THE UNIVERSITY OF WINNIPEG

Climate Action Plan

2012-2016

Contents

List of Abbreviations

AVP – Associate Vice President
CO2e - Carbon Dioxide Equivalent
CSC - Campus Sustainability Council
CSO - Campus Sustainability Office
EcoPIA - Ecological People in Action
FY - Fiscal Year (April 1 - March 31)
GESA - Geography & Environmental Studies Students' Association
GHG - greenhouse gas
IAP - Initial Action Plan
LEED - Leadership in Energy & Environmental Design
RCFE - Richardson College for the Environment
ROI - Return on Investment
STARS - Sustainability Tracking, Assessment, & Rating System
TOR - Terms of Reference
UWCRC - University of Winnipeg Community Renewal Corporation
UWSA - University of Winnipeg Students' Association
VP Finance & Admin - Vice President Finance & Administration
VP HR, Audit & Sustainability - Vice President Human Resources, Audit & Sustainability

Context

Global Emissions and Commitments

Climate change is upon us. Still, governments worldwide are unable to establish international treaties and develop national climate action policies that respond to science. The Copenhagen Accord, which has been signed by 141 countries, acknowledges that

> to achieve the ultimate objective of the [UN Framework] Convention [on Climate Change] to stabilize greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, we shall recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius (Decision -/CP15 The Conference of the Parties takes note of the Copenhagen Accord of 18 December 2009).

While recent scientific research suggests that even a 2 degree global temperature increase could prove very dangerous (Fischetti 2011), much research has gone into determining required greenhouse gas emission reductions in order to remain under this 2 degree threshold. This research suggests that current policies around the world will fail to achieve the greenhouse gas emissions reductions that will avoid a 2 degree rise in temperature.

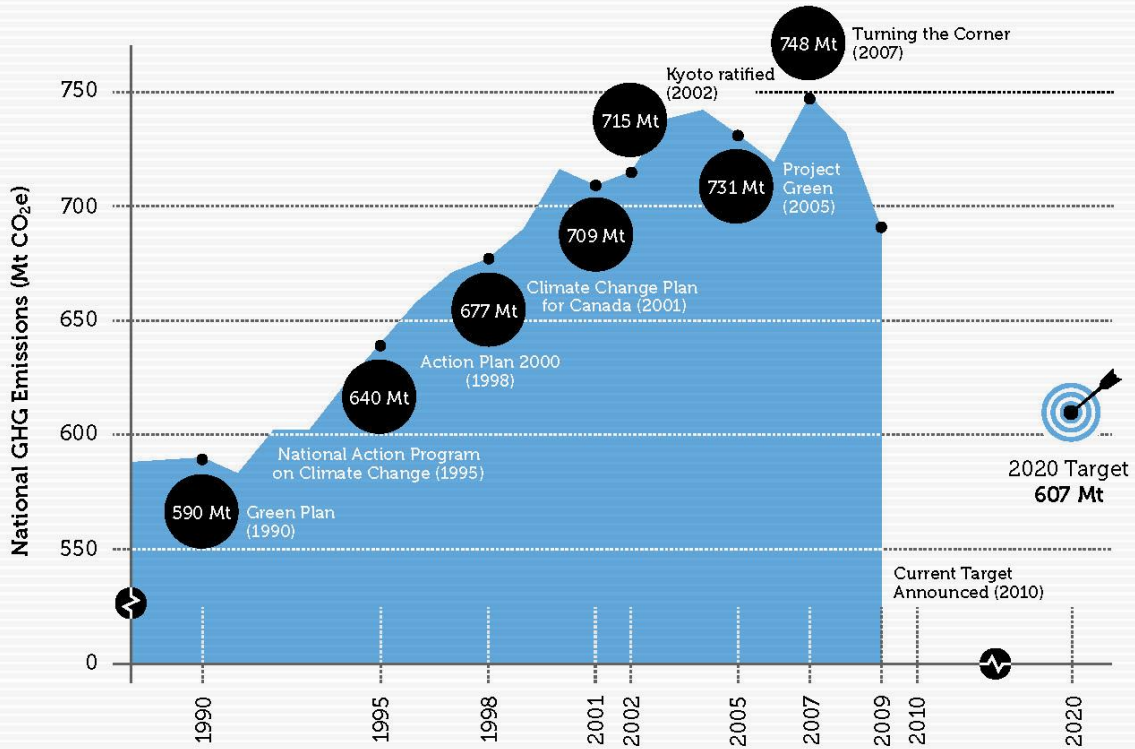
In a policy paper developed in response to the Copenhagen Accord, Nicholas Stern and Christopher Taylor concluded that in order to have a 50 per cent chance of limiting global temperature rise to 2 degrees, annual global emissions must peak and fall to around 40-48 billion tonnes of carbondioxide-equivalent (CO_2e) by 2020. This finding is in line with research supporting the conclusions of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Stern and Taylor further conclude that *if* countries meet the greenhouse gas emission commitments they made as part of the Accord, global emissions will reach about 48.2 to 49.2 billion tonnes - a reduction of 6.7 to 7.7 billion tonnes compared with the associated 'business as usual' forecast for emissions in 2020 of 55.9 billion tonnes (Stern and Taylor 2010, 3).

While other studies' predictions vary somewhat – in large part due to differing assumptions in their calculations – none predict that current international commitments will achieve the internationally agreed upon goal of limiting global temperature rise to 2 degrees (Stern and Taylor 2010, 10). Stern and Taylor's estimates are, in fact, among the most optimistic.

Canada's Emissions and Commitments

Canada's response to the climate crisis can be traced back to its 1990 *Green Plan*. The Canadian response has since gone through several iterations, as seen in the charts below. These same charts also illustrates that despite these responses, emissions are significantly higher than they were in 1990 (unless otherwise stated, all images are from *Reality Check: The State of Climate Progress in Canada,* published by the NRTEE).

TIMELINE OF FEDERAL APPROACHES TO CLIMATE CHANGE AND EMISSIONS TRENDS



Source: Data taken from Environment Canada 2011b

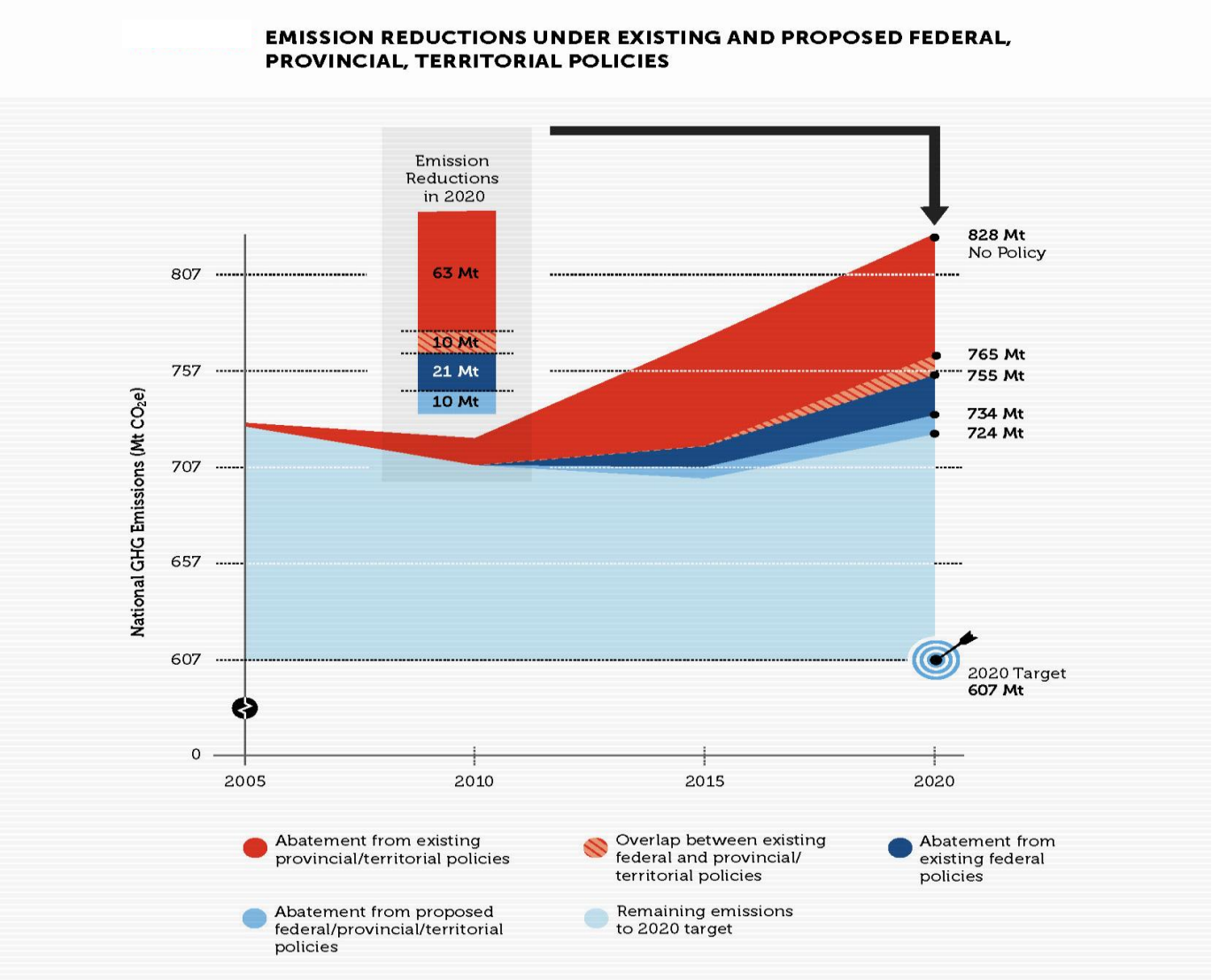
CANADA'S CHANGING TARGETS

YEAR TARGET WAS SET	TARGET	BASE YEAR EMISSIONS (Mt CO_2e)	PROJECTED EMISSIONS TARGET (Mt CO_2e)
1988	20% below 1988 levels by 2005	588*	470 in 2005*
1990	Remain at 1990 levels by 2000	590	590 in 2000
1993	20% below 1988 levels by 2005	588*	470 in 2005*
1995	66Mt below 1995 levels by 2010	640	574 in 2010
1998	49Mt below 1998 levels by 2010	677	628 in 2010
2002	6% below 1990 levels by 2012[7]	590	555 in 2012
2007	20% below 2006 levels by 2020[8]	719	575 in 2020
2010	17% below 2005 levels by 2020[9]	731	607 in 2020

* *This is an approximate number based on data in Environment Canada 1999 and NRT calculations*

Today, Canada's climate change commitments are best understood within the framework of the federal government's 'Responsible Resource Development' (RRD) plan. According to the Federal Government, this plan aims to "unleash Canada's natural resource potential." It seeks to "streamline reviews of major projects by ensuring more predictable and timely reviews, reducing duplication, strengthening environmental protection, and enhancing consultations with Aboriginal peoples" (Government of Canada 2012).

