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DÉVELOPPEMENT DURABLE

2015-2018 Plan to Fight Climate Change

Achieving and Maintaining Carbon Neutrality

UNIVERSITÉ LAVAL

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A Word From the Rector and Executive Vice Rector, Development

Denis Brière, Rector

Éric Bauce, Executive Vice Rector, Development

Université Laval has made sustainable development an institutional priority, investing considerable energy in an effort to improve the quality of life for members of the university community by simultaneously addressing issues related to their environment, standard of living, and lifestyle. We seek to rally the campus around these values and are taking steps to ensure that the institution's own actions reflect the principles of sustainable development.

After years of sustained collective effort, Université Laval has achieved carbon neutrality by massively reducing its greenhouse gas emissions at the source and using carbon credits to offset the rest. A leader in sustainable development, Université Laval is the first university in Québec to reduce its greenhouse gas emissions to zero, and the first in Canada to do so in the absence of any legal imperative.

It is thus with great enthusiasm that we present the "Plan to Fight Climate Change: Achieving and Maintaining Carbon Neutrality", which outlines the efforts made in recent years to reduce our greenhouse gas emissions, and the actions implemented to achieve campus carbon neutrality and contribute to society's well-being. We also wish to inspire organizations and businesses in our region to reduce and offset their greenhouse gas emissions so that we can tackle climate change effectively together.

We would like to take this opportunity to thank all members of the university community who are doing their part for the advancement and sharing of knowledge related to sustainable development and the fight against climate change.

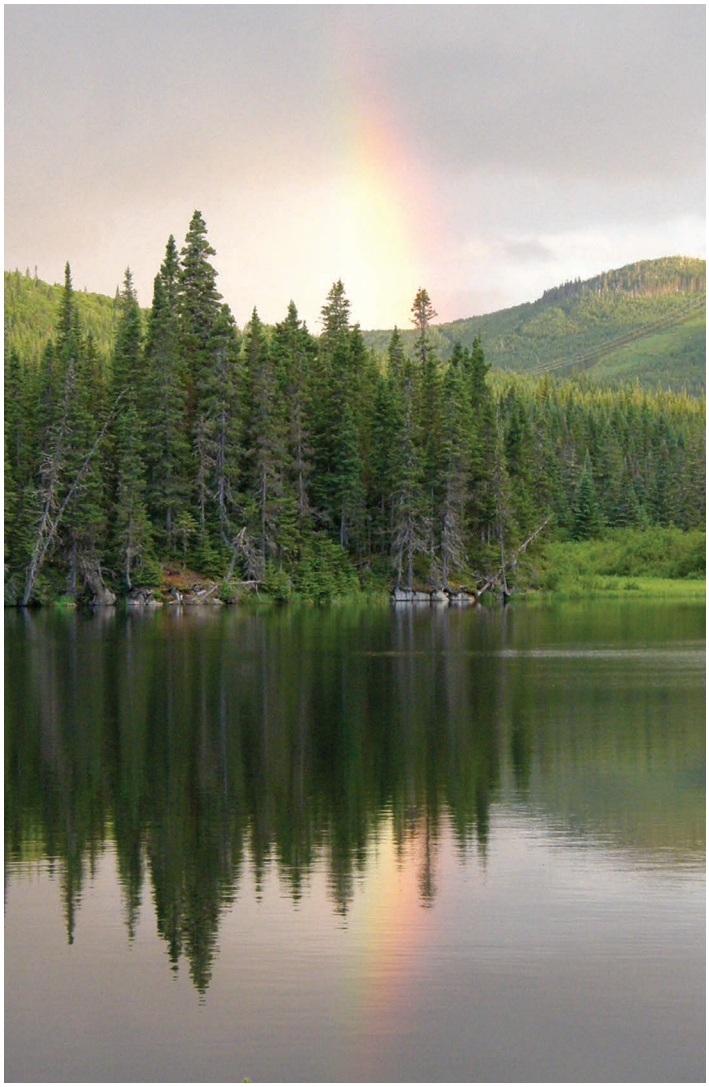
Context

The issues related to climate change are well known, imminent, and worrisome for the whole planet. While the provincial and federal governments have set a 37.5% GHG reduction target by 2030 (compared to the 1990 thresholds) and a 30% reduction compared to 2005[1], Université Laval is taking the extra step with its ambitious objective to achieve and maintain a carbon neutral campus.

Université Laval has been committed to fighting climate change for a number of years now, and the achievement of carbon neutrality serve as a testing ground for various approaches in terms of greenhouse gas reduction and fighting climate change. It wants to be a role model for organizations and communities in order to encourage society to be involved in this process, which requires the cooperation and engagement of all stakeholders.

To reach its goals, Université Laval has adopted a comprehensive approach to tackling climate change: measuring, reduce and offsetting GHG emissions. Furthermore, the university offers a complete range of programs related to the fight against climate change, in addition to promoting research in this area.

Finally, the university wishes to mobilize members of the university community and raise awareness concerning the fight against climate change by offering information sessions, awareness campaigns and a Voluntary GHG Emissions Offset Program so that they, too, can take concrete action for the climate.



