

**Canadian Electricity Association
ENVIRONMENTAL COMMITMENT &
RESPONSIBILITY (ECR) PROGRAM**



**ENMAX CORPORATION
REPORT FOR THE YEAR 2002**

March 2003

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General Utility Information

Corporate profile

In 2002, ENMAX distributed electricity in the Calgary area and sold energy supply and services to customers across Alberta.

The company was incorporated and became a wholly owned subsidiary of The City of Calgary in 1997 and began operations in January 1998. ENMAX was created to thrive in Alberta's changing electric industry which began restructuring in 1995 and saw full deregulation of its retail market in 2001. Before ENMAX, a City department called the Calgary Electric System ensured reliable delivery of electricity since 1905.

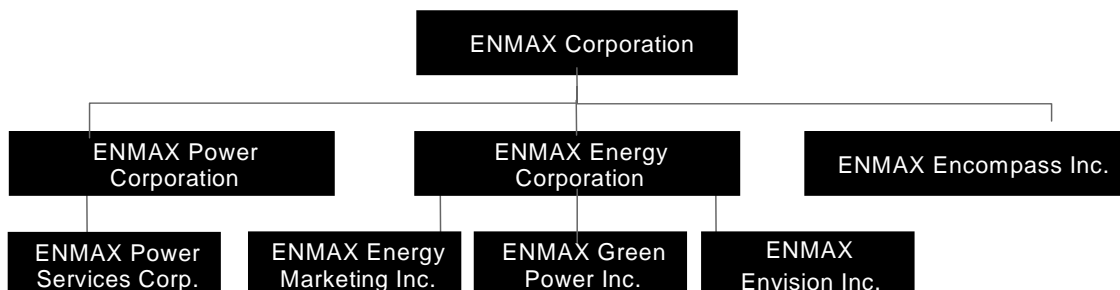
ENMAX Power, a City-regulated ENMAX subsidiary, continues to deliver power to homes and businesses in Calgary through its transmission and distribution system. In 2002, ENMAX Power delivered 7,742 gigawatt hours of power to about 326,000 customers in a 1,044 square kilometre area. As a Wires Owner, ENMAX Power works with 26 retailers in Calgary. The company also provides load settlement services to other municipalities in Alberta.

ENMAX Energy is an unregulated ENMAX subsidiary that sells electricity and natural gas to customers across the province. In 2002, ENMAX Energy served 421,000 customers or about 35% of Alberta's total electricity market. ENMAX Energy secures most of its power through contracts. The business also offers high-speed data solutions and internet services in Calgary.

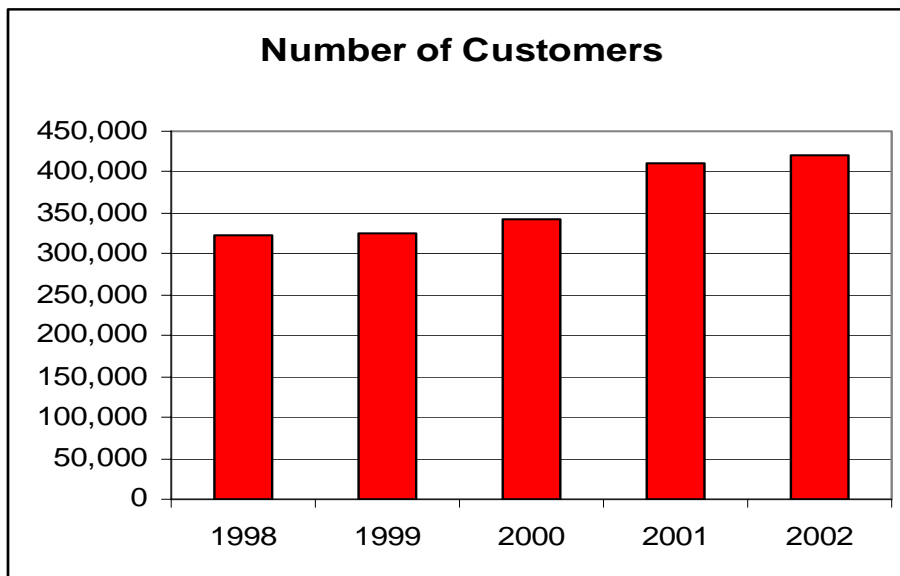
ENMAX Encompass, another unregulated ENMAX subsidiary, provides ENMAX Energy and The City of Calgary with billing and customer services for electricity, natural gas, water, and waste water. In late 2002, ENMAX announced it was pursuing an arrangement with Accenture to deliver the billing and customer service functions.

