

Regina Health District

4101 Dewdney Avenue
Regina, Saskatchewan
S4T 1A5

ENERGY MANAGEMENT ACTION PLAN

For the Natural Resources Canada's Energy Innovators Initiative
and
Canada's Climate Change Voluntary Challenge and Registry Inc.

Date: March 30, 2000

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Section 1

ORGANIZATION PROFILE

Section 1 - Organization Profile

Organization Name: Regina Health District

Address: 4101 Dewdney Avenue
Regina, Saskatchewan

Energy Innovators Registration Date: May 1998 **VCR INC. Registration Date:** Nov 1999

1.1 Key Personnel

President/Senior Authority:	<u>Donna Evans</u>	Director, Facilities Management
Telephone:	<u>306-766-4817</u>	Fax: <u>306-766-4383</u>
Key Contact:	<u>Peter Whiteman</u>	Title: <u>Manager, RHD Energy Management</u>
Telephone:	<u>306-766-2161</u>	Fax: <u>306-766-2607</u>
E-Mail:	<u>pwhiteman@reginahealth.sk.ca</u>	

1.2 Organization Survey

Date Organization Formed:	<u>RHD formed - 1994</u>	Organization Fiscal Year Dates:	<u>4/1 - 3/31</u>
Total Area (m ²):	<u>193,008</u>	% Total Area Heated:	<u>3</u>
Number of Facilities:	<u>3</u>	Number of Buildings:	<u></u>
Names of Major Facilities:	<u>Regina General</u>	Number of Buildings < 10 years old:	<u></u>
	<u>Pasqua</u>	Number of Buildings 10 - 25 years old:	<u>see 1.3</u>
	<u>Wascana Rehab</u>	Number of Buildings over 25 years old:	<u></u>
Number of Full Time Employees:	<u>6,000</u>	Number of Beds:	<u>675</u>
Number of Part Time Employees:	<u>Varies</u>	Average Annual Patient Days	<u>240,000</u>

Over the past five years (94-99), the Regina Health District has undergone major expansion and renovation projects at two of its acute care facilities in Regina, the Regina General Hospital and the Pasqua Hospital. The project, entitled "Project 98" had a capital cost of more than \$100,000,000 and officially completed in early 1999

1.3 Background Description

The Regina Health District was formed in 1994 as part of a sweeping reorganization of the Saskatchewan Health System. At that time RHD consisted of four major medical centres located within the city of Regina:

- Regina General Hospital – Acute Care– 95,425 square metres
- Pasqua Hospital – Acute Care–52,520 square metres
- Plains Hospital – Acute Care– 34,838 square metres
- Wascana – Chronic Care– 45,063 square metres

In 1996 a much-debated decision was taken to close the relatively new Plains Hospital (completed in 1974) and to expand and modernize the other acute care hospitals to handle the 200+ beds that were eliminated. Over the next four years major construction projects were completed at both the General and Pasqua Hospitals which added a total of 44,406 square metres and much new equipment. The renovation project was officially completed in early 1999 but the commissioning of the new facilities (particularly at the General) will require 18 months to complete.

PASQUA HOSPITAL – the original Pasqua was built by the Grey Nuns in the 1920s and expanded in the 1970s. The Allan Blair Memorial Wing received a major renovation in 1994-1995. Another renovation followed (1996-1999) which added almost 9,290 square metres of floor space and included several energy management innovations such as an absorption chiller, efficient burners and stack economizers for the three boilers and a comprehensive Honeywell Excel 5000 building control system.

REGINA GENERAL HOSPITAL - the first building at the eclectic General site was completed in 1913 and it has been subjected to a series of additions and closures over the years. Regina General today combines 7 phases built over the past 50 years each reflecting the HVAC technology of the day. The most recent renovation created “A” Wing, which added 40,000 square metres and facilities that make Regina General a major Prairie medical centre. The General received similar equipment to the Pasqua during the recent renovations and has an identical building control system. The site continues to evolve and current plans call for the demolition of the adjacent nurses residence (3,716 square metres) to provide more parking.

Major expansion of the two Energy Centres was necessary to service the renovated hospitals and it was decided early in the project development to seize the opportunity to ensure that the systems installed were as energy efficient as possible. An Energy Management Business Plan was prepared which identified energy enhancements to the project costing \$1,766,000 but yielded a simple payback of less than 4 years and avoided greenhouse gas emissions of 1,361 tonnes of CO₂ per year. A summary of the energy saving initiatives is included in chapter 4 of this document.

WASCANA REHABILITATION CENTRE – the WRC was built as a boy’s school in 1942 but changed its name and function in 1957. Over the past twelve years Wascana Rehab has undergone a three-phase renovation program and is now a beautiful modern facility that bears little resemblance to its original structure. Unlike the two acute care facilities, the WRC does not have a boiler plant and buys steam from a district-heating source linked to the nearby Saskatchewan Legislature Building. Recent phases of the WRC were designed to take advantage of occupant heating sources as well as passive solar heating and, as a result, there heating coils in the ventilation system are designed to temper outside air to 15-17 degrees C. This feature plus inexpensive steam appears to make energy efficiency renovations unattractive. Interestingly, the WRC has a similar Honeywell Building Control System to the other hospitals making central control of all three sites a real possibility.

