

2014 GREENHOUSE GAS INVENTORY REPORT



UNIVERSITY OF
SASKATCHEWAN

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EXECUTIVE SUMMARY

This report summarizes the greenhouse gas (GHG) emissions inventory for the University of Saskatchewan (UofS) campus through fiscal years 1991-2014. This is the third GHG inventory completed by the UofS. Previous reports have been completed in 2007 and 2010. The report provides year-to-year comparisons in order to measure progress and identify areas for improvement.

In 2010 the University signed University and College Presidents' Climate Change Statement of Action for Canada. The Statement of Action commits signatory institutions to pursue responsible solutions to address climate change. Through the development of the Climate Action Plan in 2011 the UofS has a stated goal to reduce GHG emissions 20% below 2006/2007 levels by 2020.

The greenhouse gas inventory catalogues the six GHG gases that are identified under the Kyoto Protocol which are produced in facilities and operations that are owned or under the direct control of the UofS.

INVENTORY HIGHLIGHTS

	2006-2007	2013-2014	Change
Total emissions (MT eCO ₂)	164,700	161,250	2.0% decrease
Emissions per square metre (kg eCO ₂ /m ²)	427.1	326.0	23.7% decrease

SCOPE 1

Direct GHG emissions from sources owned or controlled by the university.

SCOPE 2

Indirect GHG emissions from the generation of electricity consumed by the university.

SCOPE 3

All other indirect emissions from sources not owned or controlled by the university. Reporting is optional.

Consumed electricity is the largest major source of emissions, accounting for 55% of all emissions in 2013/14.

- The recent reduction in emission factors by SaskPower is the main source for overall GHG reductions for the university

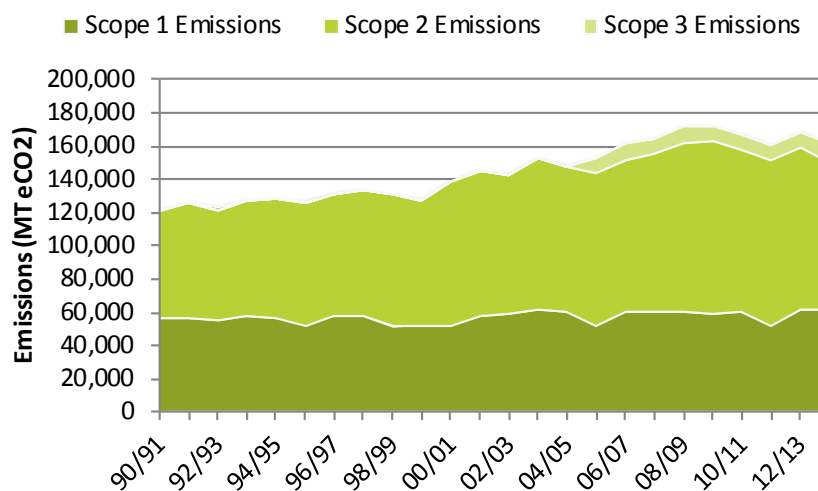


Figure 1 - Total Emissions by Scope (MT eCO₂)

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The 2014 Greenhouse Gas Emissions Report was prepared by the University of Saskatchewan Office of Sustainability.

Special thank you to the campus community that provided information for the 2014 GHG Inventory.

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1.0 INTRODUCTION

The University of Saskatchewan has completed three GHG inventories within the last 7 years. The inventories catalogue all GHG emissions related to facilities and operations owned or directly controlled by the university.

The UofS Climate Action Plan has a stated goal for 20% reduction below 2006/2007 values by 2020. The target was developed through the university's commitments for the University and College Presidents' Climate Change Statement of Action for Canada¹.

The purpose of the university's GHG inventory is to assess the amount and sources of emissions produced by the university as accurately as possible. The inventory is required to track our GHG and report against our reduction targets. GHG reporting is also required annually by Environment Canada for any facility that emits more than 50,000 MT eCO₂ Scope 1 emissions. Annual reporting is expected to be required in the future at the provincial level from the Government of Saskatchewan.