[1] Ici Radio-Canada. (2015). Québec veut réduire ses gaz à effet de serre de 37,5%. Repéré à http://ici.radio-canada.ca/nouvelles/Politique/2015/09/16/007-quebec-cibles-reduction-gaz-effet-serre-conference-paris.shtml and Ici Radio-Canada. (2015). Le fédéral vise une réduction de 30 % des émissions de GES d'ici 2030. Repéré à http://ici.radio-canada.ca/nouvelles/politique/2015/05/15/002-cibles-reduction-gaz-effet-serre-ottawa.shtml

A process that began a number of years ago

Over the years, Université Laval has implemented a number of measures that contribute to the fight against climate change. These measures combine the university's actions in terms of energy efficiency with efforts made by members of the university community to reduce GHG emissions.

Here are some measures implemented since 1950 to tackle climate change:

1950

Construction of a centralized heating and air conditioning system

At the Unviersity, heating and cooling is provided by a centralized system that produce steam, which is circulated throughout the campus by way of conduits in a network of underground tunnels. This system significantly reduces the purchase of electricity and fuel, and enables repairs to be made much faster.

1964

Creation of the Montmorency Forest: a teaching and research forest

A true open-air laboratory, the Forest enables Université Laval students and researchers to learn and innovate in an environment that meets the operational realities of the forest environment.

1984

Transformation of boilers

The transformation of boilers, enabling the use of natural gas in addition to oil, changed the composition of gases and significantly decreased their amounts.

2000

Replacement of fluorescent lighting

T-12 fluorescent lighting was replaced by more efficient models in almost all campus buildings.

2004

Conversion of refrigeration systems

The chlorofluorocarbon (CFC) refrigeration systems for the water cooling system on campus were converted to systems using less harmful hydrochlorofluorocarbon gases (HCFCs).

2004-2007

Combustion optimization work

The installation of an opacimeter on the chimneys of the power plant, the addition of CO analyzers, the installation of O_2 control systems and the repair of heat exchangers at the boilers' air inlet have helped to reduce the consumption of petroleum products and associated emissions by 2%.

2005

Creation of a **free self-service bike loan system** for members of the university community.

2007

The addition of an electric boiler to the heating system

Between 2006 and 2010, UL optimized its heating plant and added an electric boiler to the heating system, resulting in a 27% reduction in heatingrelated greenhouse gas emissions.

2008

Purchase of the **first Nemo electric truck** in Quebec by Zone, UL's student cooperative.

2009

Université Laval's first greenhouse gas report

The **Alérion Supermileage** student project wins top prize at the Shell Eco-Marathon Americas for its single-seater vehicle with very low fuel consumption.

Creation of the Coop Roue-Libre

With multiple tools and the an inventory of spare parts, Coop Roue-Libre workshop becomes a location where campus-goers can make all necessary repairs to their bikes. A trained worker is always on hand at the workshop to help anyone having trouble with the repairs.

2010

Installation of the supercomputer Le Colosse

Le Colosse, located in the old silo structure of the particle acceleratorthis concentric structure facilitates air conditioning and recovers the heat produced by the servers to then redirect it to the campus heating network, which avoids the production of 245 tons of CO_2 equivalent each and every year.

Energy challenge

1,166 people participated in this awareness-building contest for energy efficiency, generating energy savings estimated at 232,384 kWh, enough to supply 10 homes for a year.

Implementation of a **carpooling service** in collaboration with CADEUL and ÆLIÉS.

2011

First carbon-neutral bridge construction site in Canada

With a total length of approximately 44 metres, this arch bridge has an upper deck composed of glued-laminated timber beams made of black spruce from northern Quebec. The bridge received the Grande entreprise du concours Novae en écoconception (Novae large entreprise eco-conception contest) prize in 2012.

Integration of EPEAT criteria

Energy consumption criteria corresponding to the international EPEAT silver standard were included in the computer equipment acquisition group agreement. This was reflected through a reduction of energy consumption by 2.2 million kWh throughout the life cycle of machines purchased in a year.

2012

Completion of **energy efficiency conversion** for heating, ventilation and air conditioning systems in the Adrien Pouliot building. It enabled a decrease of 30% in the building's total energy consumption, of which approximately 68% was a reduction in steam consumption.

Creation of a transportation management plan

The transportation management plan, in partnership with Mobili-T, identifies the transportation habits of the university community and the means that can be implemented to increase use of sustainable transport.

Implementation of the Guaranteed Ride Home Program

This program offers to employees who come to work using sustainable transportation the use of a taxi for an emergency or unexpected situation.

Inauguration of TELUS-Université Laval Stadium

Inspired by LEED standards, the stadium benefits from the building's distinctive profile and expansive windows facilitate natural ventilation, and its west-facing site takes advantage of summertime wind patterns, which reduces air conditioning expenses.

2013

Launch of the Voluntary GHG Emissions Offset Program

This program allows members of the university community to offset GHG emissions associated with their daily commute to campus, their professional trips.

First ever carbon neutral Vanier Cup

The GHGs emitted during the Vanier Cup, held at TELUS-Université Laval Stadium, were offset through the planting of 3,500 trees.