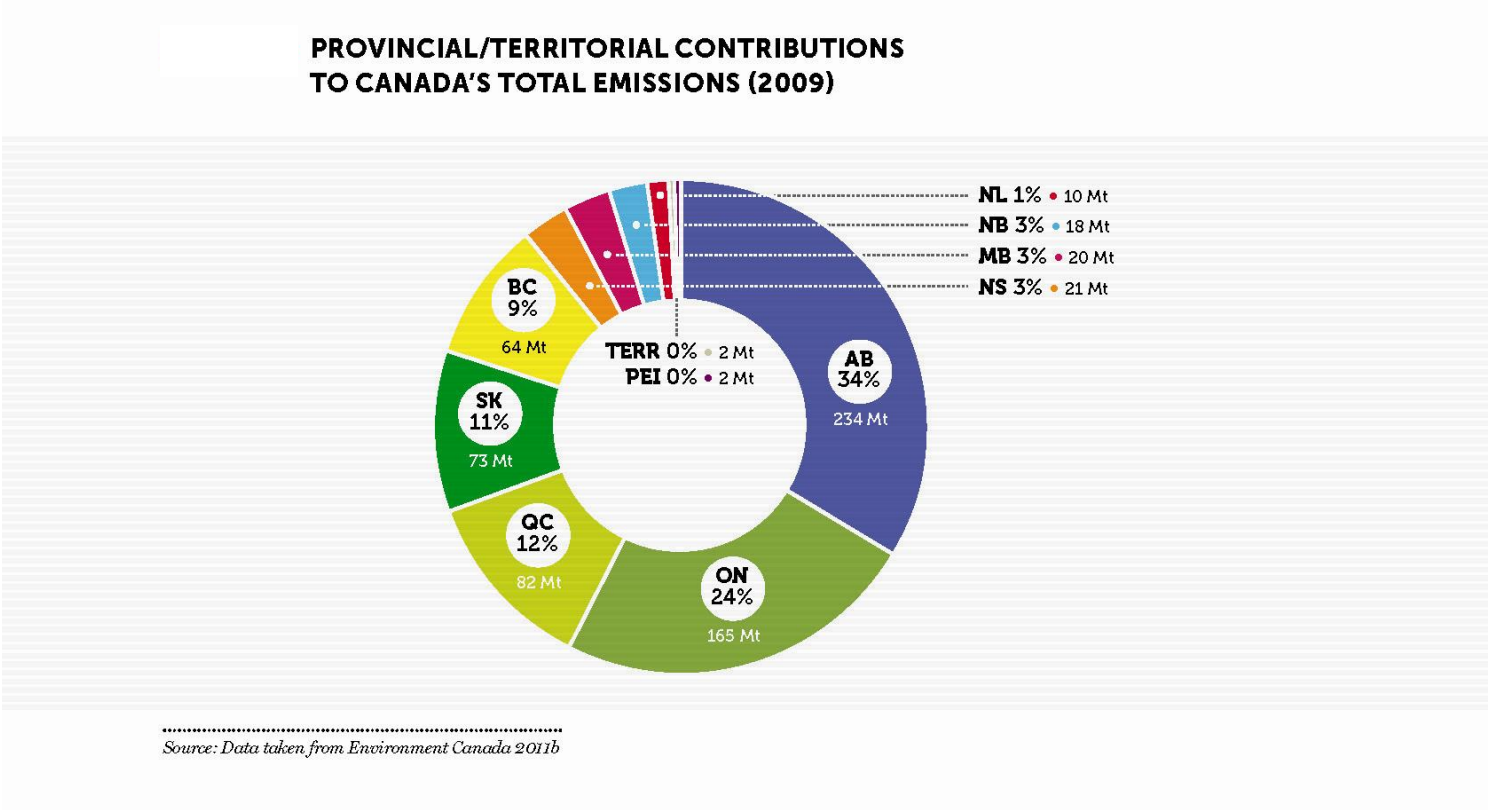
RRD includes significant changes to the Species at Risk Act, to the Fisheries Act and to the Navigable Waters Act. The Kyoto Protocol Implementation Act has been repealed, the National Round Table on Environment and the Economy has been eliminated, and several changes to federal support for academic research promise to shift the focus of research programs throughout the country. This reorientation of environmental regulations to better align with the Federal Government's resource extraction priorities are also reflected in Canada's commitments through the Copenhagen Accord. Our country committed to reducing emissions 17% below 2005 levels by 2020. This commitment is significantly more modest than Canada's binding commitment under the Kyoto protocol to reduce emissions 6% below 1990 levels.



Canada's emissions increased 17% between 1990 and 2009; however, they also decreased 6% between 2005 and 2009 (National Round Table on the Environment and the Economy (NRTEE) 2012, 32). This more recent decrease in emissions does represent a move in the right direction; however, changes are not likely to be enough to enable Canada to meet its commitments under Copenhagen, which, in turn, are not likely to be enough to contribute to adequate greenhouse gas emission reductions to avert significant global climate change impacts (see figure).

Manitoba's Emissions and Commitments

At 20 Mt in 2009, Manitoba's emissions accounted for approximately 3% of national emissions (National Round Table on the Environment and the Economy (NRTEE) 2012, 36). In Manitoba, the *Climate Change and Emissions Reduction Act*, in effect since June 2008, set an initial emissions reduction target for Manitoba of 6% less than 1990 emissions by December 31, 2012. Unlike the majority of other provinces, Manitoba has not set further emission reduction targets, nor are Manitoba's emissions projected to be 6% below 1990 levels by the end of this calendar year. Emissions have increased 10% since 1990, though they did decrease 3% between 2005 and 2009 – a drop that may be related to economic trends (Climate Change Connection 2012).



CANADA'S GHG EMISSION REDUCTIONS TARGETS*

	2020 TARGET (%)	2020 TARGET (Mt CO_2e)	2020 TARGET (Mt CO_2e)	2009 EMISSIONS (Mt CO_2e)
Canada	**17% below 2005**	**124 Mt below 2005**	**607 Mt**	**690 Mt**
BC	33% below 2007	21.5 Mt below 2007	43.7 Mt	63.8 Mt
AB**	18% above 2005	50 Mt *below BAU*	272 Mt	234.0 Mt
SK	20% below 2006	14.1 Mt below 2006	56.3 Mt	73.1 Mt
MB	Under Development (1.1 Mt or 6% below 1990 by 2012)			20.3 Mt
ON	15% below 1990	26.6 Mt below 1990	150.5 Mt	165.0 Mt
QC	20% below 1990	16.6 Mt below 1990	66.6 Mt	81.7 Mt
NB	10% below 1990	1.6 Mt below 1990	14.4 Mt	18.4 Mt
NS	10% below 1990	1.9 Mt below 1990	17.1 Mt	21.0 Mt
PEI	10% below 1990	0.2 Mt below 1990	1.8 Mt	1.9 Mt
NL	10% below 1990	0.9 Mt below 1990	8.3 Mt	9.5 Mt

* Unless otherwise noted, numbers in this column have been calculated by the NRT based on stated provincial and federal targets and data supplied in Environment Canada 2011b (see Appendix 7.6 for details).

** Alberta is the only province to state its 2020 emission reductions target in terms of megatonnes reduction from business as usual (BAU). This target comes from NRT calculations based on The Pembina Institute 2011 data which indicates that Alberta's BAU emissions in 2020 are projected to be 322 Mt.

There are several policies and programs in place in Manitoba that seek to have an impact of province-wide emissions (see Apendix C). Of these, *Tomorrow Now,* the Province's draft 8-year green plan, could represent an opportunity to re-energize Manitoba's action on climate change. While the draft *Tomorrow Now* document does include several initiatives aimed at reducing greenhouse gas emissions, the draft plan sets no new emission reduction targets nor does it address previous commitments made as part of its participation in the Western Climate Initiative to explore a cap and trade system for carbon.

A Role for Universities

Within this global, national, and provincial context of weak commitments and weaker implementation, what is the role of universities in effective action on climate change mitigation and adaptation? Given their relatively small contribution to global emissions, what value is there in universities reducing their GHG impacts? How can the teaching, research, and work that take place in universities support more effective regional, national, and global action?