2.0 METHODOLOGY

The inventory was developed by using the Clean Air-Cool Planet Campus Carbon Calculator v6.85 and emissions are reported in equivalent metric tonnes carbon dioxide (MT eCO₂). The focus of this report includes the years 2007-2014 using the 2006/07 fiscal year as the baseline. The previous inventory contained detailed information dating back to 1991.

To determine how to best complete the GHG inventory, the university used the American College and University Presidents' Climate Change Commitment's (ACUPCC) implementation guide². The Greenhouse Gas Protocol (GHG Protocol)³ was also referenced since it is an internationally recognized accounting tool for quantifying and managing GHG emissions. The GHG Protocol categorizes direct and indirect emissions into three broad scopes: Scope 1 emissions are direct GHG emissions that occur from sources owned or controlled by the university. Scope 2 emissions are indirect emissions from the generation of purchased electricity consumed by the university. Scope 3 emissions are a result of the activities of the university, but they occur from sources that are not owned or controlled by the university. The reporting of the Scope 3 emissions category is optional.

Based on standard GHG Protocol standards, the university is required to track and report emissions from the six GHGs covered by the Kyoto Protocol, namely: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

¹ <http://www.climatechangeaction.ca/>

² <http://www.presidentsclimatecommitment.org/>

³ <http://www.ghgprotocol.org/>

The university's first GHG inventory was completed in 2007 and updated in 2010. Current standards for reporting GHG emissions are constantly improving, so all calculations have been updated and any inaccuracies corrected in the 2014 update.

2.1 BOUNDARIES

As previously stated, the inventory includes emissions from facilities that are within the university's operational control.

The university produces and sells energy in the form of steam to external customers. Emissions from steam generated on-site are considered Scope 1, so are included in the inventory, whether used by the campus or sold. The university also purchases generated electricity from SaskPower not only for consumption, but also for resale to external customers. Indirect emissions from the generation of purchased electricity consumed by the university are considered Scope 2. Accordingly, the emissions from the sold electricity do not form part of our inventory. These must be reported by the final consumer of the electricity.

SCOPE 1

Direct GHG emissions from sources owned or controlled by the university.

SCOPE 2

Indirect GHG emissions from the generation of electricity consumed by the university.

SCOPE 3

All other indirect emissions from sources not owned or controlled by the university. Reporting is optional.

2.0 INVENTORY RESULTS & CONCLUSIONS

Scope 1, 2 and optional Scope 3 emissions are summarized below. Figure 2 shows the emissions breakdown for the 2006 baseline, and Figure 3 has the 2014 breakdown. Only slight changes in the emissions mix are noted.

