SUSTAINABILITY
JOHN CARROLL UNIVERSITY

Blue and Gold Make Green

Annual Report of the Committee for 2018

As a Catholic and Jesuit university, John Carroll University is committed to the environmental values of the 2015 Papal Encyclical Laudato Si', *and of the Society of Jesus, as expressed by General Congregations 35 & 36.*

Prepared February 19, 2019

This document printed on recycled paper

2018 Committee Members

- Alan Miciak, Ph.D. - Dean, Boler College of Business
- Brendan Dolan - Assistant Director of Residence Life
- Brendan Sieber,'20 - Student Union officer
- Brenna Davis - Ignatian Solidarity Network
- Carol Dietz - Associate Vice President for Facilities – *Immediate Past Chair*, *ex officio*
- Dale Armbruster,'14, 17G - Integrated Marketing and Communications
- Edward Peck, Ph. D. - Vice President for University Mission & Identity, *ex officio*
- James Watling, Ph.D. - Associate Professor, Biology
- Jeana Franjoine,'19 - Fair Trade marketing intern
- Jeff Your,'85, '01G - Manager of Central Scientific Stores & Laboratory Support Services – *Committee Chair*
- John Scarano - Director of Campus Ministry
- Jonathan Kuss - site manager, Turfscape
- Katie Doud, Ph.D. - Assistant Professor, Chemistry
- Liam Nigro,'22 – Bike Co-op; Sustainability intern
- Lou Genovese - Directory of Purchasing
- Melissa Yon - Administrative Asst., Chemistry Dept – *Committee Secretary*
- Mitch Tabol - Director of Physical Plant
- Rory R. Hill,'10G - Director of Auxiliary Services
- Sophie Kocheff,'19 – President, Environmental Issues Group
- Spenser Kale,'21 – EIG, 2019 President Elect
- Tyler McTigue,'14 - Strategic Account Manager, Current (GE), Alumni representative

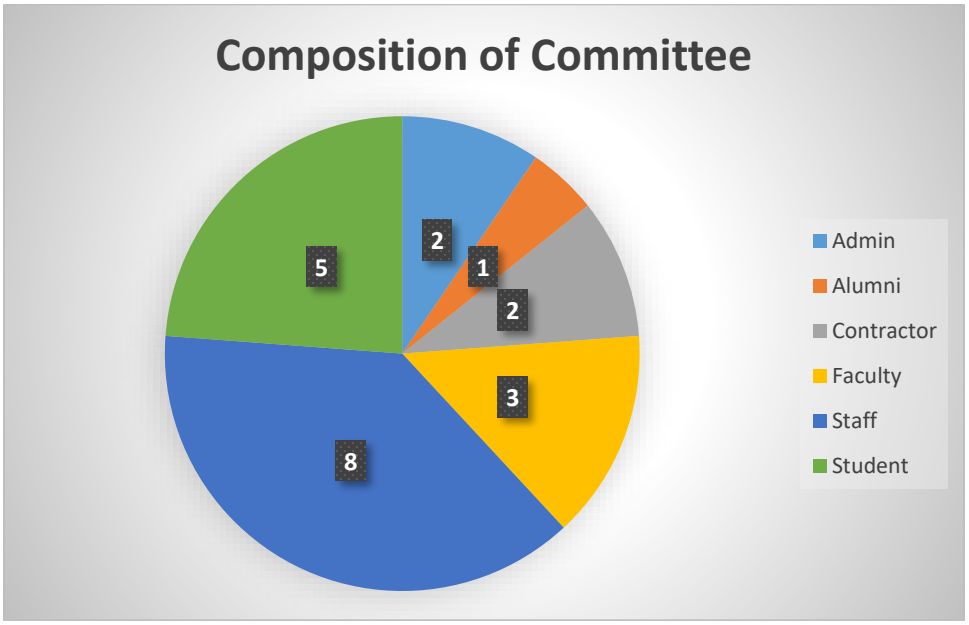


Table of Contents

Executive Summary

Faculty, staff, and students collaborate and coordinate their efforts through the Sustainability Committee toward fulfillment of JCU's strategic plan.

Highlights of the last year include a dramatic decrease in our carbon footprint. Negotiated energy contracts guarantee 20% renewable content. Turfscape brings their expertise to campus with new greenscaping practices and plantings. All trees on campus were inventoried and we progress toward achieving Tree Campus USA status. A change in waste contractors emphasized the need for a cleaner recycling stream. Paperless initiatives remain a priority. Student engagement increased on campus and on the committee.

The sub-committees' work represents an institution-wide concern for our carbon footprint and care for creation by Campus Ministry, Facilities/Grounds, Dining Hall, Residence Life, Student Affairs, Business Practices, and Recycling/Housekeeping.

Committee Highlights for 2018

- A dramatic decrease in our carbon footprint over 2017 through judicious energy shopping.
- Reduction in carbon footprint from an increased use of renewable energy (~4000 metric tons of CO2 equivalents) equivalent to 9,000,000 fewer miles driven by cars
- An increase in committee membership with some very enthusiastic participants representing a variety of campus community constituents.
- New recycling containers and signage to accompany change of waste hauler.
- Completion of a tree survey of the main campus showing more than 80 species represented. Survey was loaded into professional software package enabling Facilities to track improvements and changes to green space.
- Student learning projects included tree planting, bringing the total number of trees on campus to 998.

Introduction

John Carroll University's **Sustainability Committee** has inspired a culture of sustainability at the University since its inception in 2010. Sustainability projects at John Carroll are increasingly visible in recent years. The Committee advocates these ongoing efforts and identifies strategies for additional sustainability initiatives. Our campus is committed to measurable progress toward "going green."

