GREENEST

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Due on 10/12 at 6am PT. We will award up to 100 bonus points based on quality of work.

MCGILL UNIVERSITY:

AN INSTITUTION SET ON AN ENERGY-EFFICIENT AND SUSTAINABLE FUTURE

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We've all been to lectures with projector screens, wifi access, and brightly-lit hallways and classrooms across campus. We use the microwaves in the cafeterias, use the printers, and charge our laptops in the libraries every single day. Power and energy are an integral part of every facet of a McGill students' life, but I'm willing to bet most of us have never stopped to consider where exactly McGill sources its energy, let alone how much it expends. So what exactly *is* McGill's relationship with energy? It's a broad question, though McGill's sustainably-progressive projects and initiatives in the past two decades makes it very easy to answer with some very specific examples of environmental leadership.

If you think about McGill's demographic makeup among its students and faculty members, it's no question that they come from all parts of the world. However, we're geographically diverse even when it comes to where we live on the island of Montreal (and slightly off it!). Just to get to school and work every day, most of McGill's 45,000+ person community has to commute in some way. This entails a huge amount of carbon and energy expenditure associated with *just* that commute. In order to alleviate some of these energy expenditures, McGill has started turning towards ridesharing between campuses. Any students who commute between the downtown and Macdonald campuses each day can rideshare on the Mac Shuttle which goes to and from daily. By having a capacity of approximately 50 students at a time, the buses reduce the number of vehicles on the road by a factor of 50! For closer commutes, accessible Bixi bike stations are dotted all around campus for students and faculty members to check in and check out as they need! If you don't have your own bike, need to stretch your legs a bit on your commute home, *and* have a commitment to reduce your carbon output, taking up a membership with Bixi is a phenomenal way to contribute to Montreal's growing movement of bike sharing and sustainable transit. However, for students who live too far off-campus to cycle, all McGill students are eligible for student discounts on obtaining OPUS cards to get cheap transit fares. In fact, some at McGill are even eligible for *fully*-subsidised OPUS memberships to assist their daily commutes on public transportation.

When it comes to food, McGill is known for their delicious and sustainable food options! The Royal Victoria College cafeteria in particular is known for its Fair Trade, local, and vegetarian/vegan meal options. In partnership with the Macdonald campus crops, the cafeterias are supplied with local and sustainably-grown produce. This aligns perfectly with McGill's commitment to sourcing their food from low-impact origins with less energy needed to ship from overseas. In fact, last year, McGill won a Sustainability Award for the variety of environmentally-sustainable meal options in its on-campus cafeterias! Yet another way that McGill students reduce their overall energy expenditure is with the new Ozzi Machine reusable container system. The Ozzi system involves students exchanging their used to-go meal containers for a token from the machine and giving the token to the servers in the cafeteria to claim a newly-cleaned container. It's a perfect cycle. By having these reusable container options, automatically given to all first-year students in residence upon arrival, *so* many disposable containers are being saved from production and waste. This reduces all the energy needed as input for production, as well as the high energy expense to recycle or compost a single-use container after it's been used.

McGill is known for its educational prowess, but with its world-class reputation comes great energy intensity and a massive carbon footprint. According to a 2016 McGill Energy Management Plan, McGill uses more energy per square foot than its peer institutions in the rest of Canada do. In fact, in 2015, the University released 54,060 *tonnes* of $CO2_e$ (carbon dioxide and its equivalents) – a shockingly

high number. The Energy Management Plan affirmed that McGill's carbon output numbers had been steadily decreasing each year since becoming more conscientious in the mid-1990s, and, hoping this trend continues to fall, the plan is set to achieve carbon neutrality by 2040, paired with an intermediate target of reducing its GHG emissions by 58% by 2025.

Being located in Montreal, Quebec, where the biting cold weather begins in early October and finally leaves us at the end of April, an adequate heating system is a definite energy vacuum for a large institution like McGill. According to the McGill Facilities and Utilities web page, "the role of Utilities and Energy Management is to monitor energy usage and develop programs to reduce energy consumption and maximize the efficiency of the University's utility networks." They seek to ensure quality stewardship and efficient operation of the heating and cooling systems of the University in order to maintain energy-minimal levels, while ensuring the McGill community at large neither sits in the darkness or freezes to death during the winter.