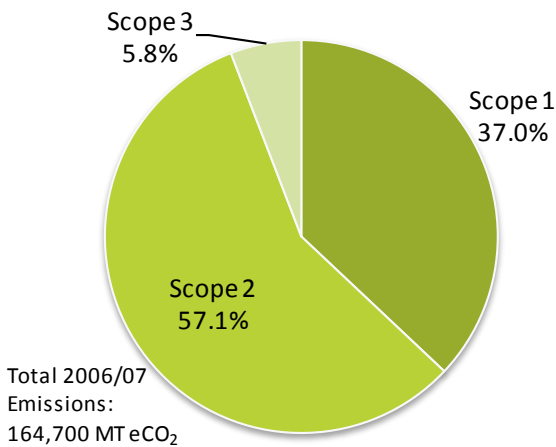


Figure 2 - Baseline Year (2006/07) Emissions Breakdown

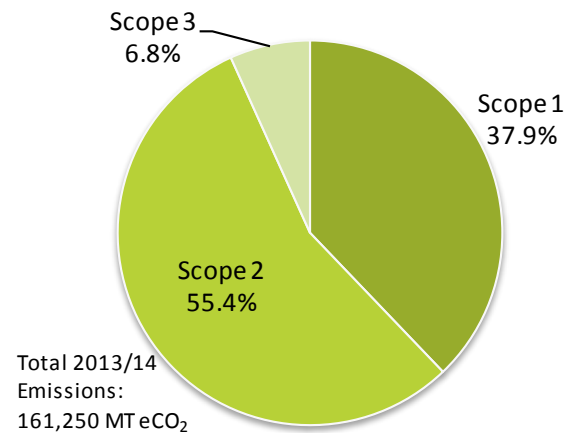


Figure 3 – 2013/14 Emissions Breakdown

Since the baseline year, 2006/07, the university GHG emissions have plateaued averaging 166,800 MT eCO₂. Over the seven years from 2006/07 to 2013/14, emissions have decreased from 164,700 to 161,250 MT eCO₂. Figure 4 shows that since 2008/09 the university has lowered its GHG intensity, measured as emissions per square metre of building space. Further discussion on GHG intensity is discussed in Section 2.2 Scope 2 Emissions.

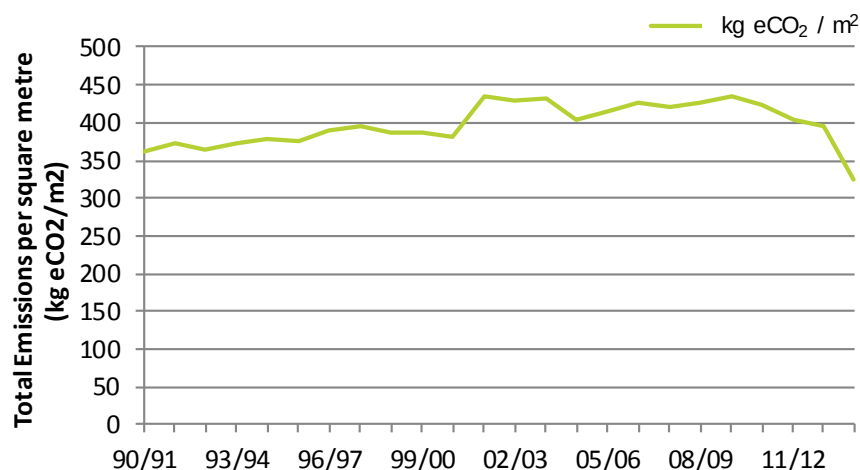


Figure 4 - Emissions per Square Metre (1991-2014)

2.1 SCOPE 1 EMISSIONS

As mentioned previously, Scope 1 emissions are direct GHG emissions that occur from sources owned or controlled by the university. The Scope 1 emissions included in this inventory are: on-campus stationary sources (natural gas and distillate oil), agriculture (fertilizers and animal husbandry), university fleet and maintenance equipment.

Figure 6 shows the Scope 1 emissions breakdown for the 2006/07 baseline, year and Figure 7 has the 2013/14 breakdown.

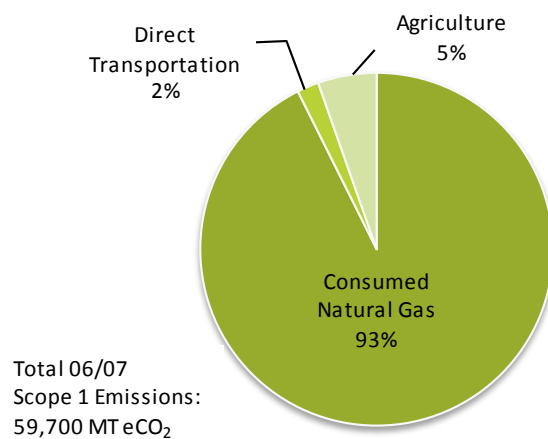


Figure 5 – Scope 1 Emissions (2006/07)

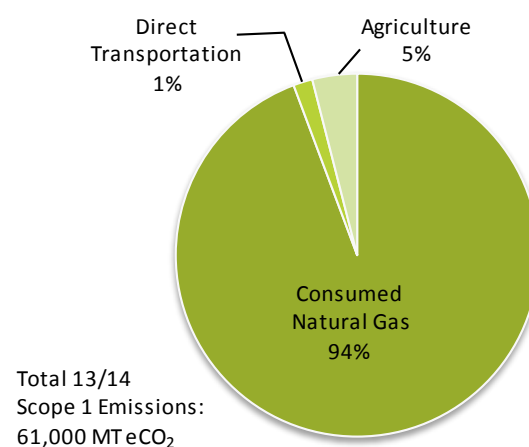


Figure 6 – Scope 1 Emissions (2013/14)

The breakdown of Scope 1 emissions has remained relatively constant over the last seven years. Natural gas used to generate steam for space heating and domestic hot water accounts for 93-94% of our Scope 1 emissions. The majority of Scope 1 emissions are related to space heating and are therefore directly linked to weather conditions.