Section 2

ENERGY MANAGEMENT POLICY



Section 2 - Energy Management Policy

2.1 Commitment by Organization

In an attempt to reduce operating costs, while assisting Canadian governments in meeting Canada's international commitment to stabilize greenhouse gas emissions, Donna Evans, Director Facilities Management, is pleased to acknowledge the RHDs commitment to undertake economic measures to increase energy efficiency as a means of limiting the production of greenhouse gas emissions.

The Regina Health District has demonstrated this commitment in recent years in a variety of ways:

- The economic investment of more than \$2 million in energy management measures as part of recent renovations at both the General and Pasqua hospitals.
- The appointment of a Manager, Energy Management with the responsibility and authority to improve energy efficiency and reduce greenhouse gas emissions across all sites in the Health District

2.2 Energy Management Goals and Targets

Regina Health District has set the goal of reducing its cost of energy by 20% below FY 1998/1999 by FY 2004/2005. This reduction will be achieved through improvements in operation and maintenance of current facilities and by the investment in retrofit projects with attractive payback periods.

2.3 Energy Management Objectives

Regina Health District recognizes its responsibility as a public health care institution to set an example on issues such as green house gas emission reduction. It is the objective of the RHD to consider energy management in its facilities related decisions and to foster awareness of GHG emission issues among its staff and patients.

2.4 Key Personnel Involved-Energy Management Committee

To achieve the goals and objectives, RHD has formed the following energy management committee:

<u>Name</u>	<u>Title</u>	<u>Roles/Responsibility</u>
Donna Evans	Director, Facilities Management	Corporate Energy Champion
Peter Whiteman	Manager, Energy Management	Chair and Coordinator
Ed Roberts	Chief Engineer	Pasqua Hospital
Bernie Desrosiers	Building Automation Tech.	Pasqua Hospital
Doug Wilson	Manager, Building Maintenance	Regina General Hospital
Rick Pearce	Chief Engineer	Regina General Hospital
Brian Fouhse	Building Automation Tech.	Regina General Hospital
David Chanig	Mechanical Maintenance Supr.	Regina General Hospital
Darrell Toth	Manager, Building Maintenance	Wascana Réhabilitation Centre
Clem Schriener	Building Automation Tech.	Wascana Réhabilitation Centre
Gord Leverick	Maintenance Supervisor	Wascana Réhabilitation Centre

The membership of the committee reflects the current emphasis on commissioning building automation following the recent major renovation programs at the Pasqua and General sites.

2.5 Additional Policy Information

Regina Health District has established the following energy management policies:

- Subject to the availability of resources, the District will continue its energy management programs on a “continuous improvement” basis
- Energy performance will be a major consideration (but not the only one) in the purchase of equipment and the design of renovations at its facilities. This policy was clearly demonstrated in the additional funds made available for energy efficient equipment and systems for the recent renovations and retrofit projects at both Pasqua and Regina General Hospitals.
- RHD recognizes the importance of “people” in greenhouse gas emission reduction and will foster No & Low-Cost programs that create awareness and complement equipment innovations.

Regina Health District
Energy Management Action Plan



Regina Health District

July 14, 1998

The Hon. Ralph Goodale
Minister,
Natural Resources Canada
580 Booth Street
Ottawa, Ontario
K1A 0E4

MINISTER'S REGISTRY	
To: <u>Charles</u>	
JUL 24 1998	
Docket No. <u>98-00347</u>	
File No. <u>10000-6-6</u>	

Dear Minister:

The Regina Health District resolves to voluntarily assist Canadian governments in meeting Canada's international commitment to stabilize greenhouse gas emissions, by taking economic measures to increase our organization's energy efficiency.

In this regard, I am pleased to confirm that the Regina Health District will commit to undertake the following actions:

- appointing John Roflik, Energy Centre Manager, as our representative to liaise with Natural Resources Canada and to oversee the successful implementation of this energy efficiency venture.
- developing a long-term, corporate energy management plan identifying a full set of options in all facilities owned, managed, or built by our organization, that will reduce our energy use.
- setting quantitative targets to reduce energy consumption and monitoring progress towards achieving them.
- participating in activities aimed at promoting energy efficiency to employees or tenants.
- systematically registering our progress in realizing energy savings, annually.

In pursuit of this commitment, I am pleased to tell you that we are interested in joining the Energy Innovators and to be registered as such, in the Climate Change Voluntary Challenge and Registry in support of the National Action Program on Climate Change.