Addition of **six electrical vehicle charging stations** on campus.

2014

Awareness campaign for work-related trips

Meetings with groups of employees who go on numerous business trips in a given year to raise awareness about the climate impacts of these trips and to develop ways to facilitate the offsetting of the GHGs generated.

2015

Publication of information and tips in the *Fil des événements* newspaper

The aim of these climate change tips is to raise awareness and educate the university community concerning the concepts and vocabulary of climate change.

Carbon neutrality reached

Plan to fight climate change

Université Laval's plan to fight climate change is structured around six approaches: measurement, reduction and offsetting of greenhouse gas emissions, adaptation to climate change, training and research in the field.

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Summary of objectives

OBJECTIVES FOR EACH APPROACH

	APPROACHES	TARGETS
1	**Measurement of GHG emissions**	> Compile data on the university's scope 1 and scope 2 GHG emissions on an annual basis, and carry out a complete assessment of all emissions every three years.
2	**Reduction of scope 1 and scope 2 GHG emissions**	> Reduce 1,800 tons of CO_2 equivalent emissions related to heating, compared to 2014-2015 thresholds.
3	**Offsetting of scope 1 and scope 2 GHG emissions**	> Maintain campus carbon neutrality.
4	**Adaptation to climate change**	> Maintain and enhance the green and wooded areas of the university.
5	**Training and dissemination of knowledge**	> Develop and offer specialized training on issues related to the carbon market and the fight against climate change. > Establish an internship program in fighting climate change.
6	**Research and creation**	> Enlist the Quebec Institute for Northern Studies. > Implement an annual dissemination activity for research projects related to the fight against climate change. > Highlight the accomplishments of the endowed chairs, centres and research groups involved in fighting climate change.

Beyond carbon neutrality

> Reduce the proportion of annual parking permits sold per full time student (FTS) by 8% compared to 2012-2013.

> Maintain scope 3 GHG emissions offsets at 1,000 tonnes of CO_2 equivalent per year.

> Establish the Mon arbre UL project.

Measuring GHG emissions

Université Laval has been working to curtail its greenhouse gas emissions for quite some time. To ensure improvement, it is necessary to measure progress. Thus the university compiles data on its scope 1 and scope 2 GHG emissions on an annual basis and carries out a complete assessment of all emissions every three years.

Emission categories

Emissions are divided into three categories according to the Université Laval Greenhouse Gas Protocol (based on recognized international standards for calculating and classifying greenhouse gases, such as the GHG Protocol and ISO 14064-1:2006).

Scope 1 and scope 2 emissions are the result of operations for which Université Laval is directly or indirectly responsible. Since the university has full responsibility for choosing the methods and equipment used in such operations, it is fully accountable for related greenhouse gas emissions. These are the emissions that Université Laval must offset to achieve and maintain campus carbon neutrality.

Scope 3 emissions are not the direct responsibility of the university, although they result from actions relating to its activities. Université Laval does not determine the methods and tools used for these actions; such choices are made by individuals and organizations outside the institution. As such, the university is not responsible for greenhouse gas emissions related to these choices.

GHG emissions assessment

In 2014-2015, the scope 1 and scope 2 GHG emissions assessment compiled 26,841 tons of CO_2 equivalent, which represents a 26% decrease in emissions since 2006 (base year). In terms of grams of CO_2 equivalent/m^2/FTS (employee and full time student equivalent), this represents a decrease of 47%.

47 %

TARGET:

Compile data on the university's scope 1 and scope 2 GHG emissions on an annual basis, and carry out a complete assessment of all emissions every three years.

Scope 1
Sources of emissions
- Heating
- Internal transport

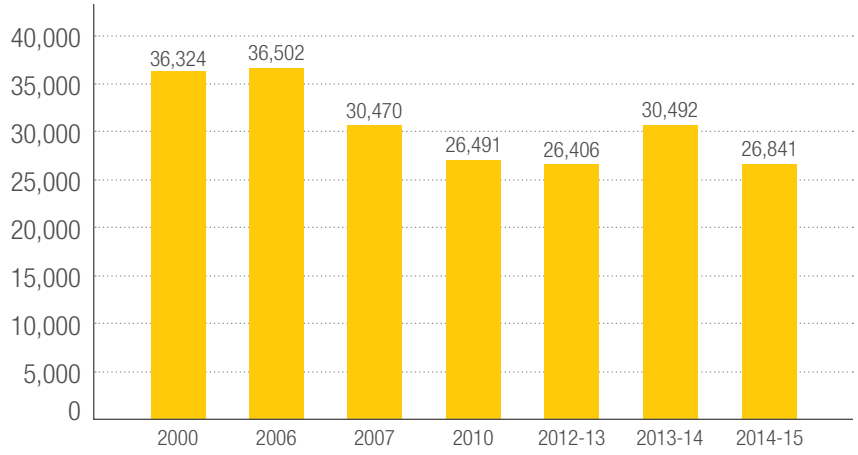
Scope 2
Sources of emissions
- Electricity

