Achieving GHG net-zero emissions (based on the 2021-22 – GHG emissions inventory)

April 20, 2023
Achieving GHG net-zero emissions for 2021-22

• Bishop’s has reduced its GHG emissions from owned and controlled sources as well as from purchased energy (scope 1 and 2) by more than 50% (from 3,853 to 1,918 tons of CO₂e) since 2007

• This significant milestone allows us today to achieve net-zero emissions seven years before our goal mainly as a result of three key initiatives:
  • Installation of a centralized energy loop including a geothermal heating system
  • Replacement of heating system in buildings recently renovated: Library Learning Commons, Student Centre, student residences, etc.
  • Offsetting the remaining GHG emissions through buying carbon credits
Achieving GHG net-zero emissions for 2021-22

• The University intends to achieve additional GHG emission reductions through renewable natural gas purchases and investment in energy saving initiatives when renovating our buildings, etc.

• Reducing the remaining GHG emissions (1,918 tons of CO₂e) will diminish the need to buy carbon credits over time to offset the impact of our scope 1 and 2 emissions

• While carbon sinks cannot be used to offset GHG emissions they are important contributors to capture carbon, especially at Bishop’s

• Bishop’s carbon sinks (forests on campus and the Johnville Bog and Forest Park) sequester 1,197 tons of CO₂ (equivalent to 62% of our scope 1 and 2 GHG emissions)
GHG Emissions Trend
Scope 1 & 2

- Business as usual Scenario
  (without GHG emission reduction measures)
- Actual GHG Emissions
- Zero Net Emission Fiscal 2022
GHG emission (scope 1 and 2) reductions

<table>
<thead>
<tr>
<th>GHG emissions (Tons of CO₂e)</th>
<th>2006-07</th>
<th>2021-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>445</td>
<td>33</td>
</tr>
<tr>
<td>Natural gas</td>
<td>3,224</td>
<td>1,576</td>
</tr>
<tr>
<td>Electricity</td>
<td>33</td>
<td>24</td>
</tr>
<tr>
<td>Vehicle fleet</td>
<td>46</td>
<td>74</td>
</tr>
<tr>
<td>Refrigerant leaks</td>
<td>106</td>
<td>211</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,853</strong></td>
<td><strong>1,918</strong></td>
</tr>
</tbody>
</table>

- GHG emission changes from 2007 to 2022:
  - 50% reduction in 15 years
  - 52% reduction compared to the ‘Business As Usual’ scenario despite a 12% increase of building space
### Geothermal system – change in the energy mix

<table>
<thead>
<tr>
<th>Energy type (% of megajoule)</th>
<th>2006-07</th>
<th>2021-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>6%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Natural gas</td>
<td>63%</td>
<td>36%</td>
</tr>
<tr>
<td>Electricity</td>
<td>31%</td>
<td>64%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- **Energy mix shift from 2007 to 2022:**
  - The use of oil has been almost eliminated
  - The use of natural gas has been reduced by 57%
  - The use of electricity has more than doubled
First geothermal urban district heating system in Canada
First geothermal urban district heating system in Canada

57 wells at a depth of 150 metres were installed below Abbott field in 2011
First geothermal urban district heating system in Canada

The new, hybrid heating system draws 25% of its power from Hydro-Québec and 75% from free underground thermal energy to create heat in the energy loop.
First geothermal urban district heating system in Canada

Then we use 75% of energy from the Energy Loop and 25% of electricity (or natural gas) to heat our buildings.
Carbon sinks

• The University mandated a firm (Addere) to assess its carbon sinks
• While carbon sinks are not considered in measuring reductions in GHG emissions, it is important to evaluate carbon sinks and communicate their importance to preserve our green spaces
• Two main sources of carbon sinks were evaluated: forests on campus and the land at the Johnville Bog and Forest Park which is co-owned with the Université de Sherbrooke

<table>
<thead>
<tr>
<th>Location</th>
<th>Carbon sinks in tons of CO₂e per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees on campus</td>
<td>456</td>
</tr>
<tr>
<td>Land at the Parc Ecoforester de Johnville</td>
<td>741</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,197</td>
</tr>
</tbody>
</table>
Achieving Net Zero Emissions through Carbon Offsets

• Fundao-Santa Clara Energetic Complex Project (FSCECP) – (Brazil)

• Project Objective: generation of zero carbon emission electricity from a renewable source – hydropower

• Hydropower Plant Capacity (122.4 MW) enable to sell electricity to the Brazilian grid, avoiding fossil-fueled energy use

• Bishop’s will purchase 1,438 t CO₂e of CP2 Vintage Carbon Offsets @ USD 3.00/ton (total : USD 4,314 (approx. CAD $5,824)

https://offset.climateneutralnow.org/fund-o-santa-clara-energetic-complex-project-fscecp-1279-?searchResultsLink=%2FallProjects
Achieving Net Zero Emissions through Carbon Offsets

- The project is based on the sequestration of black spruce in the boreal forest. Plantations are verified by BNQ, an independent and accredited third party, in accordance with ISO14064-3.