John Carroll is the **only one** of 28 Jesuit colleges and universities in the U.S. that links sustainability from its website landing page. For links to other Jesuit institutions with sustainability websites, see Appendix 3.

Mission

John Carroll University will support sustainable activity, set an example for our community, and serve as a leader in our region through education, action and policy development. We are committed to protect and preserve the earth and ensure the quality of life for future generations in a manner consistent with our Jesuit mission.

Vision

Our vision is an environmentally, socially, and economically sustainable university campus and community with employees and students who incorporate sustainability in their education, work and daily lives.

Strategic Initiatives

JCU's Strategic Plan for 2015-2020, Promise and Prominence, sets three goals: (1) Academic Excellence for Student Learning and Success, (2) Faith that Does Justice, and (3) an Engaged Campus Community. It is within Goal 2, a *Faith that Does Justice*, we find our first (of four) objectives: Jesuit Catholic Values: Deepen the University's commitment to peace, justice, and sustainability. To fulfill this objective, we commit to the following initiatives:

- Conserve natural resources and reduce waste, energy usage and our overall carbon footprint.
- Identify, promote and implement sustainable practices in all aspects of our operations.
- Directly support the University's culture of continuous improvement and enhance the University's overall Catholic character and commitment to the environment.

Goals

Goals and metrics in these nine areas were developed in December, 2010 to better gauge the efforts of sustainability and measure our progress toward achieving carbon neutrality at John Carroll University.

- Design and Construction
- Energy and Water Use
- Food Services
- Landscaping / Grounds
- Office Practices and IT
- Procurement
- Student Life
- Transportation
- Waste Reduction

Tactics

In keeping with the Goal "Faith that Does Justice", as outlined in JCU's 2015 Strategic Plan "Promise and Prominence", specific tactics for the University Strategic Plan (USP), Goal 2, Objective 1 - Deepen the University's commitment to peace, justice, and sustainability - have been identified:

- Achieve "Tree Campus USA" designation for JCU campus
- Encourage all programs to consider deepening their commitment to peace, justice, and/or sustainability and identify opportunities to further distinguish themselves[1]
- Coordinate existing programs that focus on peace, justice, and/or sustainability in order to identify common themes and combine programming efforts.
- Support and monitor ongoing sustainability efforts through the physical plant to increase energy efficiency and recycling efforts, reduce consumption, and utilize sustainable landscaping.

Our committee is additionally committed to the following, even though not specifically enumerated in the USP:

- Increase the use of native plants in campus gardens to reduce water and fertilizer use.
- Sustainability signage around campus, explaining the efforts taken and the environmental benefits thereof, e.g., rain garden describing native species.
- Continue cooperative efforts with the Mission & Identity Office and Campus Ministry to educate the JCU community regarding Catholic teaching on this topic.
- Engage the faculty to increase sustainability course content – see Appendix 1.

[1] For a complete list of all course offerings having an environmental component, see Appendix 2

Proposed 2019-2020 Tactics

- Actively manage electricity costs and participate in programs that fund energy conservation efforts. Examples include PJM Peak Capacity Limiting, ENERNOC Demand Response and SB 310 Opt Out program.
- Achieve Tree Campus USA designation for JCU
- Education of campus-wide community on proper recycling techniques

Wish List of Future Projects

- Divestment of University endowment from carbon-fuel investments, in the wake of growing social justice concern by other Jesuit and Catholic institutions.
- Ensure that Sustainability factor significantly in the 2020-2025 strategic plan.
- Obtain funding to attend AASHE conference and Loyola conference every year.
- Identify a 'futurist' speaker in the Ignatian tradition to come to campus to start the conversation about global climate change and its future economic impact on Cleveland. We aspire to be the regional thought-leader on sustainable economic growth with an emphasis toward attracting coastal Fortune 500 firms to relocate corporate and production facilities to NE Ohio ahead of coastal flooding, fresh-water scarcity, weather severity, and other climatic threats to the US.
- Continuing our emphasis on faith that does justice, we see the centrality of sustainability action as part and parcel of Pope Francis' call to "Care for Creation" in Laudato Si'. Suggest to administration that Sustainability initiatives be part of the next capital campaign.
- Assist the Mission Integration Committee to improve the university community's recognition of Ignatian values, specifically those low-scoring values identified in Xavier U's 2017 mission survey, i.e., "Finding the Divine in all things" and "Actively working to further ecological justice and care for the environment"
- Assist academic division in identifying opportunities to integrate sustainability into the curriculum informed by our Ignatian values of peace and justice and care for creation.
- Hold brown-bag listening sessions across campus to find out what people are thinking about sustainability and solicit input for potential initiatives.
- Annual recognition ceremony to formally acknowledge the sustainability efforts of faculty, staff, and students.
- Create an Office of Sustainability and hire a Director of same.
- Pathway in front of Dolan Science Center to allow easier appreciate of new plantings.
- Add more water bottle refill stations on campus.

Committee Activity

Community Engagement/Outreach

- Sustainability Committee materials provided to student in Entrepreneurship 304 course, who was presenting a group project on sustainability on college campuses in the United States in the Super Competition – November 2018
- In cooperation with the Cleveland Catholic Diocese, Notre Dame College, and Ursuline College, John Carroll University hosted a day-long conference on teaching Laudato Si' – September 2018
- Committee members visited Stanard Farm in Cleveland to evaluate the property for future University use – March 2018
- Jeff Your was interviewed by Tom Gittenger for an MBA independent study project about corporate social responsibility/sustainability by five local corporations, about JCU's sustainability efforts, February 1. See Appendix 2 for the full report.
- Jeff Your was interviewed by Olivia Shackelton for the Carroll News about the battery recycling program, published in February 8 issue. https://medium.com/the-carroll-news/battery-recycling-program-at-john-carroll-university-e80816eb45ff
- Inside JCU postings
    - January 25 – Battery recycling program and locations
    - February 23 – Publication of 2017 Annual Report
    - February 27 – Campus sustainability webinar
    - March 12 – Battery recycling program and locations. See Appendix 7.
    - September 28 – Sustainability plant sale fund raiser
    - October 4 – October is Campus Sustainability Month
    - October 29, 2018 - Sustainability course content survey of faculty
    - November 7, 2018 - Sustainability plant sale fund raiser
    - November 26, 2018 - Recycled bubble wrap, peanuts, styrofoam, boxes
    - November 26, 2018 - Have a sustainable event or practice to share?