Yours truly,


Glenn S. Bartlett
President & Chief Executive Officer

2180 - 23rd Avenue, Regina, Saskatchewan S4S 0A5

DOCUMENTS DE LA HAUTE DIRECTION
JUL 24 1998
EXECUTIVE DOCUMENTS

Section 3

ENERGY USE AND COSTS

Section 3 - Energy Use and Costs

3.1A Energy Consumption and Costs - Regina General and Pasqua Hospitals

		Type of Energy Use			
		Electricity (kWh)	Natural Gas (Cu M)	Water (Cu M)	
Baseline					
Year	1998/1999				
Total Area (m ²)	147,945				
Beds	675				
Hospital Staff	5000				
Total Cost (\$)	\$3,360,675	\$2,131,346	\$1,002,418	\$226,911	
Consumption		37,137,635	9,301,797	300,129	
CO2 Emission	47,441 tonnes				
Current					
Year	1998/1999				
Total Area (m ²)	147,945				
Beds	675				
Hospital Staff	5000				
Total Cost (\$)	\$3,360,675	\$2,131,346	\$1,002,418	\$226,911	
Consumption		37,137,635	9,301,797	300,129	
CO2 Emission	47,441 tonnes				
Forecasted					
Year	2004/2005				
Total Area (m ²)	147,945				
Beds	675				
Hospital Staff	5000				
Total Cost (\$)	\$2,710,000	\$1,710,000	\$810,000	\$190,000	
Consumption		29,795,891	7,516,281	251,131	
Cost Avoidance	\$650,675				
CO2 Emission	38,161 tonnes				
CO2 Emission Reduction	9,280 tonnes or 19.6 %				

3.1B Energy Consumption and Costs - Wascana Rehab.

		Type of Energy Use			
		Electricity (kWh)	Steam (Lbs.)	Water Cu M	
Baseline					
Year	1990/1991				
Total Area (m ²)	45,063				
Beds	350				
Hospital Staff	1000				
Total Cost (\$)	\$718,019	\$478,424	\$165,292	\$74,303	
Consumption		8,298,800	21,754,220	2,440,800	
CO2 Emission	7,888 tonnes				
Current					
Year	1998/1999				
Total Area (m ²)	45,063				
Beds	350				
Hospital Staff	1000				
Total Cost (\$)	\$717,619	\$486,802	\$155,241	\$66,443	
Consumption		8,647,232	16,885,680	2,182,617	
CO2 Emission	7,915 tonnes				
Forecasted					
Year	2004/2005				
Total Area (m ²)	45,063				
Beds	350				
Hospital Staff	1000				
Total Cost (\$)	\$696,116	\$439,140	\$202,180	\$54,796	
Consumption		7,800,000	22,000,000	1,800,000	
Cost Avoidance	\$21,503				
CO2 Emission	7,496 tonnes				
CO2 Emission Reduction	419 tonnes or 5.3 %				

**Regina Health District
Energy Management Action Plan**

3.1.1 Determination of Baseline Consumption and Cost Data

Regina General & Pasqua Hospitals: The Regina Health District is emerging from a four-year period of site reduction, site expansion, equipment modernization and staff upheaval. Fiscal year 1998/1999 is the first occasion when reliable data is available for the Pasqua and Regina General sites.

Baseline and Current 1989/1999

Site	Gas Usage CU /M	Gas Cost \$	Elect Demand KVA	Elect Usage KWHs	Elect Cost \$	Water CU/M	Water Cost \$
Pasqua	4,004,228	446,035	30,834	16,461,317	935,524	128,540	96,845
General	5,297,569	556,383	40,425	20,676,318	1,195,822	171,589	130,066
Totals	9,301,797	1,002,418	71,259	37,137,635	2,131,346	300,129	226,911

The Energy Intensity and CO2 emissions for the two hospitals has been calculated and can be found in the Annex. For the Baseline year of 1998/1999 the total CO2 emissions was 47,441 tonnes.

Wascana Rehabilitation Centre: The WRC was modernized and expanded in the late 1980's. Consumption data dates back to 1990/1991 and this was used as the Baseline for this site. The decision to consider WRC separately is supported by the fact that it is a different kind of hospital than the other two, it obtains its steam from district heating and has quite a different electricity rate schedule. The following is the Wascana data for the past ten years:

Fiscal Year	Steam Usage Lbs	Steam Cost \$	Elect Demand KVA	Elect Usage KWHs	Elect Cost \$	Water CU/M	Water Cost \$
1990/91	21,754,220	165,292	20,670	8,298,800	478,424	2,440,800	74,303
1991/92	22,123,760	192,018	20,808	8,731,016	493,455	2,166,800	69,496
1992/93	24,935,280	213,365	21,503	8,328,400	516,819	2,268,400	74,786
1993/94	23,972,650	205,069	22,054	8,286,800	533,587	1,913,500	70,750
1994/95	23,556,560	202,986	21,732	8,680,400	559,438	1,836,107	79,723
1995/96	24,566,640	208,219	23,579	8,483,935	491,942	59903	82,072
1996/97	24,105,680	197,365	24,103	8,093,355	473,000	58115	81,612
1997/98	20,304,512	173,045	24,037	8,297,592	470,571	48822	82,822
1998/99	16,885,680	155,241	24,175	8,647,232	486,802	57660	75,576

The Energy Intensity and CO2 emissions for the WRC have been calculated and tabulated results and curves for the entire period are contained in the Annex.