Our vision: Exceptional people reinventing the Canadian energy and services industry: the choice of customers and investors, every day.

THE ENMAX COMPANIES



1. Generation – ENMAX Energy and ENMAX Energy Marketing buy and sell electricity and natural gas supply to meet customer demands. Most supply is purchased from other generators with the exception of a wind-project being built by ENMAX Green Power, which is equally owned by ENMAX Energy and Vision Quest Windelectric Inc.
2. Transmission – ENMAX Power maintains, owns and operates the high voltage wires in and around the Calgary area. ENMAX Energy uses ENMAX Power's and other utilities' transmission systems to get electricity from generation plants to distribution systems.
3. Distribution – ENMAX Power maintains, owns and operates the low voltage wires that distribute electricity to all homes and businesses in and around Calgary. ENMAX Energy uses ENMAX Power's and other utilities' distribution systems to get electricity to customers.
4. Retail: ENMAX Energy sells electricity and natural gas to customers across Alberta. ENMAX Envision provides high-speed data solutions and internet services in Calgary. ENMAX Power Services markets electricity services like streetlighting, electronic communications and security systems.
5. Billing and customer service: ENMAX Encompass provides billing and customer services to ENMAX Energy and The City of Calgary.



Scope of Operations

Table 1 Purchases of Alternative Energy (MWh)

	2000	2001	2002
Total Purchases	17,300	61,737	116,758
For Utility Use	1,400	1,400	1,400

Table 2 Transmission & Distribution Line Length (circuit)

	2000	2001	2002
Total Length of Distribution Lines (Km) (less than 60 kV)	6,759	6,205	6,410 ¹
Total Length of Transmission Lines (Km)	278	278	278

Status of Environmental Management System (EMS) Implementation

ENMAX Corporation has designed an environmental management system that meets the International Standards Organization (ISO) 14,001 standard. While we made the decision to not register for the system, we will operate in accordance with the standard. The following are a few highlights of actions completed in the year 2002.

- We reviewed and reconfirmed our Environmental Policy.
- In the fall, ENMAX hired a third-party contractor to conduct an Environmental Compliance Audit. While there were no major non-conformances, there were 18 minor non-conformances. In December 2002 an action plan was drafted to address the audit's findings.
- ENMAX conducted a major Industrial and Office Waste Management Review in order to determine the baseline for solid waste and to ensure that accurate and efficient waste management practices were in place. Although the draft report was completed by year-end, additional clarification was required. This resulted in delaying the production of the final report and the follow-up action plan.

¹ 2002 and 2001 data is lower than prior years because historical data included duplicate facilities and some abandoned spared and de-energized facilities. Data corrections are in progress.

- In fall 2002, a full-time Environment Specialist was hired and is responsible for enhancing the environmental management system (EMS).
- In collaboration with our Health & Safety Unit, we used a database software package to manage environmental aspects, evaluate environmental risk, cross-reference policies and procedures, develop targets and measures, and define programs.
- A monthly, detailed environmental report specifying items and issues with the environmental management system is sent to Executive Management. The Board's Environment, Health and Safety Committee receives a comprehensive environmental report, which includes many of aspects of the environment management system, biannually.
- The full system EMS audit will be completed with the Management Review process in spring 2003.

Good News Story

- Through the Nonconformance and Corrective Action Process of the Environmental Management System, a problem was detected with a transformer bushing gasket, which caused the transformer to leak oil. This problem highlighted the need to inspect all transformers since the leakage did not occur immediately, but over a period of time. Once the problem was identified, it could be assessed through visual inspection. A number of other transformers were found to be leaking, while many more with the gasket issue were identified and changed before any leakage occurred.



Gasket not seated properly between bushing well and tank. Underside of bushing well shown.