Scope 3
Sources of emissions
- Daily transportation used by students and staff
- Air and car travel by staff and students for business and education purposes
- Trash incineration
- Procurement and waste transportation

Scope 1 and scope 2 GHG emissions assessment (2014-2015)

	In tons of CO_2 equivalent
Scope 1	
Heating	25,742
Internal transport	187
Halocarbons	146
Scope 2	
Electricity	350
Emissions related to Montmorency Forest activities (scope 1 and 2)	416
TOTAL	**26,841**

Scope 1 and scope 2 GHG emissions assessments



Méthodologie

GHG emissions are calculated using the emission factors method and quantified in CO_2 equivalent. The principles and working hypotheses used in realizing GHG assessments are based on the following references:

> GHG Protocol, A Corporate Accounting and Reporting Standard, revised edition (2004);

> ISO 14064-1:2006, Greenhouse Gases Part I – Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.

An approach based on administrative control is used. As such, the buildings that the university owns and for which it has 100% administrative control are taken into account in this approach. This is why rented buildings or condominiums, such as la Fabrique or le Vieux Séminaire, are excluded from the assessments. Similarly, properties whose emissions account for less than one percent of the total are excluded. The results thus comprise the main campus and the Montmorency Forest.

Among the gases that have a greenhouse effect, three of the six gases in the Kyoto Protocol are considered in these assessments, i.e. CO_2, CH_4, and N_2O. PFCs and SF_6 are not considered, since they are not produced by university activities. HFCs, which represent less than 1% of total GHG emissions produced by Université Laval, are also excluded from assessments.

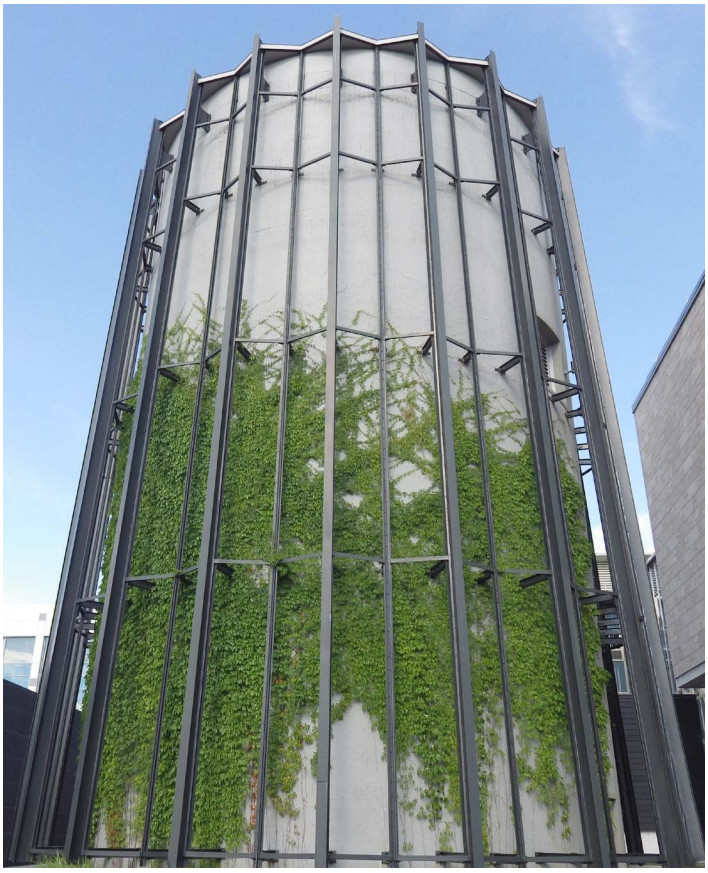
2

Reducing scope 1 and scope 2 GHG emissions

The centrepiece of the plan to fight climate change at Université Laval is the reduction of scope 1 and scope 2 GHG emissions arising from university activities.

Over the years, a number of initiatives have been implemented, including the optimization of heating equipment and networks, the addition of an electric boiler heating system, the installation of the *Colosse* supercomputer and the completion of energy efficiency work on heating, ventilation and air conditioning systems in more than ten buildings. In the coming years, the university wants to reduce its scope 1 and scope 2 GHG emissions by 1,800 tons of CO_2 equivalent compared to 2014-2015 thresholds by 2018.

To achieve this ambitious target, Université Laval's *Service des immeubles* (building department) will continue its energy efficiency activities through an approach that combines cost cuts and GHG emission reductions.



To do this, the *Service des immeubles* will put into practice a series of measures, including implementation of energy efficiency measures at the Alphonse-Desjardins, Maurice-Pollack, J.-A.-DeSève and Laurentienne buildings, as part of an energy master plan. A final version of the plan should be tabled in December 2015.

The *Service des immeubles* also wishes to carry out recommissioning projects for the building mechanics control systems in some buildings. This type of project helps to identify facilities where control systems are less efficient in order to make the necessary adjustments.

Responsible laboratories

By the nature of their activities, Université Laval's research and education laboratories consume large amounts of energy and resources. To improve laboratory performance records while maintaining research quality and following good security practices, a committee was struck to develop and implement a responsible laboratories procedure. In addition to scheduled renovation projects designed to minimize energy consumption, information and awareness documents will also be created to educate users about responsible laboratory use.