3.1.2 Determination of Forecasted Consumption and Cost

Regina General & Pasqua Hospitals: Since there are no trends available for these two hospitals it was assumed that they achieve the corporate cost reduction target of 20% between FY 1998/99 and FY 2004/05. Emphasis was placed on electricity consumption reduction because of the potential savings from fluorescent light upgrading at both hospitals. Note that the cost savings also resulted in a 19.6 % reduction in greenhouse gas emissions over the same time frame.

Wascana Rehabilitation Centre: The quality of data available for the WRC made it possible to plot consumption curves and to use them to arrive at the Forecasted Case. These curves are contained in the Annex and will be discussed separately below:

- Steam usage was steady around 24,000,000 lbs a year but dropped sharply in the last two fiscal years. This drop was due to mild winters in Regina and cannot be expected to continue. It may climb back up to 24,000,000 lbs unless steps are taken to limit this to a target of 22,000,000 lbs/year.
- Electricity consumption averages about 8,500,000 kWh but has shown a marked increase in the past two years due to longer warmer summers. A target of 7,800,000 kWh was selected as achievable since consumption was close to 8,000,000 in FY 1996/1997
- Electricity Demand has been level at 24,000 kVA for almost five years having climbed steeply during the early 1990s as the result of increases in building size at that time. A downward trend is desirable and a modest target of 23,000 kVA has been selected.
- Water consumption also climbed recently after a steady decline. The target is to re-establish to previous trend towards a level that was achieved in 1994/95

3.2 Special Events and Other Variables

The following special events may impact on energy consumption and costs at the RHD over the next five - six years:

- The renovations at the acute care facilities are officially complete but commissioning and fine-tuning is expected to continue until early 2001. Substantial improvements in energy performance can be expected as the commissioning of building automation systems progresses.
- The old Nurses Residence at the Regina General has been used by a local community college for the past few years and was part of the hospital's heating and electricity load. This 3,716 square metre building will be closed in early 2000. This represents a 4% reduction in floor area to be serviced and is expected to result in energy cost savings .
- Indications are that Natural Gas prices will rise in parallel with gasoline and diesel fuel prices. This will increase the costs of steam produced and purchased by the RHD. It will also make energy management initiatives more attractive.
- Regina has experienced three years of mild winters with little snow. It would be an error to assume that this is a trend that will continue into the future.

3.3 Additional Information

3.3.1 Current Energy Sources

Both Pasqua and Regina General Hospitals have gas fired heating plants. The Wascana Rehab. Centre buys steam from a district heating system but uses a small amount of natural gas in the kitchen. All three obtain electricity from Sask Power. All three also have diesel generator sets for back-up power.

3.3.2 Energy Intensity and CO2 Emissions

Energy Intensities and CO2 emissions were determined using a Microsoft Excel Spreadsheet entitled "Energy Consumption and Costs, and CO2 Emissions" obtained from NRCan. A spreadsheet showing the calculations and results is contained in the Annex to this document.

Section 4

ENERGY MANAGEMENT PROJECTS AND ACTIONS

4.1A Past and Currently Underway Projects and Actions

Over the past five years (94-99), the Regina Health District has undergone major expansion and renovation projects at two of its acute care facilities in Regina, the Regina General Hospital and the Pasqua Hospital. The project, entitled "Project 98" had a capital cost of more than \$100,000,000 and officially completed in early 1999.

Major expansion of the two Energy Centres was necessary to service the renovated hospitals and it was decided early in the project development to seize the opportunity to ensure that the systems installed were as energy efficient as possible. An Energy Management Business Plan was prepared which identified energy enhancements to the project costing \$1,525,700 but yielded a simple payback of less than 4 years and avoided greenhouse gas emissions of 1,361 tonnes of CO₂ per year. A summary of the energy saving initiatives is included below.

Description	Incremental Costs \$	Predicted Cost Savings \$/year	Source of Savings	Simple Payback
Boiler Stack Economizers	\$260,000	\$66,086	Natural Gas Energy Reduction	3.93
Absorption Cooling of Chilled Water	\$692,800	\$96,047	Electricity Demand	7.21
Reverse Osmosis Makeup Water	\$97,400	\$149,182	Chemical Use Reduction	0.65
Chilled Water Circuiting	\$90,400	\$23,600	Electrical Energy Reduction	3.83
Condense Water Circuiting	\$113,400	\$15,564	Electrical Energy Reduction	7.29
Increased Insulation Standard	\$75,800	\$17,500	Natural Gas Energy Reduction	4.3
Efficient Burners in Heating Boilers	\$140,700	\$41,382	Natural Gas Energy Reduction	3.4
Enhanced Cooling Towers	\$55,200	\$15,642	Electrical Energy Reduction	3.53
Total Program Cost	\$1,525,700			
Total Annual Cost Savings		\$425,001		
Overall Payback				3.57

Note that the two project with paybacks greater than 7 years were included because of operational improvements as well as energy savings.

In addition to the Energy Centre retrofits listed above, the new buildings were fitted with T8 fluorescent light fixtures with electronic ballasts and other modern energy and water saving devices such as hands-free flush controls in water closets.