Table 3 Status of EMS Implementation

Name of business units for which an EMS is to be Implemented	ENMAX Corporation including all subsidiary companies.
Date of Implementation	December 2002

Energy Efficient, Liquid-Filled Distribution Transformers

Energy efficiency of electrical distribution equipment is a stated concern for Natural Resources Canada (NRCan) and the electrical industry. Demonstration of efficiency is important for reasons related to global warming and to wise use of resources. In a partnership agreement the Canadian Electricity Association (CEA), transformer manufacturers in Canada and the United States and NRCan will document and publish through the Environmental Commitment & Responsibility Program (ECR), the energy efficiency of distribution transformers purchased within the current year. The transformer manufacturers and Canadian electrical utilities have also agreed to pursue energy efficiency using the values set in the recently published Canadian Standards Association (CSA) C802.1 **Minimum Efficiency Values for Liquid-Filled Distribution Transformers** as the minimal standard for transformer efficiency.

Table 4 – Energy Efficient Distribution Transformers

kVA Size	Transformer Quantity	Total Compliant kVA	Total Non-compliant kVA	Sum kVA (Compliant & Non-compliant)	Sum kVA Efficiency	Average Efficiency at 50% load, weighted kVA
25 & below (single phase)	106	2,590	0	2,590	256,076	98.87%
37.5 To 75 (single phase)	946	39,163	0	39,163	3,880,471	99.09 %
100 to 167 (single phase)	0	0	0	0	0	N/A
250 to 833 (single phase)	0	0	0	0	0	N/A
45 & below (three phase)	0	0	0	0	0	N/A
75 to 300 (three phase)	73	18,600	0	18,600	1,846,356	99.27 %
500 to 750 (three phase)	58	32,750	0	32,750	3,252,430	99.31 %
1000 to 3000 (three phase)	59	89,000	0	89,000	8,853,935	99.48 %
TOTAL	1,242	182,103	0	182,103		

2002 Indicators

Principle 1 – *To be more efficient in our use of resources*

P1.1 Energy Conservation Efficiency of Fossil Fuel Generation Stations

Currently, ENMAX Corporation does not generate fossil fuel energy.

P1.2 Internal Energy Efficiency

Transmission:

Engineering estimates have indicated that our transmission losses do not exceed 1.5%. Alberta transmission losses are pooled and reported by the Alberta Transmission Administrator.

Distribution:

Table 5 Distribution Energy Efficiency

	2000	2001	2002
Distribution System Energy Input (GWh)	7,596.1	7,775	7,974.3
Distribution System Energy Output (GWh)	7,499.8	N/A	7,747.6
Distribution Energy Efficiency (%)	98.73%	N/A	97.15%

Note: It should be noted that since deregulation of the Alberta market, we are able to quantify only for own services area where we provide wires services.

ENMAX's distribution energy efficiency has been generally very stable over the past three years. The 10-year average is 96.7%. ENMAX is approximately 60% through a multi-year project to replace 4 kV transformers with higher efficiency 15 kV transformers.

ENMAX has acquired and is currently establishing a program to analyze energy loads and profile for optimum performance. This program will allow for balancing and system performance adjustment at feeder level.

P1.3 Reuse of Electrical Insulating Oil

Table 6 Reuse of Electric Insulating Oil

	Item	Note	Data (litres)		
			2000	2001	2002
A	Volume of insulating oil reused (litres) following processing or cleaning at utilities centre facility.	Electrical equipment or oil is brought to a central facility and is processed and used to fill electrical equipment.	6,537	20,903	68,000
B	Volume of insulating oil reused (litres) following processing or cleaning during field operations.	Oil that is drained in a substation and is filtered by utility personnel and then used to refill the original equipment in the field.	0	0	0
C	Volume of insulating oil reused (litres) following processing or cleaning by a third-party contractor, either in the field or through a central facility.	Oil that is sent to a third party and is received back for use in electrical equipment.	44,252	29,666	0
	Volume of Insulating Oil Reused	= A + B + C	50,789	50,569	68,000
D	Volume of insulating oil recycled (litres) by a third party for use other than electrical equipment.	Recycled by outside companies for use as chain saw oil, lubricating oil, asphalt, etc.	109,132	111,491	75,245
E	Volume of insulating oil recovered for energy recovery.	Used by either your utility or a third party for electricity production or heating.	0	0	0
F	Volume of insulating oil disposed of as waste	Incinerated without energy recovery.	0	0	875
	Volume of Insulating Oil Recycled, Recovered, and Disposed of as waste.	= D + E + F	109,132	114,589	76,120
G	Volume of new oil purchased.		29,960	70,628	47,000
	Percent Reuse of Insulating Oil	$= \frac{(A+B+C)}{(A+B+C+D+E+F)} * 100\%$	31.8%	30.6%	47.2%
	Percent of Insulating Oil Recycled	$= \frac{(D+E+F)}{(A+B+C+D+E+F)} * 100\%$	68.2%	67.5%	52.2%