TARGET:

Reduce 1,800 tons of CO_2 equivalent emissions related to heating, compared to 2014-2015 thresholds.

WHAT IS CARBON NEUTRALITY?

Carbon neutrality is achieved when scope 1 and scope 2 greenhouse gas emissions are countered equally by emission reduction efforts and emission offsetting initiatives. As a result, there is no impact on climate, since the emissions are considered neutral (net zero carbon footprint).

WHY SEEK TO ACHIEVE CARBON NEUTRALITY?

- To provide a concrete solution to the problem of climate change;
- To take responsibility regarding the greenhouse gas emissions generated by our daily activities;
- To stimulate the search for viable solutions in order to reduce greenhouse gas emissions on an ongoing basis;
- To take a major step toward efficient management of carbon emissions;
- To provide leadership on climate change; and
- To promote the acquisition and transfer of knowledge in the fight against climate change.

3

Offsetting scope 1 and scope 2 GHG emissions

To offset the scope 1 and scope 2 GHG emissions that it is unable to reduce, Université Laval relies on various means, in particular its carbon sink, the Montmorency Forest. A carbon sink is a natural or artificial reservoir that absorbs carbon from the atmosphere and helps decrease the amount of atmospheric CO_2. Tree planting is one way to create a carbon sink.

The Montmorency Forest carbon sink

The Montmorency Forest is the largest teaching and research forest in the world, totalling 412 km^2. Since 1964, Université Laval students have had the opportunity to learn about good practices in forestry, forest management, forest protection, and logging, while researchers have been able to conduct studies in this open sky laboratory. Educational and research activities, particularly in forest and geodetic sciences, are held throughout the year. The Forest has been certified according to the Boreal Standard of the Forest Stewardship Council (FSC) and is organized in a sustainable manner, in compliance with pertinent laws and regulations and in line with the values of the vast array of forest resource users.

As a carbon sink, the forest plays a key role in the university's GHG reduction strategy. It can absorb an average of 13,945 tons of CO_2 equivalent per year. This calculation, which is based on an approach validated by a scientific committee, is used by the university for its carbon footprint assessment.

Methodology

A forest generally emits as much carbon as it captures in its natural state. In a way, forests are carbon neutral in the sense that there is a balance between the growing young trees that absorb large amounts of CO_2 through photosynthesis, and old decaying trees, which emit more CO_2 than they absorb.

However, when a forest is managed, as is the case for the Montmorency Forest, it is possible to measure the contribution of this management on carbon uptake in comparison to a forest in its natural state. This sort of arrangement may therefore enable the forest to absorb more CO_2 than it produces (favourable variance). The forest thus becomes a carbon sink, and this favourable variance can be recognized as a carbon offset for the forest owner or manager. More precisely, the Montmorency Forest carbon sink is based on the favourable variance in carbon capture distinguishing its innovative forest management from standard forest industry management.

Scientific committee

A scientific committee was created to validate scientific hypotheses related to the university's carbon sink. This committee includes:

- Éric Bauce, Executive Vice Rector, Development
- Robert Beauregard, Dean of the Faculty of Forestry, Geography and Geomatics (FFGG)
- Louis Bélanger, Professor, FFGG
- Pierre Bernier, Associate Professor, FFGG
- Pierre Lemay, Assistant to the Executive Vice Rector, Development
- Hank Margolis, Professor, FFGG
- Julie Poulin, Office of the Chief Forester of Quebec
- Frédéric Raulier, Professor, FFGG
- Hugues Sansregret, Director of Operations, Montmorency Forest

Value added partnerships
In order to achieve and maintain campus carbon neutrality, Université Laval has established various value added partnerships in addition to its reduction initiatives and the Montmorency Forest carbon sink:

> Partnership with the Séminaire de Québec
For a fixed five-year period, the Séminaire has offered the university carbon credits equivalent to 7,550 tonnes of CO_2 per year. The carbon credits are generated by the additional amount of carbon stored and retained in the forest biomass due to the reduction of its annual forest harvest on a portion of the *Seigneurie de Beaupré*.

In order to generate this volume of carbon credits, the Séminaire has created two conservation areas on *Seigneurie de Beaupré*, which it has agreed to exclude from its production by halting forest harvesting operations in these two areas.

> **Partners in the purchase of carbon credits**
In order to achieve campus carbon neutrality, Université Laval must purchase carbon credits on the market. To do this, it can count on two value added partnerships:

– **Ecotierra**
Ecotierra is a company based in Sherbrooke that generates carbon credits by developing high quality forestry and agricultural projects with major socio-economic impacts for local populations as well as positive environmental impacts.

Ecotierra develops innovative local and international projects that generate carbon credits, and Université Laval has been granted access to them as scientific testing grounds. In return, the university has offered active collaboration and scientific expertise in sustainable forest management, management and exploitation of forests for the carbon market, and evaluation of the challenges and effects of this management method on forests.