- Questions and Answers fielded during 2018 – committee members respond to interested parties who inquire about various subjects which come up in casual conversation or during 'driveway moments'.
    - **Q: "Does JCU shop for energy?"**
    - A: Yes, JCU negotiates two and three-year contracts for electricity and natural gas to lock in the best prices.
    - **Q: "Is JCU looking at renewable energy?"**
    - A: In 2017, JCU executed a contract for electricity which includes 20% renewably sourced energy, locking in prices for 2018-2020 at the same price as non-specified source energy.
    - **Q: "In our carbon footprint graph, it looks like Refrigerants &**

Chemicals are increasing over time – what's going on?"

- A: That category includes refrigerant replacement as well as fertilizer use. We have no data for fertilizers applied prior to 2011, so it appears to grow exponentially after that date. Refrigerants are a very small proportion of that figure (20-30 pounds/year) compared to 9K-10K pounds of fertilizer being applied.
- **Q: "Where do 'fair trade' roses come from?"**
- A: One of the following countries: Kenya, Ethiopia, Sri Lanka, Ecuador, Uganda or Tanzania
- **Q: "Why should I buy Fair Trade flowers?"**
- A: About 80% of cut flowers sold in the United States are grown in Latin America, South America, and Africa. Workers are often exploited to keep costs low, leading to severe abuse and mistreatment. Fair Trade creates a sustainable business model that guarantees: Social Justice, Environmental Protection, and Economic Development. With Fair Trade, farms, employees, and communities participate in global trade with sustainability and integrity.
- **Q: "My waste hauler says I can recycle 1-7 plastics but the Cuyahoga County Solid Waste District says the only plastics I should recycle are bottles and jugs. Why is the County trying to limit recycling?"**
- A: China stopped accepting mixed plastics for recycling this year and they were the biggest consumer of plastic. While your recycler may still have a domestic market for some mixed plastic, it has very little value and there is no guarantee it will get recycled at this time. Plastics bottles and jugs are still accepted and have markets. Until new markets can be developed, focus on recycling bottles and jugs only. Other types of plastics like yogurt cups should not be included in your recycling at this time.
- **Q: "Why do plastics have numbers inside recycling symbols if they're not recyclable?"**
- A: The numbers on plastic containers are resin codes used by the plastics industry to identify the type of chemicals used to make the container. The codes do not always mean that the item is recyclable. Instead of looking at the numbers, look at the shape. If it's shaped like a bottle or jug with a neck that is narrower than the body, it can go in your recycling.
- **Q: "What plastics CAN I recycle?"**
- A: Recycle plastic bottles and jugs. This includes items like water and soda bottles, shampoo bottles, milk, water and juice jugs, laundry detergent jugs and bleach bottles. Bottles and jugs should be emptied and rinsed. Replace the cap. Please support recycling by not putting other types of plastic into your recycling container. If you do, it will likely have to be sorted out as trash. That means NO yogurt cups, tubs, take-out containers, berry and produce containers.
- **Q: "Lately I have noticed that lights are left on in classrooms and buildings very often, even when no one is using them** or it's nighttime. This is upsetting to me as I see it as an unnecessary waste of energy...the

lights could easily be switched off and so much energy could be saved. I have heard from other students that the library is required to keep lights on at night, and that, even if students turn off lights in buildings, the custodial staff will often turn them back on throughout the night. To me this is an area in which JCU could greatly improve. I don't see why lights need to remain on in empty buildings when no one is using them. Also, in the dorm halls the lights are triggered to turn on at night if someone steps out of their room to, for example, use the bathroom. Not only is it hard to fall back asleep after being exposed to such bright light in the middle of the night, but the lights often stay on for a while on a timer, and don't shut off soon enough."