- Bishop’s will purchase 480 t CO₂e of Quebec-based Carbon Offsets @ CAD 35.00/ton (total: CAD $16,800)

Achieving Net Zero Emissions through carbon offsets

Total carbon offset purchases:

<table>
<thead>
<tr>
<th>Source</th>
<th>CO$_2$e offset</th>
<th>Cost (CDN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundao-Santa Clara Energetic Complex Project</td>
<td>1,438</td>
<td>$5,824</td>
</tr>
<tr>
<td>Carbone boréale</td>
<td>480</td>
<td>$16,800</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,918</td>
<td>$22,624</td>
</tr>
</tbody>
</table>
Evolution of sustainability at Bishop’s

1994
- First Environmental Audit
- Signatory of the Talloires Declaration
- Campus Master Plan

2003
- Environmental Policy adopted
- “Think Global, Drink Local” - students vote to ban the sale of single-use plastic water bottles

2008
- Geothermal heating system replaces oil and natural gas

2010
- Signatory of Race to Zero for Universities and Colleges

2012
- SAFS program and Educational farm

2013
- Waste Management Plan

2016
- Bishop’s Bees

2018
- GHG emissions inventory: 4,465 tons in 2012

2019
- GHG emissions inventory: 3,423 tons in 2022

2020
- La Tasse refundable mugs

2021
- Sustainable Development Policy & Sustainable Dev. Plan (2020-24)

2022
- 10,500 trees planted on campus

2023
- FairTrade campus certification
- Vélo-sympathique certification
Evolution of sustainability at Bishop’s

1994 - First Environmental Audit on air quality, energy conservation and waste generation

2003 - First Environmental Policy adopted

2008 – Start of the Geothermal Heating system project

2010 - Think Global, Drink Local - Students vote to ban the sale of single-use plastic water bottles
2012 - Campus Master Plan (revised in 2018)

Main goals:
1) A walking campus
2) Reducing automobile circulation on the campus
3) Integrating Landscape with the campus
4) Connections and gathering spaces
5) Working with existing conditions

Proposed vehicular traffic and parking

https://www.ubishops.ca/about-bu/our-campus/campus-master-plan/
2012 - GHG Emissions Inventory – 4,465 tons CO$_2$e (for all scopes)
2016 - Bishop’s Bees

An apiculture club that promotes ecological bee keeping practices.

Students involved have the opportunity to learn hive management and honey extraction.
The SAFS program emphasis is on improving the sustainability of all aspects of agriculture and food systems – focusing on the social, economic and environmental aspects of agriculture in order to help students develop a thorough understanding of food systems from farm to table and beyond.
Bishop’s students built a mobile maple syrup production unit.

They produced maple syrup from the sap of maple trees on the educational farm in the mobile maple sugar shack which was stationed in the University Quad.
The 3R principle (Reduce, Reuse, Recycle) is a hierarchy of waste management strategies to minimize waste.

Measuring rates of recycling, composting and waste is critical to set accurate reduction targets.

The first waste categorization was carried out in Fall 2021.

2019 - Race to Zero for Universities and Colleges

Pledge at the head-of-organization level to reach (net) zero GHGs as soon as possible, and by mid-century at the latest, in line with global efforts to limit warming to 1.5C.

https://www.educationracetozero.org/home
2019 - La Tasse refundable mug

Green Levy fund initiative in partnership with Sodexo

The Green Levy funds student-led sustainability projects and is a way for students to pursue their own sustainable development projects at Bishop’s with the support of the Sustainable Development Student Intern (SDSI), the Students’ Representative Council (SRC) and the University’s Sustainable Development Advisor.

https://busrc.com/green-levy/
2020 - Sustainable Development Plan (2020-24)

1. Operate Bishop’s University in an increasingly ecological and responsible manner
   • Reduce the amount of waste going to landfills
   • Reduce car circulation on campus
   • Become carbon neutral by 2030
   • Use our financial power in a responsible manner

2. Engage the Bishop’s University community in improving its sustainable performance
   • Create awareness to incite action
   • Support grassroots projects
   • Make Bishop’s a sustainability leader in the community at large
3. Instill curiosity about sustainable development through academic programs and research
   • Make visible what is invisible
   • Increase sustainability literacy
   • Increase sustainable development in research

4. Promote the well-being of our community through sustainable development initiatives
   • Increase food security
   • Support diversity, equity, and affordability

2021 - Tree planting project – phase I

Partnership with Trees Canada

Students in the BU Environmental Club and the Sustainable Agriculture and Food Systems program planted the 10,500 trees.

Care is taken to select local tree varieties: Yellow Birch, Burr Oak, White Spruce, Red Maple, Tamarack, and Balsam Fir.

https://www.ubishops.ca/sustainable-development-at-bishops-university/
2021 - Treeplanting project – 10,500 trees planted
2021 - Creation of the SD office

Laurence Williams – Sustainable Development Advisor
Laurence coordinates the actions and projects related to the implementation of the Sustainable Development Plan.

LWILLIAM@UBISHOPS.CA

Danielle Storey & Ariane Horrall – Sustainable Development Student Interns (SDSI)
The SDSI role is made possible thanks to the generous contributions of the Elizabeth Harvey Memorial Sustainable Development Fund and the Kruger Inc. Sustainable Development Internship Fund.
2022 - GHG Emissions Inventory – 3,432 tons CO$_2$e (for all scopes)

The analysis was made following the ISO 14064-1:2018 norm.
2022 - Fairtrade Campus Certification
2023 - Vélo Sympathique certification