Speaking on winter and natural water cycles, Quebec and Canada, in general, source huge proportions of their electricity from hydro-electric power! In fact, Québec is Canada's biggest provider of hydro-electric power, providing the grid with 38,400 MW of power per year. According to Statistics Canada, 2008 levels of Québec's total hydropower generation equalled 186,400,534 megawatt hours, making up 96.8% of its total electricity output, in fact! The nearest power plant to campus is located just across the Prairie River north of the island of Montreal. The Hydro Québec Rivière-des-Prairies Generating Station is responsible for providing the local energy grid with 48 MW at a time! Built from 1928 to 1930 at the time when the region of Montreal was electrified, the hydroelectric dam weighs 110 tonnes and cost $14 million to build – back in 1930! To build such infrastructure today would surely cost several hundred million dollars. Although this hydroelectric power station has been around for nearly nine decades, it has had to be adapted slightly in order to take into account the possible environmental detriments which hydroelectric dams can incur. In recent years, the power station has installed an ultrasound system upstream of the generating station to help adult American shad fish bypass the generating station to migrate to the Atlantic Ocean after they spawn in the Saint Lawrence River. According to Hydro Québec, however, two major studies by Hydro Québec, the UQAM Biology department, and La Société de la Faune du Québec which have been done in relation to possible environmental impacts on fish and ecosystem health in general are still in progress, and are still inconclusive, although projected to demonstrate positive results.

Despite the fact that a large portion of McGill's energy comes from renewable energy sources, McGill has been strongly committed to reducing its energy consumption and expenditure for many years. Since 2014, McGill has implemented Vision 2020 as an extension of their Sustainability Strategy, which seeks to achieve the highest possible standards of sustainability on campus, according to its Sustainability website page. Their official Climate & Sustainability Action Plan was officially kick-started in 2017 and is set to be well on track of achieving its goals by 2020. These aforementioned goals include full carbon neutrality by 2040. In order for McGill's carbon neutrality to be achieved, and to release as many greenhouse gases are being sequestered or offset, the University has had to strategize for a more energy-efficient campus energy system, offsetting air travel, greening commuting policies by implementing carbon-minimal transit options, and planting more trees to act as carbon sinks. McGill has

already made bounds in setting up arboretum projects on rural land owned by the University function as research fields to measure their current sequestration rate and to increase its carbon sequestration. Some of these McGill-affiliated and owned properties include the Gault Nature Reserve, Macdonald Campus Farm, and Morgan Arboretum.

McGill also hopes to attain a Platinum sustainability rating from the AASHE (Association for the Advancement of Sustainability in Higher Education) by 2030. By implementing many of the actions in their Climate and Sustainability Action Plan will bring them closer to achieving this goal. For example, the McGill Peak Demand Management project will lower the Institution's dependence on Hydro Quebec and the Quebecois power grid by reducing electricity demand in buildings during peak hours and extreme cold. They will do so by "transitioning buildings from static energy consumers to dynamic smart grids and pave the way to a carbon-neutral energy transition," according to the McGill Energy Management Plan. This is expected to reduce its overall energy use intensity by 22% *below* the newly-implemented 2013 government baseline. The cost of this energy conservation shift? Around $22 million is the estimated cost of this forward-thinking switch to sustainable energy habits. However, the predicted annual savings post-implementation are estimated at $3.99 million over a total payback period of 4.3 years. After 20 years, the total net value is expected to be $14.89 million. So is it worth the up-front investment? This is always the question of environmental economics. I am so glad McGill said "yes," because I'm confident that the eventual benefits will outweigh the costs.

Recently having gotten involved with McGill's Office of Sustainability as one of their new Sustainability Project Fund ambassadors, I had the chance to speak with Shona Watt, a Sustainability Officer at the McGill Office of Sustainability (otherwise known as MOOS). When speaking on McGill's efforts to merge top-notch education and environmental sustainability, Shona touched on the University's commitment to mitigate the effects of climate change, and the imperative part students play in making this institutional project a reality. "As McGill University works to reduce energy consumption and environmental impacts on campus, students play a large role in spreading behavioural change and reducing their own emissions. Students' passion and awareness of environmental and social issues are key in transforming our campus into a flourishing community for all."