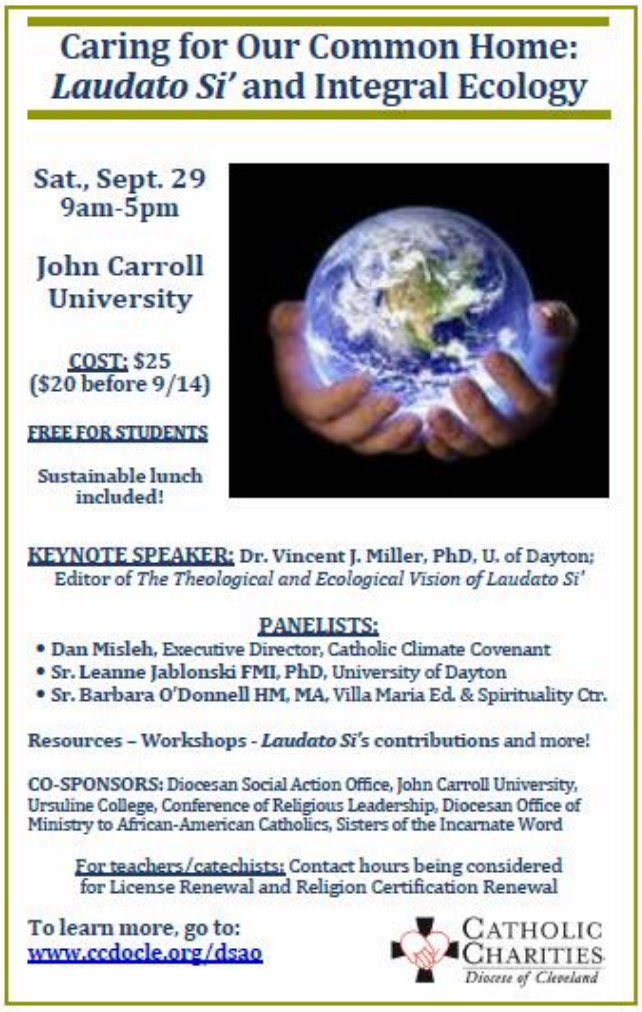
- A: We, on the Sustainability Committee, are committed to reducing our energy usage wherever possible and practicable. Unfortunately, safety measures for the protection of all on campus sometimes take precedence over economy/efficiency. Obviously, it's a good idea to light the halls in the dorms so folks don't injure themselves going to the bathroom at night. At least those are now on a motion detector system, that is an improvement that was added in recent years. Formerly, the hallway lights burned 24/7. The motion sensors are factory-set to turn off after 15 minutes of no movement. As for classrooms, we have installed motion detectors where appropriate. But others have manual overrides for teaching purposes (the ability to darken a room for AV projection, e.g.). The committee also designed and installed energy conservation stickers near classroom light switches in the last year. And, as you have already mentioned, custodial staff do turn the lights on to clean classrooms at night. It is sad that a simple task like turning off lights is too hard for some people to remember. We need continuing education to retrain all the possible users moving through our buildings. Where practical, we use computer automation to ensure energy efficiency.

Conferences and Workshops Attended

- Several committee members and two faculty members participated in "Caring for our Common Home – Laudato Si' and Integral Ecology" conference, September 29, 2018.
- Three students and a faculty member attended the 5th Climate Change Conference, Loyola University, Chicago, March 15-16. See Appendix 5 for details.
- "Sustainable Procurement in Laboratories: it's Time to ACT" – March 1
- "State of Sustainability in Higher Education 2017" – February 27

Networking and Professional Outreach

- Hosted conference for Cleveland Catholic diocese, “Caring for Our Common Home: Laudato Si’ and Integral Ecology”
- Visited urban farm at E. 53rd and Stanard Ave, Cleveland, to evaluate site for future sustainability efforts and programing.
- Students met with Mr. Jon Powers, Co-Founder and President of CleanCapital, and served as President Obama's chief sustainability officer, on campus April 4. Mr. Powers was invited to speak through the Mellen Speaker Series, hosted by the Boler College of Business.
- JCU students also attended a community meeting in University Hts with Mike Foley, Director of Sustainability in Cuyahoga County, Councilman Mike Houser, and Luke Sulfridge of Solar United Neighbors to discuss the creation of a local solar cooperative.



- Surveyed by a Capital University student about sustainability efforts at college campuses similar to Capital
- Featured in April Peace and Justice newsletter of the Association of Catholic Colleges and Universities
- Participated in Questionnaire for Jesuit Universities on Laudato Si’ and Environmental Justice, at behest of Fordham University Ph.D. student Meg Stapleton Smith, in Theological and Social Ethics program
- Member of Ohio Higher Education Sustainability Professionals
- Participated in the Green Lab Assessment survey, https://www.mygreenlab.org/
- Participated in the College and University Recycling Coalition (CURC) Campus Recycling & Materials Management Survey http://curc3r.org/
- Sponsored with Fair Trade group, a screening and discussion of “The True Cost”, a documentary about the economics, environmental impact, and human capital cost of ‘fast fashion’ – November 19

Co-Sponsored Events

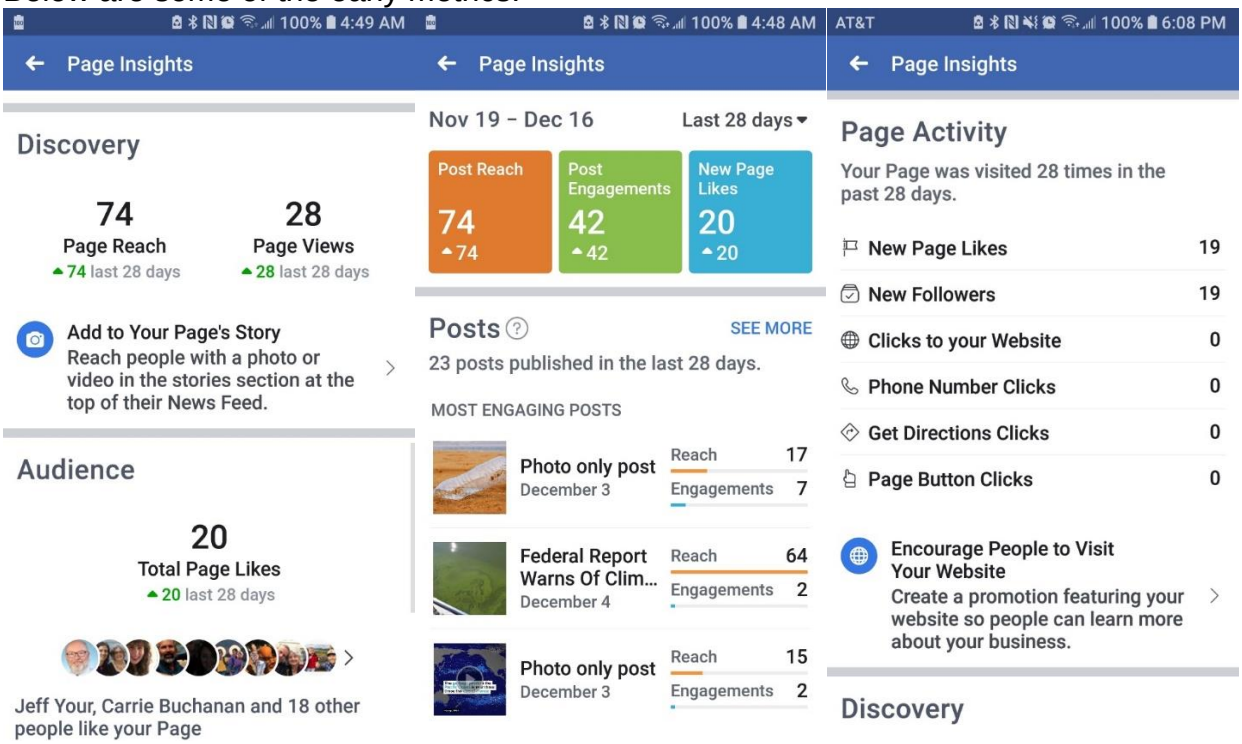
- Catholic Relief Service (CRS) Ambassadors and JCU Fair Trade screened "The True Cost", a documentary focusing on the social justice issues within the fashion industry including the humanitarian, environmental, and social impacts. The screening will be on November 19th. Following the documentary a discussion was held with about 30 participants. Sustainability Committee was a co-sponsor of this event.