Universities as Early Adopters

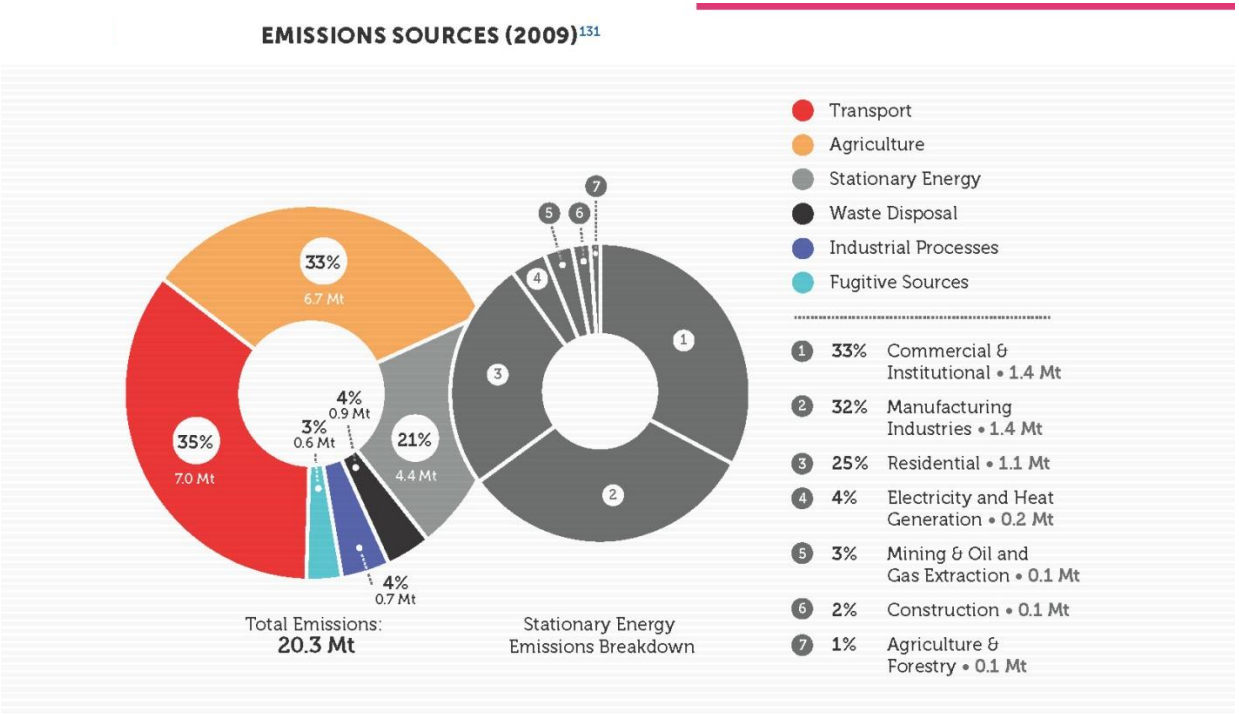
Universities are uniquely positioned to assume strong climate leadership. In the words of Anthony Cortese,

> Higher education has unique academic freedom and the critical mass and diversity of skills to develop new ideas, to comment on society and its challenges, and to engage in bold experimentation in sustainable living (Cortese 2003, 17).

Cortese and many of his colleagues (Kirk 2003, Orr 1995) will go even further, pointing out that this capacity confers on universities the *responsibility* to play a key role in bringing our world closer to its sustainability goals – effective action on climate change being one of the most pressing.

One of the key elements of this process is that of Universities being bold enough to take risks – to be among the first to implement the new technologies, new accounting practices, new levels of transparency, and new management models required to achieve real reductions in greenhouse gas emissions.

This kind of leadership proves that real climate action is possible. It demonstrates what is required to achieve the kinds of emission reductions required to respond to science. It makes measurable contributions to reducing emissions in some of the most important sources of emissions in Manitoba and in Canada: stationary energy (i.e. the burning of natural gas for heating buildings), transportation, and agriculture (see image below and Manitoba emissions inventory).



Universities as Centres for Climate Change Research

Universities can and must play a vital role in developing and communicating the knowledge needed to develop a strong scientific basis for climate policy, and, perhaps even more importantly given today's policy climate, in developing the ideas, analysis, and values required to achieve real emission reductions.

As centres for research, we can facilitate evidence-based decision making by supporting good science. We can also support research in policy, management, psychology, sociology, and culture. David Orr cites historian Jaroslav Pelikan as he calls on universities to "address the underlying intellectual issues and moral imperatives of having responsibility for the earth" (Orr 1995). This is a challenge to all disciplines in universities to consider the role they can play in addressing the root causes of climate change and other forms of environmental degradation. It is equally a challenge to University administrators to provide supports and resources to departments seeking to take up this mantle.

This imperative most obviously means that universities must support research directly related to climate science, policy and praxis; however, it also points to the need to consider the way in which other research can be applied to challenges related to climate change and to develop tools and supports to connect research and researchers with those individuals and groups developing climate solutions.

Universities as Centres for Teaching & Learning on Climate Change

Ultimately, universities must actively cultivate and encourage critical engaged citizenship among their students and throughout institutions as a whole. This work of cultivating and modelling the kind of engagement that can welcome the values, will, discernment, and commitment for real action on challenging and pressing issues is the most important work of liberal arts and science education.

As centres for teaching and learning we can also challenge students to evaluate the role that their careers, values, and lifestyles have in mitigating or exacerbating climate change, just as we can prepare them with the knowledge and abilities they will need to address and adapt to climate change. Universities can achieve this through the curriculum they teach, the priorities they demonstrate and model through their operations, and through the experiences they provide to students to connect classroom theory with real-world practice.

Anthony Cortese notes that "[h]igher education plays a critical but often overlooked role [… because] it prepares most of the professionals who develop, lead, manage, teach, work in, and influence society's institutions, including the most basic foundation of K-12 education" (Cortese 2003, 17). Recognizing this role means considering curriculum throughout university faculties and departments, considering the way in which students are engaged in the operational aspects of universities' climate action, and considering the principles and values the physical spaces and administrative practices of university campuses demonstrate and represent. In all of this, experiential learning becomes an increasingly important pedagogical tool to support students as they gain the abilities they need to respond to the climate challenges they are inheriting.

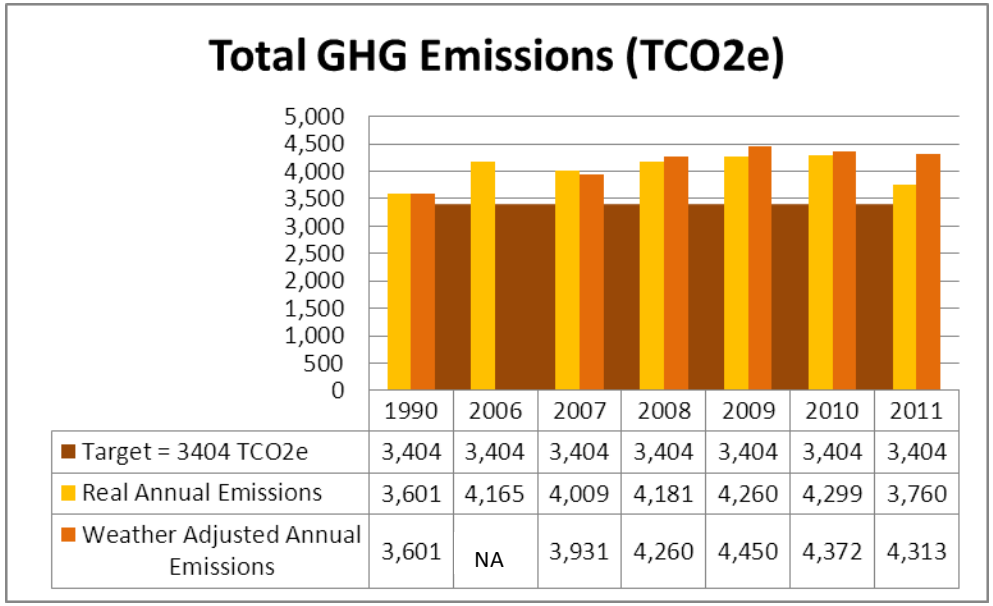
UWinnipeg Climate Action Plan

In keeping with the three ways in which universities participate in effective action on climate change mitigation and adaptation, the University considers its scope of climate action to include its own greenhouse gas emissions as well as the research, teaching and learning that takes place at our institution. Specific actions for each area are outlined below.

Historical Emission Inventories

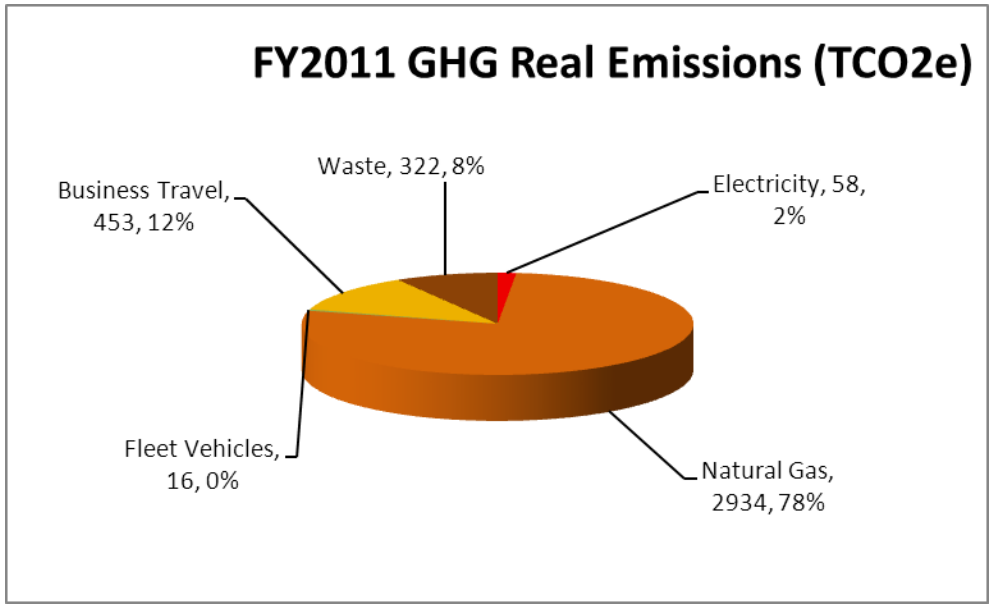
UWinnipeg has reported its greenhouse gas emissions annually since 2006 in its annual Sustainability Performance Reports. These reports are posted on the Campus Sustainability Office website. Reporting has taken place on a fiscal year basis (April 1-March 31), and the reporting methodology was developed internally to comply with ISO14064 standards. This methodology is included here in Appendix A.