– **National EcoCredit**
National EcoCredit is a leader in North America in the quantification and negotiation of environmental attributes. Since 2005, National EcoCredit has traded over 1.3 million carbon credits. Université Laval will partner with National EcoCredit for the purchase of carbon credits in order to reach campus carbon neutrality.

To finance the purchase of carbon credits, Université Laval uses the savings from its budgetary envelope for energy due to energy efficiency measures developed during the last few years. Furthermore, the university plans to actively pursue its efforts to reduce GHG emissions in order to progressively diminish its need for carbon credits.

Reaching campus carbon neutrality

	In tons of CO_2 equivalent
Scope 1 and scope 2 GHG emissions in 2014-2015	26,841
Minus: Montmorency forest carbon sink	(13,945)
Minus: Séminaire de Québec carbon sink	(7,550)
Minus: purchase of carbon credits from partners	(5,346)
NET scope 1 and scope 2 GHG emissions	0

TARGET:
Maintain campus carbon neutrality.

4

Maintain campus carbon neutrality

In addition to actively working toward reducing GHG emissions associated with its activities, Université Laval has developed various ways of adapting to climate change.

> Adapting to climate change is a way of increasing society's resilience with respect to climate change itself.

Among these initiatives, the university has designed green and shaded areas that efficiently absorb rainfall, decrease the urban heat island effect, and maintain cool areas in an urban setting. Today, Université Laval's 1.8 km^2 territory is known for the greenery found everywhere on campus. In fact, nearly 64% of its territory is covered by green and wooded areas. If we add the outdoor sports fields, that number climbs to about 70%. The university also boasts emergency access lanes made of permeable paving blocks, and eight green roofs, one of which is among the largest in the province of Quebec. It is located over the PEPS sports complex parking lot.

To effectively combat heat islands, the university uses reflective materials in the construction of new buildings (for example, the roofs of Telus-UL Stadium and the PEPS) and has redesigned certain streets on campus (for example, Avenue des Sciences Humaines).

These measures also offer other advantages, such as a decrease in energy demand and a reduction of water and air pollution at the source, and thus contribute to reducing greenhouse gas emissions[2].

[2] Excerpt from the 2013-2020 Government Strategy for Adapting to Climate Change, Government of Quebec, 2012.

In 2004, researchers at the Centre for Northern Studies (CNS) at Université Laval observed accelerated climate warming in the village of Salluit, located on the northernmost tip of the province of Quebec. This caused fear of permafrost degradation, which put into question the viability of maintaining the village in its current location. In 2007, confronted with the complex problem of land development on unstable soil, the community of Salluit and the Kativik Regional Government (KRG) asked the Government of Quebec for a sustainable solution.

An interdepartmental committee was struck in response. It worked closely with the CNS, private engineering and urban planning firms, as well as with the community of Salluit, which was placed at the heart of the decision making process in order to find a solution that respected its needs and aspirations.

In the end, recent studies have demonstrated that the community can remain in its current location and even expand toward zones delimited by permafrost experts as good areas to build on. This has allowed the community to choose a zone for expansion and to plan land development with a vision for the future, and according to the planning principles of its choice.

To maintain green and wooded areas, the Development and Implementation Committee (CAMEO) launched the Université Laval National Heritage Management Plan in September 2013. Through conservation, protection and promotion of its natural heritage, Université Laval wishes to make its campus a healthy and distinctive living environment that is lively and open to the surrounding city throughout the entire year, in short, a setting conducive to academic activities and exchanges.

TARGET:

Maintain and enhance the green and wooded areas of the university.

The main objectives of the Plan are the following:

> To create a reference tool for the supervision of projects with a potential impact on the campus natural heritage in order to ensure that its most exceptional elements are protected.

> To promote and improve environmental qualities and to ensure sustainable development of the campus natural heritage.

> To promote sustainable practices for the maintenance of trees and green and wooded areas on campus.

> To improve access to green and wooded areas on campus for the university community and the general public, while ensuring that these areas remain protected.

> To identify opportunities and priorities for tree-planting in order to improve the “green” character of the campus, without impairing the university’s future development.

> To protect and promote panoramic views and interesting campus landscapes.

> To raise awareness among various stakeholders concerning the importance and value of the campus natural heritage.

5

Training and dissemination of knowledge related to the fight against climate change

Sustainable development issues are more than ever a focus of Université Laval's training and learning activities and are included in the content of 335 courses[3]. As such, the university wishes to consolidate its offer of sustainable development training and to be a major training location in the field, on a local and international scale, particularly throughout *La Francophonie*.

The development of skills in sustainable development is at the heart of Université Laval's teaching mission, and he university offers various courses and programs related to the fight against climate change, such as the microprogram on climate change. This graduate-level program, offered entirely online, is intended for professionals of all backgrounds who wish to specialize in climate change and to become well informed agents of change in their sector of activities.

Furthermore, Université Laval is the only university in the province of Quebec that trains specialists in wood engineering, with wood being a material used for effective carbon sequestration.