Another significant improvement in energy management was the installation of Honeywell Excel 5000 building automation equipment at both Pasqua and Regina General Hospitals. This equipment allows monitoring and control of many more functions than earlier systems and, when properly commissioned, will assist operators to optimize operation and reduce energy waste. The RHD has strengthened its staff of Building Automation Technicians to ensure that this objective is achieved.

4.2A Proposed Actions and Projects

The Regina Health District is still emerging from several years of reorganization, closures and major construction. Some impressive energy efficient equipment has been installed but there are areas of energy management that have been neglected. The following actions are proposed:

Short-term actions include:

- Commissioning of Building Automation Systems – testing, reprogramming and tuning to achieve optimum energy performance. RHD has added strength to its building automation workforce to ensure that this proceeds quickly.
- Upgrading lighting in older wings of Pasqua and General Hospitals to the same standard of energy efficient fixture (luminaire and ballast) as is now installed in the new construction. For example, T8 fluorescent save 35% on electricity consumption while improving colour rendering index (CRI). The expected life of electronic ballasts is twice that of electromagnetic ballasts and each unit can be wired to four lamps thereby reducing the number of ballasts required by one half. They also give off less heat.
- Introduce an automated maintenance control system to ensure that Low and No-Cost energy management measures are being carried out along with in-house maintenance of equipment. Past experience with similar systems yielded energy savings of up to 20%.
- Upgrade hospital staff awareness of their pivotal role in energy and water conservation

Longer-term actions could include:

- Take advantage of the fact that all three hospitals have compatible building control systems and consider the cost benefits of linking these systems so all three can be monitored from one site.
- Reconfirm the heat balance at the Wascana Rehab Centre to determine the impact of changing to modern light fixtures. Would the change destroy the current self-heating system?

Section 4 - Energy Management Projects and Actions

4.1B Past and Currently Undergoing Projects and Actions

Project/ Action	Details of Project	Date Started	Date Completed	Project Team (ESCO, in-house)	Capital Invested	Annual Cost Savings	Energy Consumption Savings	CO ₂ Savings	Obstacles Encountered	Cost Avoidance, benefits, offsets
Energy Centre Modernization	See 4.1A for details	1995	1999	Contracted	\$1,525,700	\$425,000	Electricity & Natural Gas	1,361 tonnes	No major obstacles	Major maintenance savings
Building Control System Modernization	Installed new Honeywell system at both sites	1995	1999	Contracted	\$300,000	\$100,000	927,936 cu m Natural Gas	1,722 tonnes	12 months to commission new system	Gives great potential for future savings
Hired Two Building Automation Techs.	To commission and tune new control system	1999	On going	In-House	\$80,000	See above	To get full benefit from new system		None	Essential to commissioning
New Energy Manager	To coordinate and track EM initiatives	1999	On going	In-House	\$70,000	\$336,000 or 10% of current energy \$	Will account for ½ forecasted savings	4,640 tonnes	None	Essential to awareness, training and tracking
Operating & Maintenance Staff Training	In-house system specific training	1998	1999	In-House	\$10,000	Impact of Energy Manager	See above	See above	Needs senior management budget support	Essential to achieving energy targets

Regina Health District
Energy Management Action Plan

4.2B Proposed Actions and Projects

Proposed Action/ Project	Expected Start and End Dates	Project Team (ESCO, in-house)	Potential Capital Cost	Potential Cost Savings	Potential Consumption Savings	Potential CO ₂ Savings	Cost Avoidance, benefits, offsets
Implement an energy awareness program to hospital staff.	Mod 2000 then annually	Energy Manager	\$5,000	\$168,000 or 5% of current costs	Not known	2,320 tonnes	Must have hospital staff "buy-in" to energy efficiency
Upgrade lighting in older wings of General and Pasqua to be the same as installed in recent renovations. Estimate 5000 fixtures to be replaced.	Mid 2000 to end 2001	Hospital Staff or Contract	\$300,000	\$120,000	2,000 MWh	1092 tonnes	Lower maintenance
Introduce Computerized Maintenance Management system to ensure that no-cost and low-cost measures are implemented.	Mid 2000 to end 2000	Energy Manager to sponsor	\$40,000	\$168,000 or 5% of current costs	Not known	2,320 tonnes	Efficient use of staff to achieve energy targets
Interconnect Building Control Systems – three sites have compatible Honeywell Building Control Systems. Study the feasibility - costs and benefits and options for interconnection	2002	Contract	\$30,000	Not Known but could be staff reduction	Not Known	May not be any	Could lead to cost savings in standard operating procedures and reduced staff
Feasibility study of fluorescent light upgrade at Wascana. Opinions are that lower heat from T8 and electronic ballasts would disturb heat balance and require heating coils in air handling systems.	2002	Contract	Feasibility study \$30,000 Lighting retrofit \$600,000	Lighting retrofit could save \$250,000 per annum	4,000 MWh of electricity	2,184 tonnes	Lower maintenance but need to study climate control issue and the impact of relamping.

4.3 Training, Communication and Awareness Programs

Staff Training

The three RHD hospital sites have the following maintenance and operating staff:

- Pasqua – 36
- Regina General – 50
- Wascana - 16

Over the past four years, staff training has taken a back seat to the completion and commissioning of the renovations at the acute care facilities. System specific training is necessary aimed at the operation and maintenance of equipment installed at both Pasqua and General sites during the recent retrofit programs. This training is typically provided by the suppliers field staff or in-house by knowledgeable staff such as building automation technicians.

