spills	107	77	105	107	97	-9.4
Total SF6 Used for Maintenance Purposes (kilograms)	8,328	6,812	5,704	6,475	4,712	-27.2
Total Gross Annual $PM_{2.5}$ Emissions (tonnes)	4,244.92	5,252.71	3,214.83	3,015.36	1,771.15	-41.3
Total Gross Annual PM_{10} Emissions (tonnes)	9,656.70	10,542.17	7,957.16	7,657.99	5,594.27	-27
Companies with an ISO consistent EMS (percent)	N/A	88	89	93	90	-3.2
Society	**2007**	**2008**	**2009**	**2010**	**2011**	**Percentage Difference 2010–2011**
All Injury/Illness Frequency Rate (injuries per 200,000 hours)	3.01	2.88	2.15	2.10	2.02	-3.8
Lost-Time Injury/Illness Frequency Rate (lost time injuries per 200,000 hours)	0.92	0.83	0.78	0.66	0.74	12.1
Lost-Time Injury Severity Rate (calendar days lost per 200,000 hours)	16.13	21.10	15.73	13.71	14.81	8.0
Companies with Public Education Programs (percent)	N/A	96	93	93	90	-3.2
Companies with a Process for Responding to Stakeholders Concerns (percent)	N/A	93	83	90	87	-3.3
Companies with an Aboriginal Relations Group or Senior Aboriginal Advisory Position (percent) (if the company operates in Aboriginal communities)	N/A	N/A	N/A	69.6	73.9	6.3
Companies with Business Relationships or Partnerships with Aboriginal Communities (percent) (if the company operates in Aboriginal communities)	N/A	N/A	N/A	100	100	No change
Economy	**2007**	**2008**	**2009**	**2010**	**2011**	**Percentage Difference 2010–2011**
Total Value of Company Charitable Donations ($millions/year)	18.849	24.294	21.822	28.455	27.962	-1.7
Energy Saved Through Conservation (MWh)	N/A	689, 837	1,177,908	1,322,887	1,167,053	-11.8
Total Capital Expenditure on New/Refurbished Generation Infrastructure ($billions/year)	2.42	3.10	3.95	3.95	3.91	-1
Total Capital Expenditure on New/Refurbished Transmission Infrastructure ($billions/year)	0.80	1.85	2.36	2.39	2.84	18.8
Total Capital Expenditure on New/Refurbished Distribution Infrastructure ($billions/year)	1.291	1.824	2.625	2.484	2.447	-1.5
System Average Interruption Duration Index (SAIDI) Duration (hours)	5.02	4.61	4.20	4.36	5.11	17.2
System Average Interruption Frequency Index (SAIFI) Interruptions (per customer)	2.27	2.18	2.01	2.12	2.53	19.3

Notes:

1. Percentage changes relative to the previous year may vary slightly from the actual due to rounding of figures.

2. Some values for 2010 was updated based on new information from members.

CEA CORPORATE
UTILITY MEMBERS

Sustainable Electricity Steering Committee Members

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In addition to the Sustainable Electricity Steering Committee, CEA would like to acknowledge the contribution made by the members of the Sustainable Electricity Executive Council, Dr. Blair Feltmate (University of Waterloo), and CEA staff in the production of this annual report.

Canadian Electricity Association | Association canadienne de l'électricité

Investing in our Sustainable Future

- Electricity is essential to our lives – our homes, businesses and industries depend on it.
- For nearly a century, our goal has always been reliable and affordable power for all Canadians. And today we are committed to making our electricity sustainable as well.
- The electricity industry holds a vast amount of potential to contribute to a more sustainable energy future. But, in order to fully deliver on these expectations, significant investment in our electricity infrastructure is required.
- Learn more about Canadian electricity's sustainability practices and objectives at **SustainableElectricity.ca**
- And have your say on one of the biggest issues facing us today at **KnowYourPower.ca**

RENEWAL **ELECTRICITY** PROGRESSIVE
CLEAN ENERGY
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