In FY2012, the University developed a basic weather adjustment method in order to gain a better understanding of the impact of its various GHG reduction strategies. This method was limited due to a lack of access to building-specific utility data. While it does provide a general indication of weather-independent year-over-year GHG emissions, UWinnipeg will seek to develop more precise weather adjustment techniques moving forward. The method used to generate the year-over-year summary below is included in Appendix B.



	1990	2006	2007	2008	2009	2010	2011
Target = 3404 TCO2e	3,404	3,404	3,404	3,404	3,404	3,404	3,404
Real Annual Emissions	3,601	4,165	4,009	4,181	4,260	4,299	3,760
Weather Adjusted Annual Emissions	3,601	NA	3,931	4,260	4,450	4,372	4,313

Since 2006, the University has reported direct GHG emissions from Natural Gas and fleet vehicles (scope 1), indirect emissions from electricity (scope 2), and indirect emissions from solid waste and reimbursed business travel (scope 3). While the University endeavours to reduce all of its GHG emissions,[1] emissions from leased space, from commuting, and other scope 3 emissions have not been reported due to lack of data collection capabilities. The University plans to begin reporting emissions from paper purchases and commuting over the next two years (see *Action 2* for details). The proportion of emissions from each source is roughly similar year-over-year. Fiscal Year 2011 emissions are summarized in the table below.



UWinnipeg as Early Adopter

In a province with some of the lowest utility rates in the world, and with relatively low emissions to start with, how can the University achieve real reductions in greenhouse gas emissions? What changes need to be made to its mechanical systems? How can efforts in energy efficiency and greener building be financed? What management methods and administrative tools can facilitate real progress? In the coming years, these questions will be explored as the following initiatives are undertaken.

[1] For instance, in 2011 the UWSA Bike Lab opened its doors, and over the 2012/2013 academic year the University of Winnipeg Students' Association, with the support of the University, is working to establish a U-Pass for all students on campus.

Action 1: Register with *The Climate Registry* to report & verify 2012 GHG Emissions

In order to better align reporting practices with provincial trends, UWinnipeg will report its greenhouse gas emissions to The Climate Registry for this first time in 2012. Over FY2012, UWinnipeg will review its reporting methodology to align with TCR. This will also include a review of reporting boundaries and consideration of including more scope 3 emissions into inventory reports. In particular, the University will seek to report on emissions associated with paper consumption and commuter travel while continuing to report emissions from municipal solid waste and reimbursed business travel.

Action 2: Reduce absolute GHG emissions to 6% below by end of FY2012 and 10% by end of FY2016 (1990 baseline)

The University's Sustainability Policy sets the goal of carbon neutrality. The University emphasizes setting specific interim targets derived from quantitative data analysis and budget planning to ensure firm action plans exist to achieve them. Current emission reduction targets were developed after the completion of a sustainability audit of campus facilities. They reflect projected emission impacts of new construction projects and projected emission reductions from existing buildings.

UWinnipeg remains committed to achieving absolute emission reductions. Given the period of growth underway at the University, this commitment requires that considerable emission reductions be achieved in existing buildings to offset the ongoing emission impacts of an expanded campus.

To this end, the University's main emission-reduction activity through to 2016 will consist of an energy retrofit to existing campus buildings. The retrofit plan consists of control, ventilation, and heating system changes to existing buildings. Once complete, these changes will provide annual savings of up to 1,200 T CO2e, 650,000 m^3 of natural gas and 700,000 KwH of hydroelectricity. The measure package is projected to cost approximately $2M with a simple payback of 7-9 years. In 2011, the University was granted a $58,400 Climate Mitigation Action Grant through the Manitoba Climate Investment Pilot Program to support the first phase of retrofit measures. This seed money has been further leveraged to secure $1.9M from the Council on Post-Secondary Education for the completion of both phases of the retrofit project. Some measures have already been completed, and the full retrofit package will take approximately 2 years to carry out.

This retrofit will build on the installation of the hybrid heating system consisting of two electric boilers and new controls to enable UWinnipeg to switch from Natural Gas to electric boilers at off-peak times. The smaller of the two boilers was operational as of January 2011 and the second passed its safety inspection in April 2012.

Other management practices and tools will also be developed to ensure greater monitoring and transparency in new building development and acquisition processes and to address other sources of GHG emissions. These activities are summarized in the table below, which is adapted from the *UWinnipeg Sustainability Strategy*.

Target: Reduce GHG emissions to 6% below 1990 levels by 2012 and to 10% below 1990 levels by 2016.			
Action	**Timeline**	**Budget**	**Responsibility**
Control, ventilation, and heating system changes to existing buildings (1200T CO2e) completed.	Phase I 2011/2012 Phase II by FY2015	$2.5 M 7-9 year ROI	VP, Finance & Administration; Director, Physical Plant; Controls Technician, Physical Plant
Develop & implement UWinnipeg-specific 'Green Building Standards' to apply to all new building projects.	FY2011/2012	Within existing budgets	Director, Community Renewal Corporation; Manager, Campus Sustainability Office
Ensure that all new building acquisitions undergo an evaluation of their impact on the energy and GHG profile of campus.	Immediately/Ongoing	Part of capital development budgets	Director, Community Renewal Corporation
Utility data for owned and leased space is collected directly from utility providers.	FY2011	Within existing budgets	Chief Engineer, Physical Plant; Manager, CSO
Improved waste, recycling, and composting volume tracking system in place.	FY2012	TBD	Manager, CSO; Director, Physical Plant
Compost collection sites in all food service areas and main thoroughfares.	FY2012	TBD	Manager, CSO; Director, Physical Plant
Office-sized compost bins in place in department offices.	FY2013 – 40% FY2014 – 60%	TBD	Manager, CSO; Director, Physical Plant
Recycling bins in all classrooms, hallways, and offices throughout campus.	FY2011	External funding	Manager, CSO; Director, Physical Plant
Zero stand-alone garbage bins on UW campus.	FY2011	External funding	Manager, CSO; Director, Physical Plant
Student peer-to-peer waste stream education programming in place.	See Goal #9	See Goal #9	Manager, CSO
Ensure CSO participation in selection and implementation of new financial/resource management system.	FY2014	TBD	AVP Finance & Comptroller; Manager, CSO
Increase post-consumer content of all paper products purchased on campus (pending quality testing, increase to: 50% post-consumer content for office paper and letter head; 100% recycled content for business cards).	FY2012	TBD	AVP Finance & Comptroller; Purchasing Agents; Coordinator, Printing & Parking

UW established as car co-op site.	FY2012/2013	Within existing budgets	Manager, CSO
Adequate bicycle parking in place in all UW buildings.	Ongoing	Within existing budgets	Manager, CSO
Ongoing UWSA Bike Lab programming in place.	Ongoing	UWSA budgets	UWSA Outreach & Special Projects Coordinator
Tracking system in place for GHG impacts of paper purchases	FY2013	Within existing budgets	Manager, CSO
Tracking system in place for GHG impacts from commuting to and from campus.	FY2012	TBD	Manager, CSO
UPass and EcoPass transit options revisited as opportunities arise.	As possible	TBD	Manager, CSO
Green Office Certification in Place.	September 2012 - implemented FY2014 – revised system to respond to roll out of needs assessment	$10,000 for program development; Ongoing costs TBD, sources of funds will include work study program	Manager, CSO
Needs assessment of administrative systems tools for greening processes complete.	FY2012 – needs assessment FY2013 – action plan roll out	TBD	Manager, CSO
Sustainability related professional development needs are identified and an action plan is rolled out.	FY2012 – needs assessment FY2013 – action plan roll out	TBD	Manager, CSO

Action 3: Continue to refine weather adjustment methodology & update GHG calculation methodology as needed

Because of the significant variations in campus population and frequent changes to buildings stocks and uses, University campuses present a particular set of challenges when it comes to accurately adjusting energy consumption for annual weather variations. The University has developed a weather adjustment methodology for the purposes of this plan. It will seek to continually refine this method to improve the accuracy of weather adjustments and to better understand the margins of error associated with weather adjustment calculations. Some

elements of the University's current GHG calculation methodology also require updating. Current calculations in need of updates are GHG emissions from waste, GHG emissions from business travel, and calculations for emission removals.

Action 4: Participate in public consultations and dialogue about climate change

As UWinnipeg continues to implement and develop its climate action strategies, an increasing number of challenges are emerging that have triggers beyond the University's direct control. Energy economics in the province, the structure of the waste industry, and existing sources of private and government support for sustainability-related efforts all have a significant impact on our ability to achieve our sustainability goals. The University will act as an advocate for responsible climate action. It will seek to be an active participant in provincial and federal consultations and dialogues about climate policy, just as it will proactively seek to create relationships with business and industry that advance progress on climate action.