Social media

A Sustainability Committee Facebook account was created in November 2018 with plans to expand our social media presence to Instagram in 2019.

https://www.facebook.com/jcusustainability/

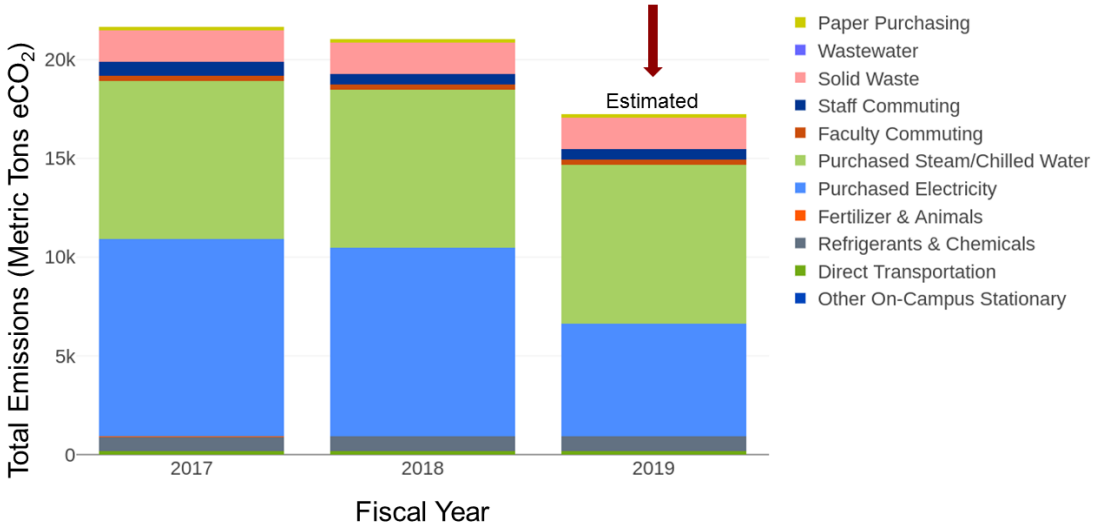
Below are some of the early metrics:

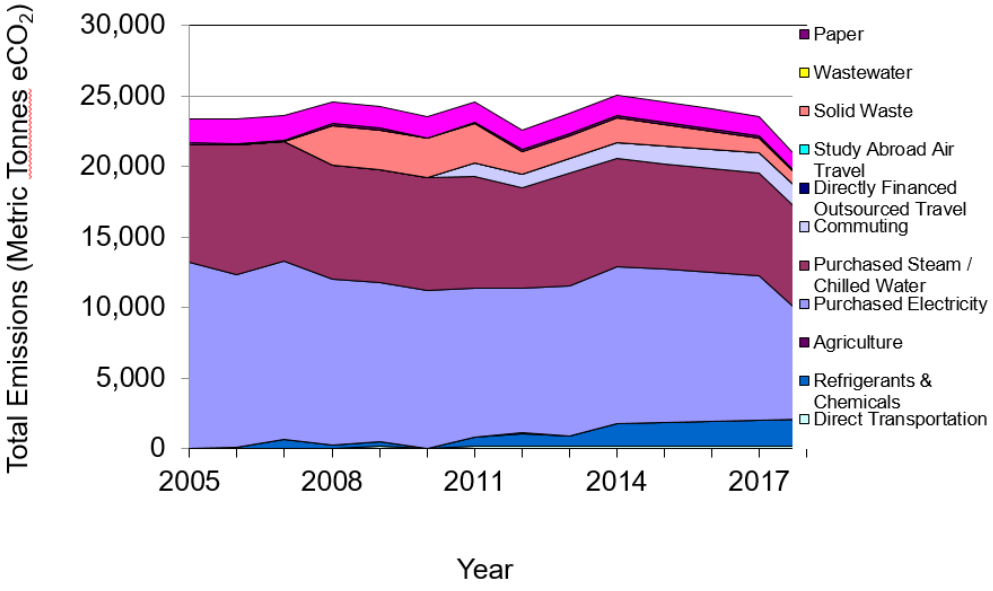


Sub-Committee Updates

Business Practices
Carbon Footprint
Campus Ministry
Energy and Utilities
Facilities and Grounds
Recycling / Waste Reduction
Residence Life / Student Engagement
Student Dining
Tree Campus USA
Website and Communications

Carbon Footprint Calculations





Committee member and Biology faculty Dr. James Watling updated the annual calculation of campus carbon emissions with observed data through FY18. Total campus emissions decreased almost 600 metric tons of CO_2 equivalents between FY17 and FY 18, about equal to the annual emissions of 130 cars. That decrease was mostly the result a reduction in the energy purchased for electricity on campus, but also a decline in the number of faculty and staff commuting to campus.