The benefits of staff training are well understood and the RHD Energy Manager has plans for training in several energy related areas such as correct operation and maintenance of Variable Speed Drives.

Peter Whiteman has scheduled a total of six facilities personnel to attend a “Dollars to \$ense” workshops during 2000.

Response to Climate Change

Regina Health District is well aware of its responsibilities to demonstrate leadership in the reduction of greenhouse gas emissions and has taken bold steps to demonstrate this awareness.

- In its expansion programs since 1994, the RHD has selected the most energy efficient technologies available in retrofits of boilers, stack economizers, chillers, HVAC and building control systems.
- RHD has identified and filled the position of Manager, Energy Management and given him the responsibility and authority to further energy conservation and cost reductions across all site in the District.
- An Energy Management Committee has been formed with representation from each of the sites and monthly meetings are being held.

Communication and Awareness Programs

RHD has a challenge to make hospital staff aware of their role in the reduction of greenhouse gas emissions following the confusion that resulted from the closing of the Plains Hospital and the recent enlargements at the Pasqua and General sites. The current Manager, Energy Management has only been in the position for 4 months but has plans to use the hospital's intranet system and its monthly internal newsletter to create awareness and to obtain suggestions from hospital staff concerning energy management.

Section 5

REPORTING & EVALUATION



Section 5 - Reporting and Evaluation

As part of the Regina Health District's commitment to energy management and to its membership to the Energy Innovators Initiative, RHD will submit a progress report annually to the Office of Energy Efficiency (OEE), Natural Resources Canada (NRCan) and to the Canada's Climate Change Voluntary Challenge and Registry (VCR Inc.). The report will include at minimum:

- Updated Organization Profile
- Updated Energy Management Policy
- Updated Energy Use and Costs
- Energy Management Projects Completed, Undergoing, and Proposed.

5.1 Reporting, Verifying and Updating the Action Plan and Targets

One of the responsibilities of the Manager, Energy Management and the Energy Management Committee is to establish a system to collect data and analyze results as a measure of progress towards energy management objectives. Deviations from the anticipated trends in energy performance are to be reported to the Director, Facilities Management as soon as possible with the committees proposed corrective action.

Section 6

Annex

6.1 Methodology for Calculations and Sample Calculations

Calculation of energy intensity and greenhouse gas emissions were carried out using a Microsoft Excel spreadsheet and are contained in later sections of this **Annex**

Regina General and Pasqua Hospitals
Energy Intensities and CO2 Emissions

Regina Health District
Energy Management Action Plan

Regina General and Pasqua Hospitals

	<i>Baseline & Current</i>	Forecasted		
	1998/1999	2004/2005		
Totals				
Area (m ²)	147,945	147,945		
Total Energy Cost	\$3,133,764	\$2,520,000		
Total Energy Consumption (GJ)	479,722	386,871	0	0
Total CO ₂ Emissions (tonnes)	47,441	38,161	0	0
Intensities				
Cost Intensity (\$/m ²)	21.2	17.0	#DIV/0!	#DIV/0!
Energy Consumption Intensity (GJ/m ²)	3.2	2.6	#DIV/0!	#DIV/0!
CO ₂ Emissions Intensity (tonnes/m ²)	0.321	0.258	#DIV/0!	#DIV/0!
Indirect Emissions: Electricity				
Electricity Cost	2,131,346	1,710,000		
Electricity Consumption (kWh)	37,137,635	29,795,891		
CO ₂ Emissions (tonnes)	30,175.8	24,210.4	0.0	0.0
Direct Emissions: Fuel				
Natural Gas				
Natural Gas Cost	1,002,418	810,000		
Gas Consumption (GJ)	346,027	279,606		
CO ₂ Emissions				
CO ₂ (tonnes)	17,190.6	13,890.8	0.0	0.0
N ₂ O (tonnes)	66.51	53.74	0.00	0.00
CH ₄ (tonnes)	7.99	6.46	0.00	0.00
Total CO ₂ Equiv. (tonnes)	17,265.1	13,951.0	0.0	0.0