Action 5: Ensure that new specific targets and detailed implementation plans are in place by the end of 2016

By the end of 2016, UWinnipeg will release a new set of GHG emission reduction targets and timelines with accompanying action plans. As natural gas consumption consistently accounts for approximately 80% of the University's emission inventory and close to 100% of its scope 1 GHG emissions, the University will be required to develop a plan to significantly reduce – or even eliminate - its use of natural gas. As such, UWinnipeg is currently conducting research into geographically relevant non-emitting energy alternatives, identifying funds and financing options for phasing out natural gas, and seeking out opportunities for partnerships with external stakeholders aimed at turning UWinnipeg into a demonstration site for fossil-fuel-free operations.

UWinnipeg as a Centre for Climate Change Research and Dialogue

As a public institution engaged in significant teaching and research, and with an increasingly multi-disciplinary network of scholars working in sustainability-related fields, what role might we play in facilitating dialogue within and among academics, business and government to advance sustainability throughout the province? What structures might be established through the Richardson College for the Environment or elsewhere on campus in support of such a role for our University? How might our students be included in such structures so that their abilities as critical thinkers, engaged scholars, advocates, and activists is cultivated and strengthened? These questions pertaining to the University's academic engagement with GHG management, climate policy, science, theory, and philosophy underline the immense potential inherent in creating an arena for scholarly dialogue about sustainability that is grounded in UWinnipeg's liberal arts and science tradition, supported by our applied and professional programs, and accessible to a broader audience. Ideally, this broader audience will include those individuals and institutions which create the policies, programs, and practices that enable or restrict the sustainability performance not only of the University, but of institutions throughout our province and our country.

Action 1: Develop an inventory of Current Climate Research

The University currently publishes a list of sustainability-related research in its annual sustainability performance reports; however, this list is known to be incomplete. In 2012, the University will strike a committee of faculty and staff to develop the means to better capture the full scope of climate-change mitigation and adaptation research taking place at the University. This inventory will be made available in the University's first STARS report and will be updated annually.

Action 2: Engage with faculties about how to better support & communicate climate change research

Once a mechanism for documenting climate change research has been established, the University will work with faculties to develop a plan to better support and communicate this research on campus, to various levels of government, and to the private sector.

UWinnipeg as a Centre for Teaching & Learning on Climate Change

Several departments and programs at UWinnipeg work to prepare students to address the various aspects of climate change mitigation and adaptation. These include undergraduate degree programs offered through the department of Environmental Studies, Geography, International Development Studies, Politics, and Biology, and Human Rights and Global Studies. It also includes the Masters of Development Practice, the Master of Arts in Environmental, Resource and Development Economics (ERDE) and the Masters in Indigenous Governance. Alongside these academic programs, UWinnipeg students are regularly invited to engage in experiential learning opportunities related to climate change in departments throughout the University and engage in climate advocacy and activism through various student associations and groups. The University will build on and strengthen these programs and practices as it further develops and systematizes its approach to cultivating climate leaders and solution builders.

Action 1: Develop an inventory of climate-related curriculum

While the University has a general knowledge of the range of courses and programs in place that relate to climate change, it will benefit from a more complete understanding of climate-change related curriculum on offer throughout its various departments and programs. In 2012, the University will strike a committee of faculty and staff to develop the means to better capture the full scope of climate-change mitigation and adaptation teaching and learning taking place at the University. This inventory will be made available in the University's first STARS report and will be updated annually.

Action 2: Engage with faculties and students about how to improve and support curriculum content and delivery

Once a mechanism for documenting climate change related teaching and learning has been established, the University will work with faculties and students to develop a plan to better support and communicate these learning opportunities on campus. This plan will include consideration of opportunities and strategies to strengthen connections between curricular, extra-curricular, and experiential teaching and learning.

CAP Governance, Implementation, Monitoring, and Evaluation

The actions outlined in this plan are also included in the *UWinnipeg Sustainability Strategy* and are subject to the same governance structures, decision-making criteria, and monitoring and evaluation mechanisms as the strategy. Refer to the strategy for further detail.[2]

Conclusion

Climate action plans are living documents that must be flexible to unexpected opportunities and circumstances. This plan is intended to provide a framework for climate action at UWinnipeg that is responsive to the priorities identified through consultation and to the current organizational and external environment.

The University recognizes that this plan does not address every aspect of climate action, but that it does provide a rich set of initial actions that will improve its capacity to reduce greenhouse gas emissions and support climate change research, teaching, and learning in the years ahead. UWinnipeg remains committed to continually reducing its absolute greenhouse gas emissions. While maintaining its capacity to respond to new opportunities, challenges, and risks, the University will work to meet or exceed the goals and targets set in this plan.

[2] http://www.uwinnipeg.ca/index/cms-filesystem-action/pdfs/sustainability/uwinnipeg_sustainability_strategy.pdf

Appendix A: UWinnipeg GHG Emission Accounting Methodology

The University of Winnipeg
GHG Management Handbook
(Rev. September 2012)

Introduction

The purpose of this document is to assemble all of the policies, procedures, reporting protocols, and calculation methods relating to the University's GHG (green house gas) emissions, measurement and management activities. A secondary purpose is to assure that the University's system for managing GHG measurements, control methods and reporting activities are consistent with CSA / ISO 14064 standards, and can provide a basis for continuous improvement in the future.

The approach adopted by the University's GHG management inventory attempts to reflect best practice as embodied in both the standards and requirements set by Environment Canada in its National Pollution Release Inventory, as well as internationally recognized best practice as reflected in the CSA / ISO 14064 standards for GHG reporting. To adopt a lesser standard or one which less well integrates the best current science on GHG measurement seemed to fall short of due diligence for the University.

GHG Reporting Inventory

Reporting Period: GHG management inventories are compiled on a fiscal year basis from 1 April to 31 March of each year.

Intended Users

The GHG management inventory is intended to inform reporting to a variety of stakeholders. The inventory provides the basis for preparing reports specific to different stakeholder groups and will therefore include varying levels of detail.

- General public, students and media via website postings of summary data, year over year comparisons, and performance to date compared to targets;
- University administration and department managers, complete reporting of entire inventory with all relevant data via written and electronic reports annually or upon special request.
- Community organizations, alumni, NGOs, etc., same reporting process as for general public.

- Regulatory agencies of the City, Provincial or Federal Governments, as per their respective reporting requirements.

Standards / Protocols Adhered To

CSA / ISO 14064; Environment Canada National Pollution Release Inventory.

Organizational Boundaries

The organizational boundaries applicable to this inventory are based on the "operational control share" approach to calculating GHG emissions and as specified by the Scope specified for the University's Sustainability Management System.

Operational Boundaries

The GHG management inventory includes

- Energy indirect emissions and removals incurred from consumption of electricity;
- Direct emissions and removals incurred from consumption of natural gas for space heating, stationary fuels, transportation fuels, and organic wastes;
- Emissions due to business travel by employees of the University.

Types of GHGs

The GHG management inventory includes the following substances:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Oxides of Nitrogen (NOx)
- Sulfur Hexaflouride (SF_6)
- All Hydrofluorocarbons (HFCs) as specified by Environment Canada's National Pollution Release Inventory.
- All Perfluorocarbons (PFCs) as specified by Environment Canada's National Pollution Release Inventory.

Quantities of emissions are reported by gas and by category and also aggregated as CO_2 equivalents (CO_2e).

Purpose of the Inventory

The purpose of the GHG inventory is to provide an empirical foundation for decision-making and target-setting by University Senior Administration as well as align University GHG management practices with internationally recognized best practices.

Targets for GHG Emission Reduction

The University of Winnipeg Air Quality Management Policy (90.0002) forms part of its general Sustainability Policy and commits the University to continuously reduce emissions of pollutants to the Earth's atmosphere with the ultimate goal of zero net emissions. Interim targets on the way to the complete elimination of emissions are set as capital becomes available and operations allow.

Principles of GHG Management

The University's GHG management strategies aim to express (a) cost effective approaches to GHG emission reduction, (b) social responsibility in management of emissions, (c) verifiability of reports and claims to emission reductions, (d) credibility of measurement and management methods, and (e) continuous improvement of all policies and procedures related to GHG management.

Principles of GHG Quantification

The University's GHG management strategies aim to reflect principles of quantification that are: (a) transparent and publically accessible, (b) relevant to the management activities designed to minimize their negative impacts, (c) accurate, (d) complete, and (e) consistent with credible standards applicable in Canada and world-wide.

GHG Management Team

Manager, Campus Sustainability Office
Service Coordinator, Physical Plant
Chief Engineer
Executive Director, Facilities Management
VP – H.R., Audit and Sustainability
VP – Administration and Finance

Organizational Policies, Strategies and Targets

The GHG Management Inventory is corollary to the University's Air Quality Management Policy (90.0002), its omnibus Sustainability Policy (90.0001), and requirements under the Manitoba Sustainability Development Act Regulation 2004. The inventory provides empirical data on GHG emission performance, a basis for strategic decision-making respecting capital investments, evidence of due diligence in reduction of GHG

emissions, and data, profiles, and trend analyses that help Senior Administration assess the effectiveness of past GHG manage ment programs and plan for future ones.

The GHG Management Inventory forms part of the broader Sustainability Management System of The University of Winnipeg, and findings from the Inventory are incorporated as part of Air Quality Management planning, assessment and reporting.

Quantification and Monitoring Procedures

Base Year(s)
For progress tracking purposes, the University calculates emissions based on fiscal years beginning 1 April and ending 31 March of every calendar year. Year-over-year comparisons are then made to each preceding fiscal year with the intention of developing a 10 year data set for trend analysis purposes.