Figure 7 shows the relationship between Scope 1 emissions and Heating Degree Days (HDD). There is a general trend that in warmer years (less HDD) we produce less steam and therefore consume less natural gas.

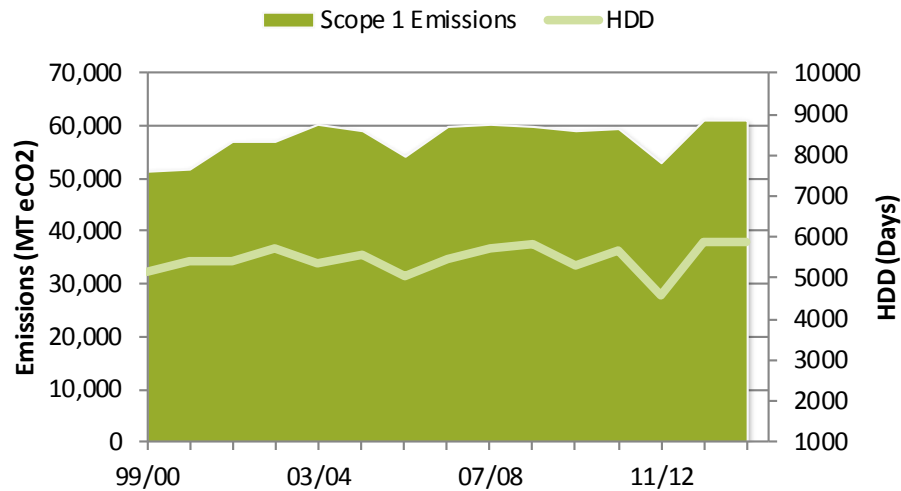


Figure 7 – Scope 1 Emissions per Heating Degree Day (2000-2014)

The intensity of the Scope 1 emissions compared to building space has been declining last 10 years (Figure 9).

2.2 SCOPE 2 EMISSIONS

Scope 2 emissions are indirect emissions from the generation of purchased electricity consumed by the university. The university does not produce any of its own electricity; SaskPower is the university's sole supplier of electricity.

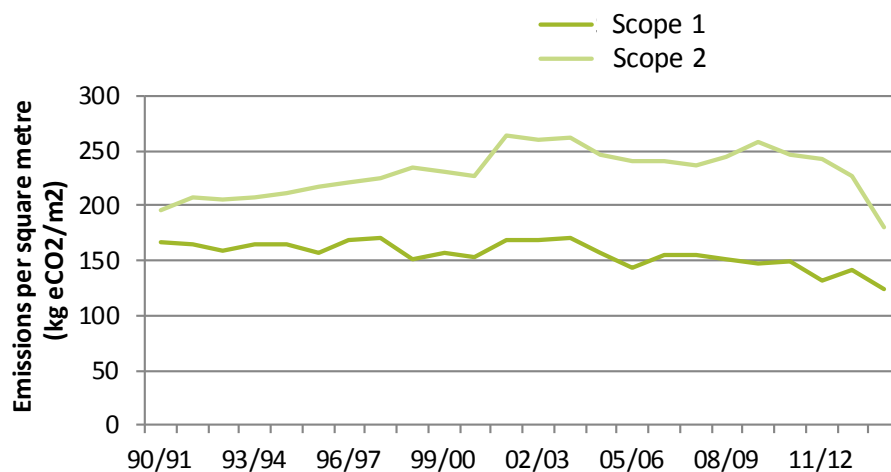


Figure 8 - Emissions per Square Metre (1991-2014)

Figure 8 shows that GHG intensity of Scope 1 and 2 emissions per square metre of building space is continuing to decrease. Recent building construction on campus has increased our building space and energy use has not increased to the same proportion, so intensity is decreased. Figure 9 shows the relationship between Scope 1 & 2 emissions and the increase in building space.