In 2002, the movement of oil was slower than normal for the first two thirds of the year, but increased towards year-end. This is reflected in the large amount of oil that was in storage and not reflected in the table above. There were still some operational concerns this year about sending oil to our external recycler for use within the electrical industry – these issues centred upon quality control and storage volumes. Most of these issues were resolved at year-end and will be reflected in the 2003 statistics.

P1.4 Utilization of Solid Combustion By-Products

This does not apply as ENMAX is not a generator of fossil fuels.

Principle 2 – To reduce the adverse environmental impact of our business

P 2.1 Atmospheric Emission

This does not apply as ENMAX is not a generator of electrical energy.

P2.2 Spills

A reportable spill shall be considered to be a spill of liquids, solids, or gases for which reporting to an external party is a legal requirement.

A priority spill is a subset of reportable spills if the substance spilled is a petroleum product or PCB product and any one of the following conditions apply:

- Spill volume is greater than 500 litres;
- Spilled substance enters a water body; or
- Spill attracts local, provincial, or national media attention.

Table 7 Reportable and Priority Spills

Year	2000	2001	2002
Number of Reportable Spills	8	4	15
Number of Priority Spills	1	2	2
Total Volume of Liquid Reportable Spills (litres)	430	1,095	1,510
Total Volume of Gaseous and Solid Unintended Releases (kg)*	3	11	18

*** Note: ENMAX tracks both single event releases caused by equipment failure and topping up of gas from slow leaks as in the case of SF6 equipment.**

At ENMAX, all releases to land, water and air are reported and documented. Where there is a legal requirement to report to the appropriate authorities, this is handled by the ENMAX Environment Department. This provides a single point of contact in addition to ensuring the appropriate investigation and follow-up.

The environmental management system has enhanced the reporting, documentation and the overall quality of investigation to determine if a release can be prevented in the future, either by better siting of a transformer or engineering controls for the transformer unit or its surroundings.

Table 8 Priority Spills

Priority Spill #1 (02-06-30)

Did the priority spill involve a petroleum product?	Yes	
Did the priority spill involve PCB contaminated substance?		No
Was the priority spill greater than 500 litres?		No
Did the spilled substance enter a waterway?		No
Did the priority spill attract local, provincial or national attention?	Yes – provincial	
What was the source of the spill?	Equipment failure due to external circumstances (fire).	

This priority release was the direct result of a major apartment complex fire. There was no possible way of preventing this release; however, there were some substantial items learned as a result of the follow-up investigation. This was shared with the Calgary Fire Department and ENMAX staff.

Priority Spill #2 (02-08-20)

Did the priority spill involve a petroleum product?	Yes	
Did the priority spill involve PCB contaminated substance?		No
Was the priority spill greater than 500 litres?		No
Did the spilled substance enter a waterway?		No
Did the priority spill attract local, provincial or national attention?	Yes - national	
What was the source of the spill?	Vault transformer fire	

A transformer fault occurred due to problem in a protector installation/retrofit, which caused the destruction of two transformers in a downtown underground vault. The incident did not cause a significant oil release, but the resulting air emissions did create some areas of concern.

P 2.3 Environmental Aspects Indicator for Fish (Hydroelectric Generation)

Does not apply, as ENMAX is not a hydroelectric energy producer.