The University has made a policy commitment to achieve compliance with the emission reduction targets set under the Kyoto Pro tocol to the United Nations Framework Convention on Climate Change (1997) by reducing its overall GHG emissions to a minimum of 6% below 1990 levels by 2012. For purposes of Kyoto compliance, therefore, FY1990 is used as a base year.

Total GHG Emissions
Total annual GHG emissions are the sum of all direct and indirect emissions of GHGs from the university.

Reportable Substances
The university will calculate and report emissions of all substances specified under the GHG emission calculation protocol of the Canadian Standards Association and as specified by the terms of the CSA – ISO 14064-1:2006 standard for reporting. These will include but are not limited to carbon dioxide CO_2, methane CH_4, nitrous oxide N_2O and Sulphur hexafluoride SF6, as well as all applicable Hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) according to the attached schedule.

Indirect Emissions
Indirect GHG emissions are emissions arising from electrical consumption. Indirect emissions in SI tonnes CO_2e are calculated by multiplying total electrical consumption in kWh for any given year by the emission factor for that year for Manitoba as obtained from Manitoba Hydro and dividing by 1000.

Data on consumption of electricity by the university is compiled from monthly consumption histories and billing records maintained by the university's Chief Engineer. Electricity consumption incurred at university residences is obtained from the Student Services Residences office.

(Total Annual kWh Electricity Consumed) X (CO_2e Emission Factor) / 1000 = Indirect GHG Emissions CO_2e tonnes. CO_2 Emission Factors change from year to year. They can be obtained from the GHG Issues Engineer at Manitoba Hydro.

Direct Emissions

Direct GHG emissions arise from the following sources: (a) natural gas consumption; (b) fleet vehicle fuel consumption; (c) business travel; (d) municipal solid wastes generated by the university.

(a) **Natural Gas Emissions** – Data on consumption of natural gas by the university is compiled from monthly consumption histories and billing records maintained by the university's Chief Engineer. Natural gas consumption incurred at university residences is obtained from the Student Services Residences office.

GHG emissions from combustion of natural gas are calculated separately for CO_2, CH_4, and N_2O, by multiplying total natural gas consumed in m^3 by the appropriate emission factor, dividing by 1000 to arrive at emissions in SI tonnes, and then adding these to arrive at the total of CO_2e from natural gas sources. The emissions factors for each gas are obtained from Environment Canada's *Emission Factors used for Canada's Greenhouse Gas Inventory*.[3] Each gas is to be calculated separately to allow for reporting based on gas type as well as aggregate emissions.

GHG_{NG} (t. CO_2e) = (NG m^3 x 1.877kg. CO_2/1000) + (NG m^3 x 0.000037 kg. CH_4/1000) + (NG m^3 x 0.000035 kg. N_2O/1000)

Where NG = natural gas in m^3.

(b) **Fleet Vehicle Emissions** – Data on consumption of fleet vehicle fuels is collected monthly from the Physical Plant Office.

Calculation of GHG emissions arising from fuel consumed by university fleet vehicles are calculated separately for CO_2, CH_4, and N_2O, by multiplying total fuel consumed in liters by the appropriate emission factor for each gas, dividing by 1000 to arrive at emissions in SI tonnes, and then adding these to arrive at the total of CO_2e from fleet vehicle fuel sources. The emissions factors for each gas are obtained from Environment Canada's *Emission Factors used for Canada's Greenhouse Gas Inventory*.[4] All vehicles are treated at Tier 2 Light Duty Gasoline Vehicles (LDGV) Each gas is calculated separately to allow for reporting based on gas type as well as aggregate emissions.

GHG_{FV} (t. CO_2e) = (l. fuel x 2.289 kg CO_2/1000) + (l. fuel x 0.00014 kg. CH_4/1000) + (l. fuel x 0.000022 kg. N_2O/1000)

Where FV = Fleet Vehicle Emissions.

(c) **Business Travel** – Business travel emissions are defined as GHG emissions incurred directly through travel by University administration, faculty, support staff, or students while on University business. Not included in this value are emissions incurred by administration, faculty, support staff or students through routine commuting to and from the campus in the course of attending classes and / or working at the University.

Data on reimbursed business travel are compiled monthly by the Campus Sustainability Office from information collected at the Financial Services Office pertaining to distances traveled and modes of transportation used by all staff making claims for travel reimbursements. These data are then aggregated by mode of transportation and GHG emissions calculated for each modality and aggregate emissions.

Kilometers traveled by car are estimated to incur emissions at the fuel consumption rate of 10 kms. / liter.

GHG emissions from business travel are calculated in CO_2e only, based on kilometers traveled and mode of transportation (urban bus, inter-city bus, aircraft, boat, intercity passenger rail) multiplied by the appropriate emission factor per passenger kilometer as specified in *Canadian GHG Challenge Registry Guide to Entity & Facility-Based Reporting* (Version 4.3), Table 6. Emissions from automobile business travel are calculated based on kg. CO_2e / L. of gasoline. These values are then divided by 1000 to yield emissions in SI tonnes CO_2e and then summed to return total emissions from business travel.

[4] www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=DDCA72D0-1, accessed December 2012.

GHG_{BT} (t. CO2e) = ($km._{UB}$ x 0.146 kg CO_2e/1000) + (km_{IB} x 0.0565 kg. CO_2e/1000) + ($km._{AIR}$ x 0.1359 kg. CO_2e/1000) + ($km._{RAIL}$ x 0.1033 kg. CO_2e/1000) + (l. $fuel_{CAR}$ x 2.36038 kg. CO_2e/1000)

Where:
BT = Business Travel Emissions
UB = passenger kms. by urban bus
IB = passenger kms by inter-city bus
AIR = passenger kms. by air
RAIL = passenger kms. by rail
CAR = liters of gasoline assuming 10 liters / 100 kms. of travel.

Biomass Emissions

GHG emissions from biomass are limited to only a few sources at the university:

- Uncomposted pre- and post-consumer organic materials from campus food services;
- Uncomposted organic materials from grounds maintenance activities;
- Uncomposted organic materials from the university vivarium, greenhouse and other research facilities using animals or plants.

The quantities of these materials which are *not* captured by the university's composting program are estimated based on its Annual Waste Audit. Emissions from uncomposted organic materials are then calculated as part of the emission calculation procedure applied to Municipal Solid Waste as follows:

Municipal Solid Wastes – Calculation of emissions from solid waste going to landfill (total waste generated less materials diverted to recycling and composting) is made for kg. CO_2e only, by waste type, then divided by 1000 to obtain CO_2e in SI tonnes. Emissions factors for each waste type are obtained from Australian Greenhouse Gas Office (2004). *AGO Factors and Methods Workbook –August 2004.* Australian Government: Commonwealth of Australia, pp. 17-18. ISBN 1920840-37-0. The equation used to calculate GHG emissions from any given source material is as follows:

GHG emissions (t. CO_2e) = [((Q x DOC x DOC_F x F_1 x 16/12) – R) x (1 – OX)] x 21

Where: Q = t. municipal solid waste
DOC = Degradable organic carbon as a proportion of the particular waste type.
DOC_F = Fraction of degradable organic carbon dissimilated for the waste type produced with a default value to 0.55 for paper and paper board, wood, straw and garden and park waste, 0.77 for other (non lignin containing) materials, 0.66 for co-mingled wastes.
F_1 = Carbon fraction of landfill gas which has a default value of 0.5.
16/12 = Conversion rate of carbon to methane.
R = Recovered CH_4 in an inventory year and expressed in tonnes.
OX = Oxidation factor (0.1).
21 = CH_4 global warming potential used to convert the quantity of methane emitted to CO_2e from quantity of waste produced.

To obtain total CO_2e emissions from municipal waste, the above captioned equation is applied to each waste type by weight to return CO_2e emission for that waste type, then all CO_2e emissions were summed to return the aggregate CO_2e for total waste discharged each year.

$$GHG_{MSW}\ (t.\ CO_2e) = (Q_{PAP} \times 2.8\ t.\ CO_2e) + (Q_{TEX} \times 3.9\ t.\ CO_2e) + (Q_{WS} \times 2.1\ t.\ CO_2e) + (Q_{GP} \times 1.2\ t.\ CO_2e) + (Q_F \times 1.5\ t.\ CO_2e) + (QcoM \times 1.2\ CO_2e)$$

Where: Q = Quantity of waste type in tonnes;
PAP = Paper and paper board waste;
TEX = Textile waste;
WS = Wood and straw;
GP = Garden and park waste;
F = Food;
CoM = Co-mingled wastes.

Emissions Removals

Carbon removals / sequestration occur in two ways at the University:

- Sequestration of carbon in growing trees;
- Removals / avoidance of marginal increases in emissions through emission abatement projects or technologies.

Calculation of sequestration rates in trees is accomplished using *Canadian GHG Challenge Registry Guide to Entity & Facility-Based Reporting, 2005.* Ottawa, ON: Canadian Standards Association GHG Registries, p. 28. rate of 9.18 kg./tree/yr. for urban forest, times the number of trees comprising the University's "urban forest" in any given fiscal year. Trees planted are added to this total and trees removed during the year are subtracted.

Calculation of GHG removals / emission avoidance attributable to specific abatement projects or technologies are audited and verified on a project-by-project basis.

Total Emissions

Total emissions for the University are obtained by summing the emissions from all indirect and direct sources by gas type in CO_2e and then subtracting all emissions removals for a grand total. For comparison purposes, these values are then corrected to correct for severity of winters as measured in Heating Degree Days for Winnipeg as obtained from Environment Canada archives. Additional values may be generated to yield "intensity measures" as when total GHG emissions are divided by the total floor area to obtain emissions per m^2, or divided by total FCEs (full course equivalents) to obtain a "production" intensity measure of GHG / FCE.