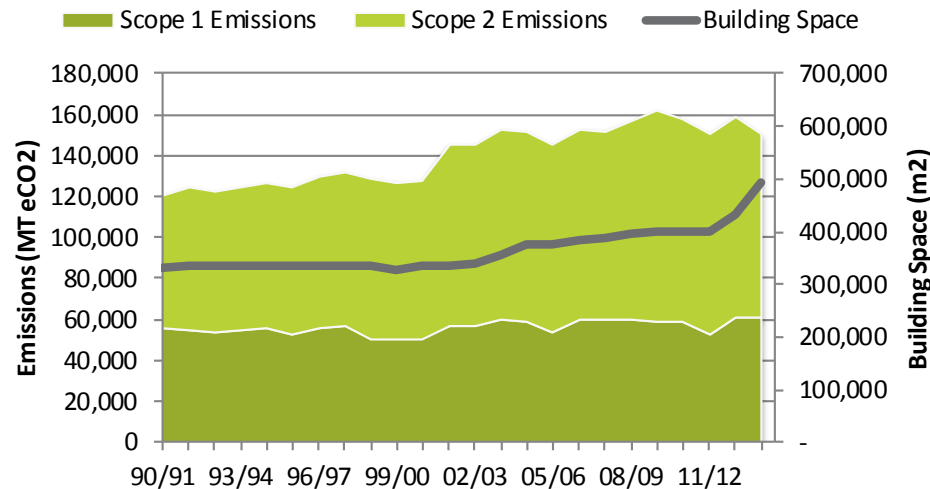


Figure 9 – Scope 1 & 2 Emissions compared to Total Building Space (1991-2014)

Since the university purchases all the electricity from SaskPower, the annual Scope 2 emissions are also a function of the electrical utility emission factor. Emission factors are used to calculate greenhouse gas emissions based on the amount and combination of fuel combusted:

$$[\text{Emission Factor (kg/kWh)} * \text{Consumed Electricity (kWh)} = \text{Scope 2 Emissions (kg)}].$$

When SaskPower generation includes cleaner sources than previous years their emission rate decreases, which has a direct effect on the university's Scope 2 emissions. Figure 10 shows the variance in SaskPower's emission factor since 2000 and Figure 11 shows the relationship between electrical consumption and Scope 2 emissions. The recent reduction in emission factors by SaskPower is the main source for overall GHG reductions for the university.

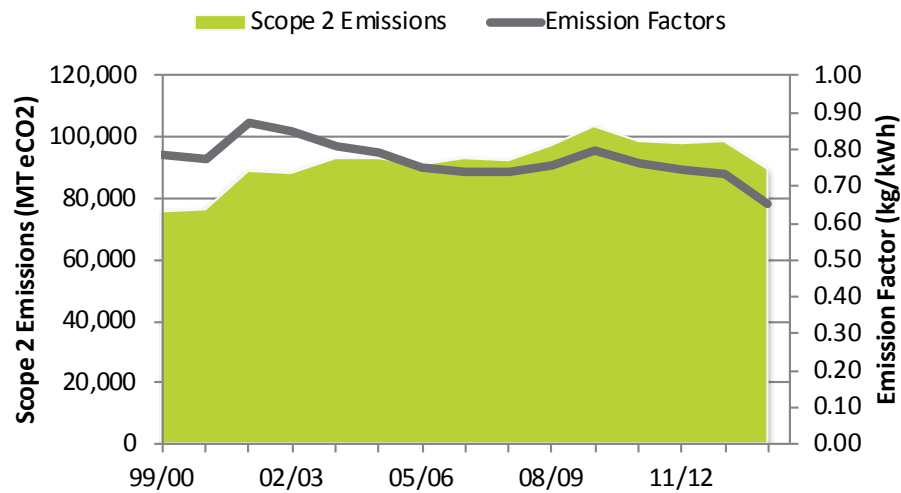


Figure 10 – Scope 2 Emissions compared to Emission Factor (2000-2014)