Beginning in FY19, renewable energy sources will comprise 20% of JCU's utility consumption. The benefits of this change in utility consumption are indicated by the red arrow above, assuming a business-as-usual estimate for all emissions categories except purchased electricity. The expected reduction in the campus carbon footprint as a result of the increased proportion of renewable sources used for electricity (almost 4000 metric tons of CO_2 equivalents) is about the same as **driving 9,000,000 fewer miles** in a typical passenger vehicle.

Business Practices

JCU has an institutional-wide stated preference to purchase Electronic Product Environmental Assessment Tool (EPEAT) Silver or higher-rated products.

We also have an institution-wide stated preference to purchase Green Seal™ or EcoLogoTM certified cleaning products. Green Seal products are used on campus where applicable. Quarterly review sessions are held with the housekeeping vendor to ensure compliance.

JCU has an institution-wide stated preference to purchase recycled content office paper. All paper, except for some stationery, is 100% recycled not post-consumer waste). Letterhead is 30% post- consumer waste.

We support alternative fuel and power technology by including in its motorized vehicle fleet (cars, trucks, tractors, buses) eight (8) vehicles that are 100 percent electric or fuel with compressed natural gas. The total vehicle fleet numbers 37, so this represents 21% green compliance. JCU has adopted a policy prohibiting vehicle idling at all delivery docks. No idling signs are posted at all docks.

Beginning July 1, JCU became a smoke-free campus.

Our Human Resources Department offers a pre-tax deduction for RTA passes for employees. To save commuting costs, the University also offers a condensed work week option.

In October 2018, nine beverage vending machines were removed across campus. These machines sold between 0-10 cases each per year. It was costing JCU more money to run these than received in commission. Coca-Cola™ advised us that

machines use $10-$15 of energy per machine per month. This action also reduced the sale of bottled water from campus, a long-term goal of the Committee.

Third-party partnerships

- Aramark
- ComDoc
- Cuyahoga County Waste District
- Full-Cycle Organics
- Meritech
- Rumpke
- Staples
- Waste Management

Central Scientific Stores and Laboratory Support Services has long expressed concern regarding environmental issues associated with packing materials used to protect the contents of science supply shipments. These include concerns about chlorofluorocarbons (Styrofoam), non-degradable litter, vermiculite, ozone depletion, and resource renewability. These concerns are expressed directly to suppliers and through professional organizations such as the National Association of Scientific Materials Managers and the American Chemical Society.

Preference is given to suppliers who make a conscientious effort to choose packing materials that are environmentally responsible while providing adequate protection to ensure the prompt, undamaged delivery of product.

Example of innovation in chemical packaging which is sustainable, compostable, and contains no plastics.

Campus Ministry

Immersion Experience in Nicaragua. The experience is focused on developing an understanding of the impact that trade has on the people of Nicaragua, especially the poor. The group will analyze trade from various perspectives in the coffee and apparel industries. Groups also visited Jamaica and El Salvador.
http://jcu.meritpages.com/achievements/John-Carroll-University-students-embrace-social-justice-learning-opportunities-during-Winter-Break-/85133

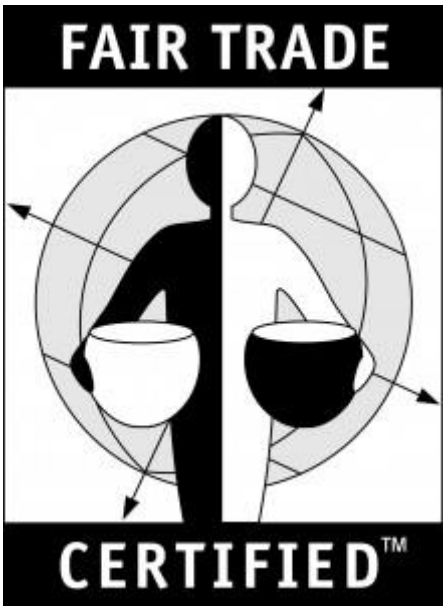
Fair Trade

Fair Trade products are offered on campus, administered by a student group via campus ministry. *Gifts that Give Twice* is the annual holiday sale that is sponsored by the **Fair Trade Committee**, the Center for Service and Social Action, and Campus Ministry. Most of the fair trade products for sale during Gifts that Give Twice are provided by the Catholic Relief Services Fair Trade "Work of Human Hands" line. These products help farmers and artisans in more than 30 countries in accordance with five main initiatives:

- Environmental Stewardship
- Building Long-term Relationships
- Establishment of Cooperative Workplaces
- Fair Prices
- Small Business Empowerment and Development

In addition, the committee

- Sold Fair Trade roses for St. Valentine's Day 2018
- Equal Exchange product sales in 2018: $374
- Hosted a documentary showing of "The Dark Side of Chocolate" which portrays the unethical practices and human rights abuses currently occurring in the chocolate industry
- Co-hosted a documentary showing and discussion of "The True Cost" with Catholic Relief Services. "The True Cost" sheds light on the negative effects of today's fast fashion world and the unjust conditions workers in these countries face. The documentary includes the social, economic, and environmental impact of our fashion industry.
- Hosted a "Food for Thought" event with Students for Social Justice to give a foundational presentation on Fair Trade. We talked about what is available on campus and in our larger community. We discussed what the future of Fair Trade at JCU holds, and proposed starting a Fair Trade Committee, which is planned to begin this Spring.
- The Fair Trade Expo on October 20th was very well attended by the community and numerous students volunteered for the event.
- Hosted a table at the Employee Benefits Fair and handed out free chocolate samples as well as educational information on Fair Trade.
- Halloween - Educational outreach in the atrium with chocolate report cards to provide information on which chocolate companies are



protecting their workers and the environment and which are not engaged in ethical practices.