P 2.4 PCB Management

- **PCB material** is any PCB equipment, PCB liquid, PCB solid or PCB substance subject to the storage of PCB materials regulations.
- **High-level PCB material** is any material (including equipment) with a PCB concentration of greater than 1% (10,000 ppm).

- **Low-level PCB material** is any material (including equipment) with a PCB concentration of greater than 50 ppm but less than 10,000 ppm.
- **Sent for destruction** includes all PCB material sent to a licensed PCB destruction facility or PCB material that has been decontaminated on-site.

Table 9 PCB Management

Total Inventory at December 31	2000	2001	2002
Total inventory of high-level PCB material in storage (tonnes).	.3	.9	0
Total inventory of low-level PCB material in storage (tonnes).	3.1	3.6	47.9
Total amount of high-level PCB material sent for destruction (tonnes).	8.9	4.96	2.4
Total amount of low-level PCB material sent for destruction (tonnes).	20.1	13.7	13.7
Total amount of high-level PCB material taken out of service. (tonnes).	9.2	4.66	1.5
Total amount of low-level PCB material taken out of service (tonnes).	10.4	20.4	58.0

For the first eight months of 2002, PCB materials received were very low. In the remaining four months, the quantities of transformers received increased substantially as transformers identified as part of the ENMAX PCB Management program were removed from service. In addition, changes to the Transportation of Dangerous Goods Regulation resulted in shipping arrangements of the transformers to be delayed until early 2003.



ENMAX program for testing transformers for PCB's

Table 10 In-service Estimates (information only, not an indicator)

	2000	2001	2002
Total estimated inventory of high-level PCB materials in service (tonnes).	6.3	4.5	2.4
Total estimated inventory of low-level PCB materials in service (tonnes).	323.3	394.9	347.0

In-service estimates are based upon the 2000 ENMAX PCB Management Plan. The basis for the high-level volumes is upon the percent of high-volume material that was removed in 2002. Quantities of PCB liquid-filled lead cable remain the only area of concern for estimating the amount of PCB materials in service.

P. 2.5 Generation of Low- and Intermediate-Level Radioactive Waste (LILRW)

Does not apply, as ENMAX is not a nuclear energy generator.

Principle 3 – *To be accountable to our constituents*

P 3.1 Public Reporting on Environmental Performance

Table 11 Public Reporting on the Environment

	Yes/No
	2002
Does the utility produce a publicly available report on environmental performance?	Yes
Does the utility include environmental or sustainable development indicators as part of its publicly available report on environmental performance?	Yes
Does the utility include environmental or sustainable development objectives and targets as part of its report on environmental performance?	Yes
Does the utility report achievements in comparison to the objectives and targets that are described in its report on environmental performance?	No
Does the report include a public feedback and response mechanism?	Yes

Note: The ECR does not require that the report on environmental performance to be a “stand alone” document, e.g., it could be part of the corporate annual report or other annual utility documentation.

P 3.2 Responding to External Input Concerning Environmental Performance

Table 12 Responding to External Clients for the Environment

<i>Transmission & Distribution Business Units</i>	Yes/No
	2002
Does the utility have a procedure in place to <u>document</u> relevant information and requests on environmental performance?	Yes
Does the utility have a procedure in place to <u>respond to</u> relevant information requests on environmental performance from external interested parties?	Yes
Does the utility <u>track responses</u> to documented, non-government external inquires to ensure they are timely?	Yes
Does the utility have a <u>process in place</u> to consider documented, non-government external inputs as part of its decision making?	Yes
Is there <u>documentation in place</u> describing how documented, non-government external inputs are considered as part of the utilities decision making.	Yes

Examples of Information Requests

- PCB information related to transformers
- Electro Magnetic Field (EMF) requests
- Noise issues
- Greenhouse gas
- Regulatory requirements (mandatory and voluntary)
- Information requests from shareholder (The City of Calgary)
- McBride Lake Wind Farm project
- Renewable energy proposals

In 2002, the number of information requests remained steady, but the diversity of questions broadened. These new areas were related to new business areas that ENMAX was not previously involved in as well as general, overall environmental concerns.