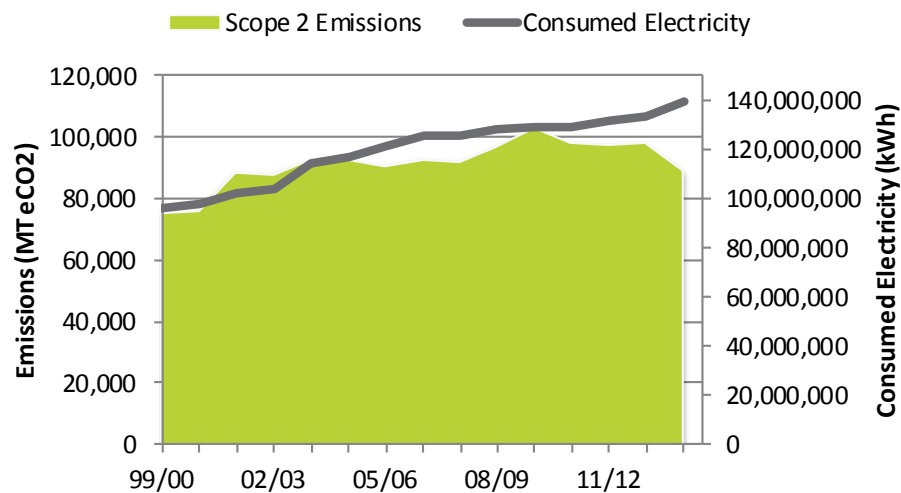


Figure 11 – Scope 2 Emissions compared to Electrical Consumption (2000-2014)

2.3 SCOPE 3 EMISSIONS

The Scope 3 emissions category is an optional reporting category that is concerned with the treatment of all other indirect emissions. Scope 3 emissions are a result of the activities of the university, but they occur from sources that are not owned or directly controlled by the university.

Scope 3 emissions for directly financed travel and solid waste are included in the 2013/14 GHG inventory. The following is a list of Scope 3 emissions that were excluded from the GHG inventory: sold electricity, student and employee commuting, study-abroad travel, transportation and distribution losses from purchased energy, and upstream emissions from directly financed purchases. The university will continue to develop tracking procedures so that additional Scope 3 categories can be included in the future.

Figure 12 shows the Scope 3 emissions breakdown for the 2006/07 baseline year and Figure 13 has the 2013/14 breakdown.

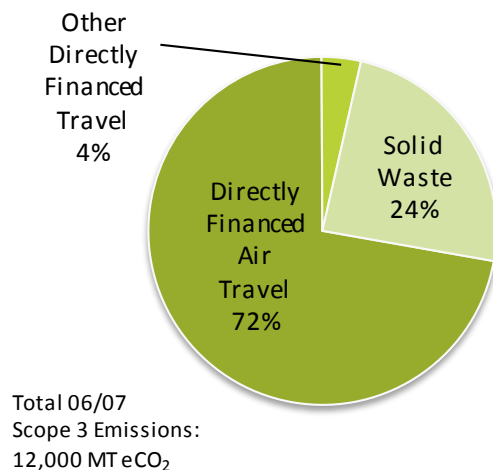


Figure 12 – Scope 3 Emissions (2006/07)