- Purchased sets of plates, bowls, and silverware for use during both Fair Trade and Campus Ministry events to help promote zero waste.
- Passed out Christmas bags with coffee and reusable k-cup filters to departments with a Keurig in order to reduce waste. We also included Fair Trade information.

Fair Trade Expo and Teach-in hosted at JCU

The Ohio Fair Trade Teach-In and Expo, initiated in 2005, brings people of all ages together from across the state to learn about and become more involved in supporting fair trade—a model for socially and environmentally conscious consumerism.

The Teach-In & Expo 2018—hosted by the Ohio Fair Trade Network and John Carroll University—was held October 20, 2018, at the Dolan Center on the JCU campus in University Heights, Ohio. We had a range of presentations and discussions from basics of fair trade principles to fair trade certification.

The educational component of the event featured Nicole Vitello, President of Oke USA Fruit Company, who spoke about how the fair trade movement is changing the banana industry. Oke is a 100% fair trade fruit importer and partner of Equal Exchange. She is proud to be part of that model in fresh produce by promoting the connection between small farmers in Latin America and consumers in the United States.

Main sponsors include the Ohio Fair Trade Network, John Carroll University, InterReligious Task Force on Central America & Colombia, Revy Fair Trade

Fair trade items were available for sale all day, provided by 40 fair trade vendors from across Ohio and neighboring states.

"**Caring for Our Common Home: Laudato Si' and Integral Ecology**" was hosted at JCU in cooperation with the Cleveland Catholic diocese on Saturday, September 29, 2018

Conference Agenda

9:00-9:30 am	Registration
9:30 am	Welcome, keynote intro and keynote (Dr. Vince Miller)
10:30-11:15 am	Responder panel (Sr. Leanne Jablonski FMI, Sr. Barbara O'Donnell HM)
11:15-11:30 am	Break
11:30a-12:30pm	Workshops (first round – four workshops, plus teacher workshop) 1) Parish/School Formation and Opportunities with Laudato Si' and Integral Ecology 2) Water Quality, Access and Equity (Locally and Globally) 3) Integral Development and Climate in Global Poverty and Migration 4) Climate Change, Energy and Equity 5) Teacher Session: Part I, AM – Healing Earth curriculum (by Dr. Michael Schuck) Part II, PM – Sr. Barbara, Magnificat HS teachers/students
1:15-1:30 pm	Local environmental organizations exhibit tables browsing
1:30-2:30 pm	Workshops (second round – same as first round, with Part II for teachers)
2:45-3:30 pm	Youth panel
3:30-4:30 pm	Local Environmental Organizations panel: Local Engagement and Advocacy Featuring: Catholic Climate Covenant and NE Ohio organizations: Green City/Blue Lake Inst., Clev. Tree Coalition, Alliance for the Great Lakes
4:30 pm	Closing prayer of commitment and sending (with closing remarks)

https://twitter.com/laudato_si_jcu

Energy and Utilities

Peak Capacity Energy Conservation Events - Based on forecasts, we are notified by the PJM grid administrators when there will be a moderate to high probability for Peak Capacity Events to occur. For more information see http://sites.jcu.edu/summerenergy/

What is the PJM Grid?

PJM Interconnection coordinates the continuous buying, selling, and delivery of wholesale electricity through the Energy Market. In its role as market operator, PJM balances the needs of suppliers, wholesale customers, and other market participants and monitors market activities to ensure open, fair, and equitable access.

What is Demand Response?

Demand Response, a planned reduction in electricity use during times of high demand, helps maintain grid reliability by reducing the stress on the system. PJM encourages Demand Response activity in the PJM Grid to help reduce wholesale electricity prices and reduce electricity usage to address environmental concerns.

Campus Strategy to Limit Energy Consumption
Utilize Building Automation System (BAS) to set rooms that are not utilized during the summer to unoccupied mode. Use manual controls for areas not on BAS. Unoccupied mode reduces air flow and controls temperature to 80 degrees. (Consider relocating offices and classes to increase the number of unoccupied rooms.)

Reduce common area lighting to emergency lighting levels in Dolan Science Center and Library where safety is not compromised. Library lights can be controlled by the staff as needed.

Set air conditioning temperature to 76 degrees except for rooms/areas that must be maintained cooler. Can be done on Building Automation System in Dolan Science Center, the Boler School of Business, O'Malley, Administration Building, the Administration Annex, Grasselli Library, Millor, Sutowski, and Murphy Hall. Utilize manual controls in other areas, and for window air conditioners.

Turn off air conditioning in unoccupied residence halls. In residence halls with only a few occupants, provide portable air conditions as needed and do not air condition the whole building.

Evaluate food service operation for opportunities to shut down coolers, refrigerators, and freezers; and opportunities to minimize areas used, lighting, ventilation, and exhaust hood operation.

Evaluate the possible reduction of the number of fume hoods needed.

Benefits of Adopting a Campus Strategic Energy Plan

Actively managing and reducing overall energy consumption provides an opportunity for the university to reduce overall campus electric and gas consumption as well as the campus carbon footprint.