Every year, the Hydro-Québec Institute for the Environment, Development and Society (EDS) offers many conferences related to sustainable development and the fight against climate change. Here are a few examples:

> Half-day conferences on challenges and opportunities for Quebec and La Francophonie ahead of the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change.

> Lecture on the Sustainable Canada Dialogues given by Catherine Potvin, associated member of the EDS Institute, entitled "Acting on Climate Change: Solutions from Canadian Scholars."

> A series of conferences on the conclusions of the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

Did you know?

Forests absorb CO_2 from the atmosphere and 1 m^3 of wood enables 0.9 tons of CO_2 to be absorbed from the atmosphere.[4]

[3] A s of November 9, 2015.

[4] Cecobois. (2016). Bois et cycle de vie du carbone. Repéré à http://www.cecobois.com/bois-et-cycle-de-vie-du-carbone

Increase Training Opportunities

In order to respond to society's training needs, the university wishes to offer specialized training on issues related to the carbon market and the fight against climate change and to establish an internship program in fighting climate change.

Specialized Training

Always seeking to keep ahead of society's training needs, the university wishes to develop and offer specialized training on challenges related to fighting climate change in response to the particular needs of specific clienteles. For example:

- Governance of organizations and carbon management
- Training on the impact of climate change on Aboriginal communities
- Voluntary and private carbon initiatives
- Climate change, the carbon footprint, and the field of agriculture
- Laws associated with carbon initiatives
- Carbon accounting
- A mandatory carbon market

Internship Program in Fighting Climate Change

In partnership with businesses and organizations affected on a local or international level by the fight against climate change, Université Laval's Internship Program in Fighting Climate Change, which is unique in Quebec and Canada, aims to offer internships that will allow student interns to develop practical experience in projects on adapting to climate change or reducing the climate footprint.

This program will help interns to develop a better understanding of challenges and opportunities as well as an expertise in fighting climate change and adapting to it. As agents of change, they will be able to suggest technological or social innovations to the organizations with which they could later pursue their activities, all in an effort to reduce the climate footprint.

TARGETS:

Develop and offer specialized training on issues related to the carbon market and the fight against climate change.

Establish an internship program in fighting climate change.

6

Research and creation associated with the fight against climate change

The research environment has undergone spectacular transformations in recent decades, pressured by scientific challenges and inherently complex societal and economic issues that call for solutions transcending national boundaries. This requires the pooling of expertise from various sectors and the sharing of available resources. More than ever, the future of our societies hinges on creativity and the ability of all concerned actors to innovate.

The 2015–2020 Research Development Plan also highlights Université Laval's ability to help answer high-priority questions confronting various research institutions and research users from the economic, social, and political arenas with respect to the fight against climate change.

The skills and expertise of Université Laval faculty members, professionals, students and post-doctoral fellows in the area of research and innovation will help the institution expand its influential role in the scientific, social, cultural, economic, and technological development of our globally oriented society.

In the next few years, Université Laval wishes to make use of expertise developed by the Institut nordique du Québec, establish the annual dissemination of research projects linked to the fight against climate change (i.e. a specific research day), and showcase the achievements of endowed chairs, centres and research groups working in the area of climate change.

TARGETS:

Enlist the Quebec Institute for Northern Studies.

Implement an annual dissemination activity for research projects related to the fight against climate change.

Highlight the accomplishments of the endowed chairs, centres and research groups involved in fighting climate change.

The endowed chairs, centres and research groups linked to the fight against climate change that the university wishes to showcase include:

- Quebec Climate Change Adaptation Observatory
- Canada Research Chair in Sustainable Energy Processes and Materials
- NSERC Industrial Research Chair on Ecoresponsible Wood Construction
- Centre for Northern Studies
- Centre for Economics Research on the Environment, Agri-food, Transportation, and Energy
- Centre for Research on Planning and Development
- Urban Science Mixed Research Unit
- Institut nordique du Québec
- Centre for Social and Environmental Accounting Research
- Center for Innovation in Logistics and Sustainable Supply Chain

Quebec Climate Change Adaptation Observatory

Developed in conjunction with the Quebec National Institute of Public Health (INSPQ), within the health component of the 2013-2020 Government of Quebec Climate Change Action Plan, the Quebec Climate Change Adaptation Observatory (OQACC) seeks to better equip public health authorities in their efforts to monitor the adaptation of individuals and organizations to heat waves and floods.

Its intention is also to support efforts concerning the prevention of health impacts caused by this weather instability. The first phase of the work of the Observatory is to be completed by 2017 and it has three particular focal points:

1) to prepare plans for adaptation to extreme heat and floods for the Quebec population, for municipalities and for organizations in the health sector;

2) to develop a greater understanding of this adaptation; and

3) to contribute to the training of future generations by providing students with higher-education opportunities.

Institut nordique du Québec

In the fall of 2014, Université Laval, McGill University and the National Institute of Scientific Research (NIRS) confirmed their intention to create the Institut nordique du Québec. This new structure will help provide government decision-makers, communities and the private sector with the necessary knowledge for the ethical and harmonious development of Northern Quebec.