Wascana Rehabilitation Centre
Energy Intensities and CO2 Emissions

Regina Health District
Energy Management Action Plan

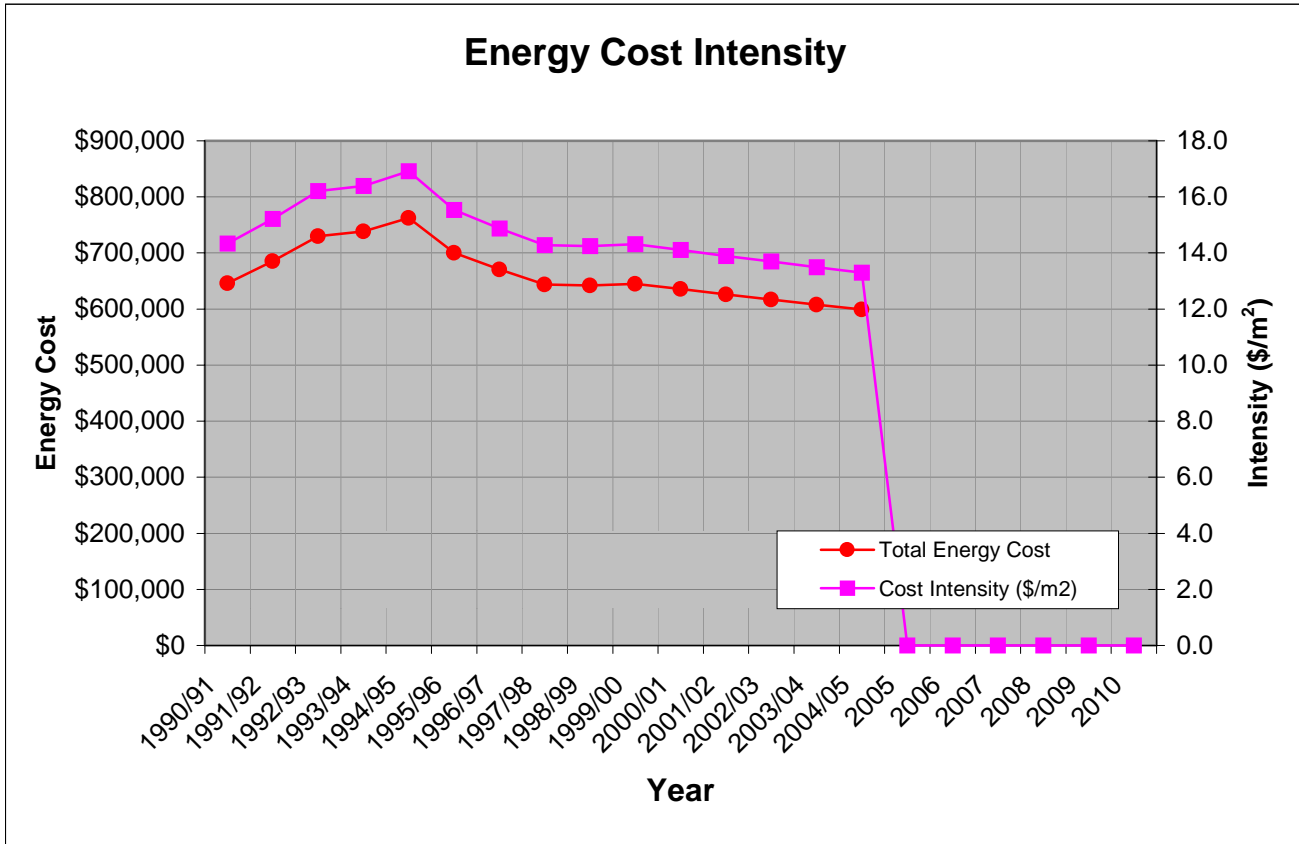
Wascana Rehabilitation Centre

	<i>Baseline</i>														
	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05
Totals															
Area (m ²)	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063	45,063
Total Energy Cost	\$646,195	\$685,473	\$730,184	\$738,656	\$762,424	\$700,161	\$670,365	\$643,616	\$642,042	\$645,065	\$635,525	\$626,174	\$617,011	\$608,030	\$599,230
Total Energy Consumption (GJ)	52,826	54,772	56,289	55,124	56,102	56,460	54,568	51,293	48,944	49,335	49,726	50,118	50,509	50,900	51,290
Total CO ₂ Emissions (tonnes)	7,888	8,259	8,080	7,995	8,293	8,187	7,845	7,811	7,915	7,845	7,775	7,706	7,636	7,566	7,496
Intensities															
Cost Intensity (\$/m ²)	14.3	15.2	16.2	16.4	16.9	15.5	14.9	14.3	14.2	14.3	14.1	13.9	13.7	13.5	13.3
Energy Consumption Intensity (GJ/m ²)	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
CO ₂ Emissions Intensity (tonnes/m ²)	0.175	0.183	0.179	0.177	0.184	0.182	0.174	0.173	0.176	0.174	0.173	0.171	0.169	0.168	0.166
Indirect Emissions: Electricity															
Electricity Cost	478,424	493,455	516,819	533,587	559,438	491,942	473,000	470,571	486,802	478,851	470,950	463,011	455,073	447,135	439,140
Electricity Consumption (kWh)	8,298,800	8,731,016	8,328,400	8,286,800	8,680,400	8,483,935	8,093,355	8,297,592	8,647,232	8,506,000	8,365,000	8,224,000	8,083,000	7,942,000	7,800,000
CO ₂ Emissions (tonnes)	6,743.1	7,094.3	6,767.2	6,733.4	7,053.2	6,893.5	6,576.2	6,742.1	7,026.2	6,911.5	6,796.9	6,682.3	6,567.8	6,453.2	6,337.8
Direct Emissions:															