The Sustainability Project Fund collects approximately $0.55 per credit per student, which is matched by the University, in order to fund on-campus projects pertaining to all things environmental! Some of the most successful student-led energy conservation projects in the past decade since the SPF began have been funded by this program. MOOS TRAX, currently being remodelled as the McGill Carbon Calculator, was the 186th SPF project. As visible in the photo below, the online application asks students to list how they travelled and the original postal code from their destination. Based on this data, the app can calculate how much carbon was expended during their commute. This has been used by most sustainably-certified McGill events to collect information about how its attendees commuted in order to allocate part of the budget towards paying the carbon offset for the commutes. The MOOS TRAX app is a sure upgrade from the 26th SPF project back in 2011, the Pulse Energy Dashboard! The project was funded for a mere $1,200 and has been providing energy consumption information and statistics to members of the McGill community since its creation seven years ago.

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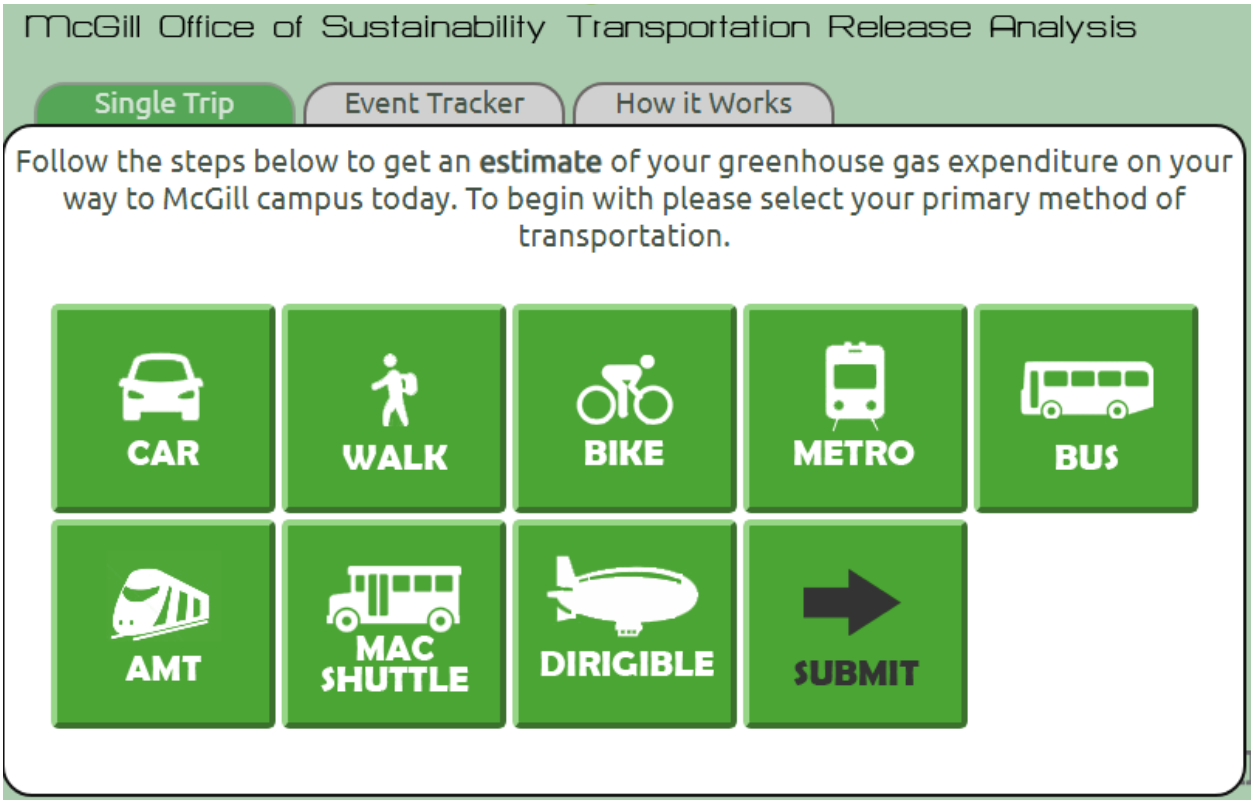
All in all, in researching McGill's many forward-thinking approaches to reducing its carbon output and energy expenditure, I became more and more reassured in my decision that I had made a good choice in coming to this school. To study in an institution which has committed to reducing its energy consumption and wastage is a lucky situation indeed, especially as an avid environmentalist. For sustainable values to literally *power* such an institution is indicative of the commitments it is willing to make to ensure the health and conservation of our planet for generations to come.

SUBMITTED AT: 5:35 am Eastern Time October 12, 2018



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This article will hopefully be published in the coming weeks on the McGill Office of Sustainability online blog! I will update you when it's published.