Information Management System

The GHG Inventory and Reporting System is maintained by the Campus Sustainability Office (CSO), Room 1Y08, 359 Young Street, Winnipeg, Manitoba. Raw data from all previous GHG reports, compilation of data for up-coming reports, all draft and final reports and spreadsheets, all data storage and analysis, and all authoring and publication of reports is a CSO function and responsibility.

Monitoring and Data Collection

Raw data on electricity and natural gas consumption are compiled for all university buildings except residences and rental properties by the university Chief Engineer from Hydro / Centra Gas invoices on all bulk utility meters. These data a reported periodically to the CSO via e-mail as an Excel spreadsheet. Data for each month are merged with a master spreadsheet detailing all utility consumption data with a historical depth of ten years.

Data from university residences on electricity and natural gas consumption is compiled by CSO staff from copies of utility in voices sent to the CSO by the Housing Office of Student Services.

Raw data respecting business travel is gathered directly by CSO staff from travel claim reimbursement forms stored in the Financial Services Office.

Raw data respecting biomass / organic materials leaving the university is compiled by CSO staff from e-mail reports and invoices from waste management and recycling contractors, as well as direct measurements of materials weights leaving the university performed by UW staff in Shipping and Receiving. Composition of the waste material stream is estimated based on annual waste audits conducted every Spring.

Raw data on fleet vehicle fuel consumption is compiled by the Physical Plant Office from credit card invoices and reported bi-monthly to the CSO by e-mail where these data are merged to a master Excel spreadsheet detailing all utility consumption data with a historical depth of ten years.

Calibration and accuracy of utility metering devices is the responsibility of Manitoba Hydro and Centra Gas respectively. The accuracy of biomass measurements and travel activities are the responsibility of the UW and are subject to periodic internal audits.

Data Manipulation Procedures

Data are manipulated in such a way as to generate standard descriptive statistics, proportions, graphs and charts of trends, time series and longitudinal profiles of performance, both absolute and intensity measures of emissions, various listings by emission type, period, etc., and discrepancy measures of performance against targets.

Data Storage Procedures

All GHG reporting data are stored in electronic form on the "K" (shared) drive of the university server. This drive is backed up nightly. Paper copies of any data reports that may come to the CSO (mostly older records and essentially archival) are stored in print file storage cabinets in the CSO office.

Access to GHG data is authorized only for Technical Services System Administrators, the CSO Director, and the CSO Office Assistant. Access to data sets can be secured only by first establishing a valid UW system user account, and then being added to an authorized user access list to the shared "K" drive either by the CSO Director or the CSO Office Assistant.

Data sets are maintained for a period of ten (10) years where after they are deleted or physically disposed by confidential shredding.

Reporting Procedures

Reports (electronic and/or printed) of the university's total net GHG emissions are submitted:

- in its annual Sustainability Performance Report (as soon after the end of each fiscal year as practicable);
- for posting to the Campus Sustainability website annually following approval of the report by Senior Administration;
- on demand to Senior Administration for sustainability planning purposes;
- on demand to any other agency of the federal, provincial, or municipal government requiring such reports by statute or regulation.

Emissions Management

Emissions management and reduction initiatives usually imply significant investment in capital projects and renovations to University infrastructure. Various projects which have a mitigative effect on GHG emissions are development by Facilities Management staff and tabled as part of each annual cycle of capital planning. This process is currently rather more opportunistic than planned or methodical since, given the current capital funding regime applying to the University, the resources available are dependent on both provincial policies and the generosity of donors. While the University can and does seek to exert some influence over these factors, success is never assured and planning remains challenging.

Inventory Adjustment Procedures

The University of Winnipeg subscribes to the ISO-CSA Update Service by means of which we receive periodic notices of training opportunities and amendments to national standards and procedures. We endeavor to update calculation methods, reporting protocols, and management systems as new science and evolving best practice warrant. The University is also in continuous dialogue with the Climate and Green Initiatives

Office of Manitoba Science, Technology, Energy and Mines—the entity responsible for GHG reporting and mitigation programs in Manitoba, in order to assure that University procedures fully satisfy due diligence requirements of the Province.

GHG Verification

GHG verification will be performed by an independent third party auditor in compliance with ISO / CSA 14064-1 standards.

Appendix B: UWinnipeg Weather Normalization Methodology

Rationale

Natural gas consumption consistently accounts for approximately 80% of UWinnipeg's greenhouse gas emission inventory. Because it is used primarily for heating campus buildings, this consumption can vary significantly based on the weather in a given year. This variation makes it difficult to measure the effectiveness of measures taken to improve the efficiency of University mechanical systems, as it is difficult to separate changes in natural gas consumption caused by warmer or cooler winters from those changes caused directly by specific GHG reduction strategies.

Emissions from solid waste and reimbursed travel do not vary according to changes in weather. Until 2011, hydro-electricity was not used for heating purposes on campus. In 2011, a small fraction of campus heating drew on electricity – one small electric boiler was operating to heat main campus buildings and the Buhler building made use of an electric boiler to meet a portion of its heating needs. Similarly, some variation in electricity consumption will correspond to varying cooling needs based on the relative warmth of summer months. Given the very low emission factors for hydroelectricity, the proportional impacts of these emissions is negligible low – between 2007 and 2011, emissions from hydro have account for between 0.75% and 5.10% of the University overall GHG inventory. Given the proportionally negligible changes to overall inventories that weather-adjusted electricity-related emissions would cause, these adjustments have not been made here.

With the addition of a larger electric boiler at the University, it may be necessary to develop a weather-adjustment methodology for the University's electricity consumption.

Adjustment against baseline year

The purpose of this weather adjustment exercise is to answer the question: If year X had the same weather conditions as our baseline year (1990), what would our greenhouse gas emissions have been? Arriving at an answer to this question will enable the University to evaluate the success of the programs it has put in place to reduce greenhouse gas emissions.

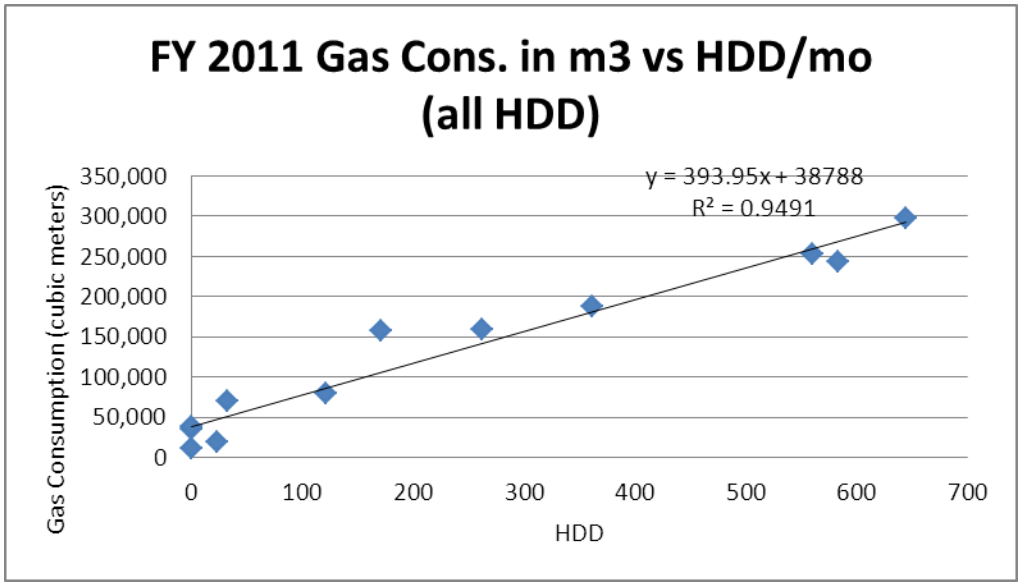
Determining Heating Degree Days (HDDs)

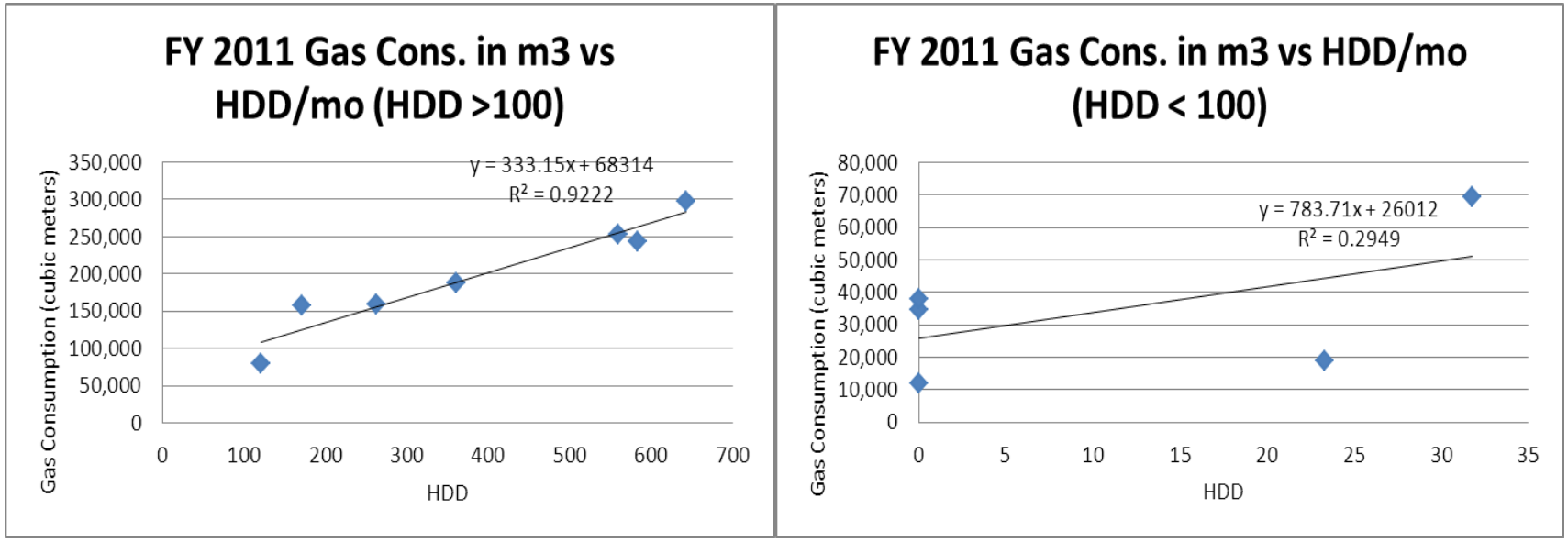
Daily weather data for 1990 and for each year being adjusted was obtained from Environment Canada. This data included the maximum, minimum, and mean temperature on a given day. For each day, a number of 'heating degree days' (HDD) was calculated by taking the difference, in degrees Celsius, between the mean temperature on a given day and the 'HDD basis temp'. The 'HDD basis temp' is the

temperature at which the University turns on its heating systems. The number of HDDs for each month was then tabulated. The monthly HDDs for the year 1990 represent the baseline monthly HDDs.