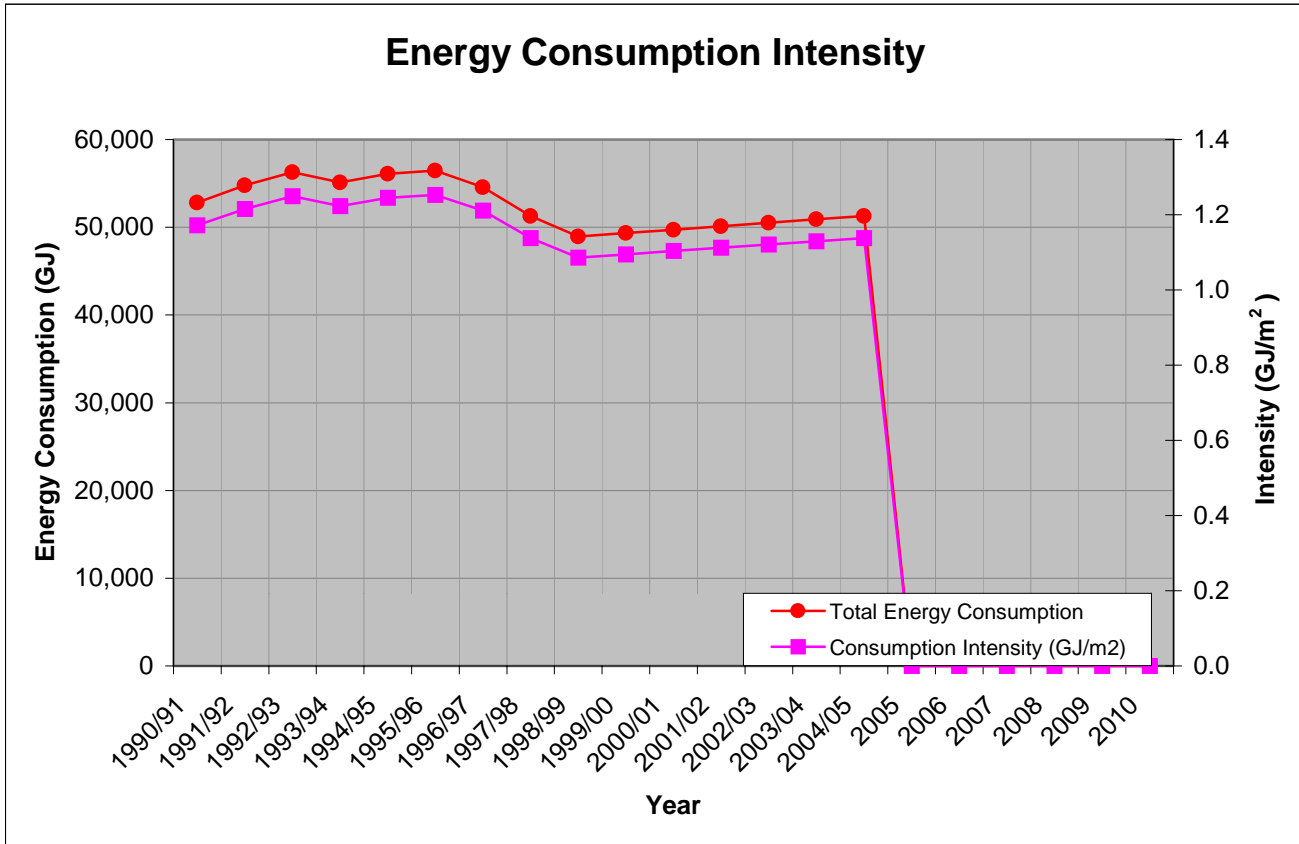
Regina Health District
Energy Management Action Plan

Steam (Gas)																
Steam Cost		165292	192,018	213,365	205069	202986	208,219	197,365	173,045	155,241	163,012	170,842	178,672	186,502	194,332	202,180
Steam Consumption (lb)		21,754,220	22,123,760	24,935,280	23,972,650	23,556,560	24,566,640	24,105,680	20,304,512	16,885,680	17,738,000	18,590,000	19,442,000	20,294,000	21,146,000	22,000,000
Equivalent Energy Consumption (GJ)		22,951	23,341	26,307	25,291	24,852	25,918	25,431	21,421	17,814	18,714	19,612	20,511	21,410	22,309	23,210
CO₂ Emissions																
CO ₂ (tonnes)		1,140.2	1,159.6	1,306.9	1,256.5	1,234.7	1,287.6	1,263.4	1,064.2	885.0	929.7	974.3	1,019.0	1,063.7	1,108.3	1,153.1
N ₂ O (tonnes)		4.41	4.49	5.06	4.86	4.78	4.98	4.89	4.12	3.42	3.60	3.77	3.94	4.12	4.29	4.46
CH ₄ (tonnes)		0.53	0.54	0.61	0.58	0.57	0.60	0.59	0.49	0.41	0.43	0.45	0.47	0.49	0.52	0.54
Total CO₂ Equiv. (tonnes)		1,145.1	1,164.6	1,312.6	1,261.9	1,240.0	1,293.2	1,268.9	1,068.8	888.9	933.7	978.6	1,023.4	1,068.3	1,113.1	1,158.1

Wascana Rehabilitation Centre



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