- For 2002, we enhanced the environment section on both the internal and external websites, which included a direct e-mail link to the Environment Department.
- Information inquiries centred upon specific items such as the status of PCB's in transformers related to environmental assessments associated with real estate transactions.
- ENMAX's business development of the McBride Lake Windfarm project included public consultation which our partner conducted prior to engagement but continues as the project proceeds.

Principle 4 – To ensure that our employees understand the environmental implications of their actions and have the knowledge and skills to make the right decisions

P 4.1 Evidence of an Effective Employee Awareness and Training Program

Table 13 Employee Awareness & Training

Transmission & Distribution	Yes/No
	2002
Has the utility implemented a procedure to identify environmental training needs?	Yes
Has the utility implemented procedures or information systems to track the number of employees that require environmental training?	Yes
Is your training consistent with ISO 14001 requirements?	Yes

ENMAX has an approved environmental training plan that is consistent with the requirements of ISO 14000. The environmental awareness program has been offered to office employees through our interactive computer-based Learning Management System (LMS). This system includes the ability to test and record which employees have taken the course.

With the identification of new environmental aspects, both workshops and courses are developed as part of the addressing of environmental aspects for the LMS.

The internal website “Intramax” has been updated to include a variety of information regarding the environmental management system including the core manual, the objectives and targets, and key issues summary.

Pilot Indicators and Protocols to Support Principle 2 - *To reduce the adverse environmental impact of our business*

Treated Wood Utility Poles

Table 14 Treated Wood Utility Pole Guidelines

	2002
Which of the recommendations set out in the User Guidance Document has your utility committed to implementing by the end of 2003?	All
Has a schedule been prepared for implementation of each recommendation?	End of 2002
When will the recommendations that you have committed to be fully implemented?	Jan. 2003

- a. Post utility use of treated wood poles (all treatment types)
 - When structurally sound, they are reused for supports, and/or temporary installations.
 - When structurally sound but unusable for utility purposes, they are sold for public use. Purchaser is provided with a warning letter about content.
 - All remaining utility poles unfit for public use or parts thereof are landfilled.

In 2002, undertook research to determine if treated wood poles used in the ENMAX Calgary service area could be either used for fuel in cement kilns or recycled. At the present time, there are no recycling markets for treated wood poles used in our system.

- b. Treated wood sent to landfill
 - In 2002, ENMAX disposed of 101 tonnes of treated wood poles to landfill. Assuming that a 45-foot pole, (the most common pole purchased at ENMAX in 2001) weighs 821 kg ², the total number of class 3 - 45 foot pole equivalents disposed of is 123.
- c. Treated wood transmission poles purchased 2002

² North Pacific Lumber Co., Utility Pole guide

Table 15 Transmission Poles by Treatment Type

<i>Treatment</i>	<i>Number</i>	<i>Pole Feet (Number X Length of Pole)</i>
Non-treated		
Pentachlorophenol		
CCA	42	7,510
Other (fiberglass)		
Total	42	7,510

d. Treated wood distribution poles purchased

Table 16 Distribution Poles by Treatment Type

<i>Treatment</i>	<i>Number</i>	<i>Pole Feet (Number X Length of Pole)</i>
Non-treated	1	50
Pentachlorophenol		
CCA	1,074	99,960
Other (fiberglass)		
Total	1,075	100,010

e. Life-enhancement treatments on poles

ENMAX has been using life-enhancement treatments for three years and has implemented a five-year cycle to inspect and apply life-enhancement strategies to all utility poles.

Good News Story

- A Best Management Practice for removal of treated wood poles was developed in 2002 largely through the efforts of Margaret Trenn, of Aquila Networks, and supported by representatives from BC Hydro, AltaLink, and ENMAX. The document has been reviewed by both the British Columbia and Alberta Environment Departments.

Species at Risk and Habitat Stewardship

ENMAX has not completed a formal self-assessment related to species at risk. At the end of 2002, a pilot project was initiated to conduct an aerial survey of transmission lines. This pilot has proved successful and will be extended to cover the entire transmission network. This will allow for more accurate information related to our mapping of transmission lines.

The formal species at risk assessment is scheduled for spring 2003.

It will incorporate work that was underway last year with The City of Calgary Parks and Recreation Department to inventory wetlands. This work has been incorporated into an enhanced land management program that is being developed under our Environmental Management System.