In a context of climate change and of aunique environment to be protected, northern development must take place using state-of-the-art expertise. In this regard, the Institut nordique du Québec will benefit from the expertise of various partners, including Northern communities, who will add their traditional knowledge to scientific knowledge and technological know how.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Beyond carbon neutrality

A. Reduction of scope 3 GHG emissions

To encourage the reduction of scope 3 GHG emissions, Université Laval offers a range of services to promote sustainable travel, including self-service bicycles, walking paths, a guaranteed ride home program, the abonne BUS transit pass, and carpooling, in order to facilitate the use of sustainable modes of transportation for members of the university community. By the end of 2018, it wishes to increase the intermodal share for students, other than single-occupant car travel, measurable, in particular, by reducing the proportion of annual permits sold.

TARGET:

Reduce the proportion of annual parking permits sold per full time student (FTS) by 8% compared to 2012-2013.

To achieve this transfer of intermodal shares from single-occupant car travel toward other modes of transportation, the university and the *Service de sécurité et prevention* (security and prevention department) will capitalize on the consolidation and implementation of new incentivizing awareness-raising initiatives to promote sustainable modes of travel, for example:

> Implementation of a flexible plan for employee users of sustainable transportation: occasional daily parking permits at a preferential rate.

> Completion of the transportation management plan.

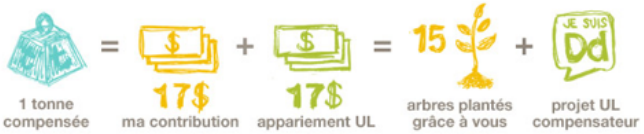
> Continued construction of sections of the bicycle path identified by the master plan.

> Addition of a secure bicycle enclosure at the Jean-Charles-Bonenfant building.

> Reduction of free parking during events.

B. Voluntary GHG Emissions Offset Program (scope 3)

Since its launch in February 2013, the Voluntary GHG Emissions Offset Program has enabled the offsetting of more than 1,445 tonnes of CO_2 equivalent. Annually, this represents more than 10,500 trees which are planted specifically due to contributions by the university's employees and students. The unique feature of this program is that for every dollar invested by the university community, the institution invests the same amount to carry out an offsetting project on campus.



While the Voluntary GHG Emissions Offset Program does not contribute directly to campus carbon neutrality, it is a powerful tool for raising awareness among groups of employees doing the most work-related travelling and creates an individual commitment to carbon neutrality.

To succeed, the University can count on the support of a number of units, such as the Faculty of Pharmacy, Fondation de l'Université Laval and the Direction des communications, which have committed in the 2015-2018 Sustainable Development Action Plan to offsetting GHG emissions associated with the travel of participants for the events that they organize.

TARGET:

Maintain scope 3 GHG emissions offsets at 1,000 tonnes of CO_2 equivalent per year.

C. Raising awareness concerning the fight against climate change

The university can also count on six sustainable development information officers who travel around the various university buildings meeting members of the university community to raise their awareness concerning issues linked to sustainable development, including the fight against climate change. Through dialogue, they make people think about the impact of their actions on the climate as well as about ways to reduce their climate footprint.

To raise awareness and rally the university community around the fight against climate change, the university has put in place various means such as awareness-raising visits of groups of employees who travel for work-related purposes. Approximately 250 professionals are reached each and every year.

Periodically, brief information on the subject is shared in various media (the university newspaper, *Infolettre DD*, social networks, etc.) in order to educate the university community on the concepts and vocabulary related to climate change.

In the years ahead, Université Laval intends to continue holding knowledge dissemination activities such as conferences, round tables and workshops, in conjunction with *Institut EDS*. It also wishes to help establish training activities for clients such as the *Université du 3e âge* (seniors' university) or consciousness-raising activities for high school and primary school students.

D. *Mon arbre UL*

The *Mon arbre UL* project, initiated by Coop Zone, consists in collecting, cultivating and distributing oak and other hardwood seedlings. Its objective is to avoid wasting the abundant seeds found on the university grounds by collecting the fruits from the trees, while contributing to the fight against climate change by planting trees as well. *Mon arbre UL* could also be a mobilizing project for the whole university community, particularly for students of the faculty of forestry, geography and geomatics, who collaborate in bringing it about.

TARGET:
Establish the Mon arbre UL project.

CONCLUSION

In order to fully play its role in Quebec and Canadian society and within the international scientific community, Université Laval intends to consolidate and increase its status as a major research and creation university resolutely turned toward the future and open to the world. The institution wishes to remain a cornerstone of its community through its humanist approach and capacity to educate the leaders of tomorrow. Université Laval is committed to expanding the borders of knowledge by ensuring knowledge transfer and proposing innovative and sustainable solutions.

As a centre for education and research, it is incumbent upon Université Laval to meet the great challenges of our society, including climate change. The university has designed a GHG reduction strategy with various orientations that include measuring, reducing and off-setting emissions and educating and raising awareness with respect to what is at stake. This action plan is part of a larger project to become a model in the area of sustainable development. By becoming a carbon-neutral campus, Université Laval wishes to inspire other organizations and communities to follow in its footsteps, while adapting the UL model to their situation. As Gandhi said, "You must be the change you wish to see in the world."

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