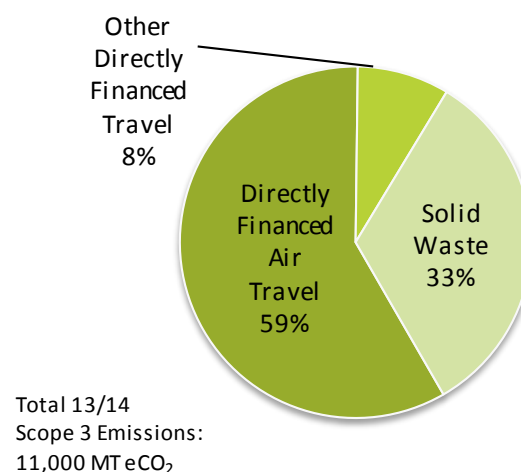


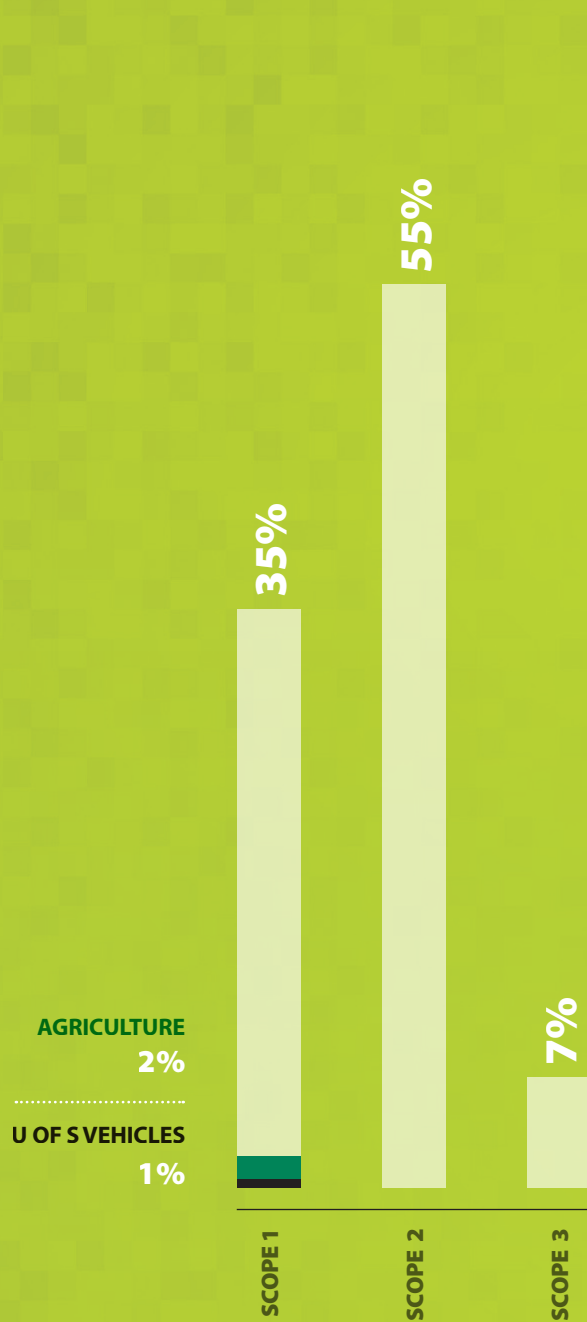
Figure 13 – Scope 3 Emissions (2013/14)

The total amount of Scope 3 emissions is fairly small relative to the other scopes; however this is one of the key areas where individuals' day-to-day decisions can have a great impact.

3.0 CLIMATE ACTION PLANNING

The Climate Action Plan was completed in 2012 and has set a target to reduce emissions by 20% from 2006/07 levels by 2020.

The Climate Action Plan will be the catalyst for engaging the campus community in GHG emission reductions. The plan includes strategies for the reduction of university emissions.



SCOPE 1

Consumed

Natural Gas, Agriculture ■, and Fuel ■

Direct GHG emissions from sources owned or controlled by the university. Examples include emissions from boilers, university vehicles and agriculture.

SCOPE 2

Consumed

Electricity

Indirect GHG emissions from the generation of electricity consumed by the university.

SCOPE 3

Travel & Waste

All other indirect emissions from sources not owned or controlled by the university. Examples include business travel, solid waste and employee and student commuting. Reporting is optional. (Current inventory does not include commuter travel.)

University of Saskatchewan

is implementing the climate action plan to meet our GHG reduction targets.

See Climate Action Plan at:

usask.ca/climateaction

161,250

metric tonnes

2014 greenhouse gas emissions
(CO₂ equivalent)