Developing mathematical relationship between heating degree days and natural gas consumption.

For each year, a regression analysis was performed to determine the mathematical relationship between heating degree days (HDD) and natural gas consumption. In performing this analysis, it became clear that the mathematical relationship between HDD and natural gas consumption was different for instances where HDD > 100 than it was when HDD < 100. In instances where HDD < 100 (i.e. shoulder season and summer months with very low natural gas consumption), natural gas consumption was left unadjusted. Several non-weather dependent factors contribute to natural gas use variations over this time period, most of which are caused by seasonal variations in campus population. Where HDD > 100, a linear relationship between HDD and natural gas consumption was established and used to perform weather adjustments. This period of time also corresponds to more stable campus population levels and use patterns. The charts below provide a graphical representation of the results of this regression analysis.





Using the mathematical relationship to adjust natural gas consumption

For each year, the regression analysis yielded a linear equation for natural gas. For instance:

$$NG_{2011(HDD>100)} = 333.15HDD_{2011} + 68{,}314$$

Where HDD_{2011} is the number of HDDs in a given month for the year indicated.

To determine adjusted natural gas consumption for each year, HDD values for 1990 were substituted into the equation generated from the regression analysis for each year. This process yielded the follow equations:

$$NG.adjusted_{2007(HDD>100)} = 272.66HDD_{1990} + 86{,}144$$

$$NG.adjusted_{2008(HDD>100)} = 241.04HDD_{1990} + 102{,}160$$

$$NG.adjusted_{2009(HDD>100)} = 251.33HDD_{1990} + 125.841$$

$$NG.adjusted_{2010(HDD>100)} = 298.03HDD_{1990} + 88{,}461$$

$$NG.adjusted_{2011(HDD>100)} = 333.15HDD_{1990} + 68{,}314$$

For instance, for 2011:

MONTH REPORTING (2011)	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
Unadjusted Gas Cons. m3	157,604	69,427	12,120	34,679	37,982	19,032	79,340	188,358	252,449	297,555	243,434	159,634	1,551,615
Weather Adjusted Gas Cons. m3	153,168	69,427	12,120	34,679	37,982	19,032	120,386	211,103	340,166	366,085	254,812	226,961	1,845,921
2011 HDD	171.1	31.8	0	0	0	23.3	121.2	361.2	559.6	643.8	582.9	262.2	2757.1
1990 HDD	254.7	75	1	0	0	22.6	156.3	428.6	816	893.8	559.8	476.2	3684

Adjusted values for natural gas consumption were then used to calculate the weather-adjusted emissions from natural gas for each year by applying the same calculation as that used for real natural gas consumption (see GHG Management Handbook). As 2011 was significantly warmer than 1990, weather adjusted natural gas consumption is 119% of actual consumption.

Limitations to this methodology

Over the past several years the University has undergone significant changes to its building stock – new buildings were built while older buildings were renovated or demolished. These changes imply significant year-over-year variations in energy consumption. While it would be ideal to develop the mathematical relationship between heating degree days and natural gas consumption for several years of data, these annual changes in building stock render this impossible. As such, the calculations here draw on data only from the twelve month period being adjusted.

The base temperature for heating degree days is the temperature at which the University turns on its heating systems. This temperature in fact varies from building to building, depending on the building's level of insulation, use patterns, and on other factors. The University does not have historical data detailed enough to apply different HDD base temperatures to different buildings. For this reason, a 'blanket' base temperature has been applied to represent the average temperature throughout campus. For the purposes of this weather adjustment calculation, University engineers advised that 10 degrees Celsius would be the best estimate for a campus-wide HDD Base Temp over the years in question. In future years, as the University's energy monitoring systems improve, it may be possible to employ more sensitive HDD base temperatures to weather adjustment calculations.

Appendix C: Summary of Relevant Provincial Legislation and Initiatives

Sustainable Development Act: The Act was assented to on June 28, 1997. It set the framework for the establishment of the Manitoba Round Table on Sustainable Development. The Act requires that the Province draft sustainable development strategies, develop goals and indicators relative to sustainable development, and issue regular sustainability reports. Through regulation X, it also established sustainable development guidelines that applied to institutions such as universities. While the Act does not make specific reference to climate change, it provides a mandate for all public institutions to develop SD strategies that include climate action. As it is now 15 years old, discussions about updating the Act are underway.

Manitoba Green Building Policy: The policy was passed in April 2007. The policy is meant to ensure that new, provincially funded buildings are less costly to operate and maintain, use less energy, and produce fewer greenhouse gas and other emissions than conventional buildings. The policy requires that any provincially-funded new construction project use an Integrated Design Process; that it achieve energy efficiency standards that are at minimum 33 percent better than the Model National Energy Code for Buildings, and meeting Manitoba Hydro's Power Smart Design Standards; that it employ life-cycle costing of the building or building systems; that it achieve at minimum LEED Silver certification; and that it prefer low or zero carbon renewable energy sources. This policy applies to all new construction at the University, serving to reduce the climate change impact of adding additional buildings to our space inventory.

Climate Change and Emissions Reduction Act: *In effect since June 2008, this Act set an* initial emissions reduction target for Manitoba of 6% less than 1990 emissions by December 31, 2012. It established the requirement that the Province issue reports on climate change in 2010, 2012, and every fourth year thereafter.[5] It includes provisions for make regulations designating a public registry for the purpose of enabling persons, businesses and other entities to voluntarily register emission inventories, reductions, and credits. The Act required the phase-out of coal for energy in Manitoba and the development of strategies for the elimination of petroleum-based energy sources for off-grid communities. Finally, it included provisions to establish emissions-related standards for various emission sources including vehicles, furnaces, landfills, and buildings. While Manitoba's emissions are very unlikely to be 6% below 1990 levels by the end of this calendar year, several other elements of the Act have been implemented and intersect with UWinnipeg's activities. They are discussed below.

[5] The Government of Manitoba's most recent report shows that since 2000, Manitoba's emissions have stayed around 20 mega tonnes (mt). They were lowest in 2001 at 19.7 C02e mt and highest in 2008 at 21.6 C02e mt. Emissions were 20.2 C02e mt in 2009, but rose to 20.3 C0 2e in 2010 (Government of Manitoba n.d.).

Western Climate Initiative (WCI): The WCI is a collaboration of independent jurisdictions working together to identify, evaluate, and implement emissions trading policies to tackle climate change at a regional level. According to the WCI website, "WCI Partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15 percent below 2005 levels by 2020." The Province of Manitoba has signed on as a partner to the WCI. Partners of the WCI report emissions through The Climate Registry (TCR), a nonprofit collaboration between North American states, provinces, territories, and Native Sovereign Nations to record and track the greenhouse gas emissions of businesses, municipalities and other organisations. This affiliation with the WCI and the TCR inform UWinnipeg's reporting and verification methodologies and practices.

Cap and Trade Consultations: In December 2009, Manitoba committed to moving forward with legislation enabling the creation of a cap and trade system to reduce greenhouse gas emissions in Manitoba, subject to public consultations in 2010. The consultations closed in March of 2011 and a final plan for the province is still being developed. As such, potential implications for UWinnipeg remain unclear.

Manitoba Climate Investment Pilot: In 2012, the Province of Manitoba launched this pilot program aimed at assisting businesses and not-for-profit organizations measure and reduce their greenhouse gas (GHG) emissions. The pilot provides funding support in two areas: capacity building and emissions reduction. Capacity Building Grants provide funds for membership with The Climate Registry and to fund 3rd party verification of emissions inventories. Climate Mitigation Grants fund projects that will quantitatively reduce GHG emissions in Manitoba. UWinnipeg received support through both in the pilot's first year.

TomorrowNow, Manitoba's Green Plan: A draft of the Province's eight year plan was released in the spring of 2012 (Government of Manitoba 2012), and comments about the plan are being accepted until October 31, 2012. The plan includes a section about climate change, while several of its other sections overlap with climate change issues considerably. Key elements of the draft plan include mandatory GHG emission reporting requirements in Manitoba, a re-affirmation of the Province's commitment to eliminate coal plants in the province, and "a commitment to work with the forest industry to increase the use of woody debris from forest harvesting operations to produce biomass for emerging biofuel and bioenergy markets." The plan also addresses other areas related to emission reduction and climate change adaptation. While UWinnipeg's emissions are unlikely to approach mandatory reporting thresholds, this plan could have and does intersect with UWinnipeg's efforts in several ways. As such, the University will seek to provide feedback on it.

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