Applying these standards and utilizing the Peak Demand Limits this summer will save an estimated $106,500 in electricity charges.

Influencing Peak Capacity Charges

Implementing the Demand Response load shed plans on the five to eight days predicted for calculating capacity charges will reduce the University's capacity charges for 2017. It is estimated this could result in savings of more than $85,000.

Participating in Load Shed Events

The Demand Response events this summer could generate more than $37,000 in revenue.

Types of events

Peak Demand Limiting – Every day, all summer long

- Utilize Building Automation System (BAS) to set air conditioning temperature to 76 degrees except for rooms/areas that must be maintained cooler.
- Set rooms that are not utilized during the summer to unoccupied mode. Use manual controls for areas not on BAS. Unoccupied mode reduces air flow and controls temperature to 80 degrees. (Consider relocating offices and classes to increase the number of unoccupied rooms.)
- Reduce common-area lighting to emergency lighting levels in Dolan Science Center and Library where safety is not compromised. Library lights can be controlled by the staff as needed.

Demand Response Event Plan

When:

- For participation in program to reduce electric load during periods when electric demand on the grid exceeds generation – to minimize brown outs and black outs.
- We will receive notification 30 minutes before events start, and we usually get notice of possible event the day before the event.
- Events are typically called between May 1 and October 31 and can last up to 10 hours.

Plan:

- Implement Peak Load Limiting Plan, if not in effect.
- Start and transfer load to specified emergency generators. This will cause a momentary (less than one second) interruption to equipment on emergency circuits when transferring the load to the generators and when transferring the load to utility power in all buildings, except Rodman, Administration, Administration Annex, and Dolan Hall, which do not have emergency generator power.
    - Note: UPS's have been installed in the ITS closets to maintain connectivity to JCU classroom servers.
- Shutdown air conditioning in Bernet, Millor, Murphy, and Don Shula Stadium.
- Evaluate AC in Rodman, Administration, Administration Annex, O'Malley, Library, and RecPlex on a case-by-case basis.
- We can restore air conditioning during events based on temperature and/or humidity limits, depending on duration of the event.
- Turn off Stadium lights.

Peak Load Contribution Plan (PLC)

When:

- Calculated by PJM Grid operator using the maximum load used during a specified one or two hour(s) window on five days with the highest load on the electric grid. This is used to determine capacity charges applied to all electricity used for next year.
- PJM may project more than five days, but probably less than eight – there were only five days identified in 2014 and 2015.

Plan:

- Implement Peak Load Limiting Plan, if not in effect.
- Shutdown all air conditioning except approved exceptions.
- Turn off Stadium lights.
- Manually reduce ventilation in Varsity Gym, Intramural Gym, and Dining Hall.
- Turn off domestic hot water pumps for all buildings.
- Turn off refrigerators and other electrical convenience appliances during PLC period.

John Carroll University purchased 11,306 MMBtu in RECs (Renewable Energy Certificates) and other similar renewable energy products that are Green e-certified, representing 20% of our energy purchase. On-site renewable electricity generating devices represent capacity of 67,840 KWH during 2018.

Utility metrics for 2007-2017 are graphically displayed in Appendix 8.

Facilities and Grounds

The Maintenance staff is continuing the cleanup of mechanical rooms, the DSC Garage, basements and other areas of the campus. The staff has been removing discarded equipment and other materials, many of them to be repurposed, recycled, or scraped to a salvage company. We have also been recycling our wooden pallets to a company that uses them for mulch.

Another application was recently submitted to the Northeast Ohio Regional Sewer District (NEORSD) to obtain a fee credit for lessening the impact of storm water runoff on the JCU campus. The bio-swale adjacent to the Carroll lot and the dry basin in front of the Dolan Science Center help us qualify for and obtain a reduction in sewer fees paid to NEORSD. We also continue to jet and clean out storm, sanitary and grease lines, as well as catch basins to alleviate clogs and to keep the flow going.

Davey Tree Company came out to John Carroll and GPS-located and mapped out every tree on the campus. This information was downloaded into the Tree Keeper software cataloging the species, location, and condition of every tree. Having access to this software allows us to keep an accurate count of all of our trees, note the trees that have been removed or added, determine the condition of each tree, and identify the memorial trees donated to the University. We are continuing to create a memorial tree index where donors can choose indigenous species that will provide lasting beauty while maintaining the continuity of the campus landscape.

Our landscaping contractor, Turfscape, designed a pollination garden on the side of the Natatorium facing the Belvoir Parking lot. Designing and landscaping of some ornamental beds with native plant and flower species will attract pollinators such as hummingbirds, butterflies, and bees during the summer months. Other projects like this will continue this spring.

In collaboration with Turfscape, we have been researching and fulfilling some of the requirements for earning the Tree USA designation for the JCU campus. The Tree Campus USA is a program of the Arbor Day foundation and promotes urban forestry, sustainability, and ecological awareness along with the participation from faculty, students, and the community. Some of the requirements include creating a GPS map of the campus trees, strategically planting additional trees around the campus as a service work project initiative with the students, and celebrating Arbor Day.

On Saturday, October 20, 2018, John Carroll University partnered with students from Dr. Deborah Zawislan's Theology class and Turfscape to add nine more trees to the already beautiful campus. The project was part of a student service requirement of Dr. Zawislan's class, wherein faculty and students volunteered to plant trees for the upcoming Tree Campus USA designation that JCU hopes to achieve in 2019. Nine different trees were added including a Dogwood as a vigil tree, located at Rodman Hall. The five students participated in the event listening to a short lecture on tree planting by Chris White, formerly of Turfscape, installing the trees, fertilizing them, and adding

mulch as protection for the winter. They were able to learn the proper way of planting a tree and making sure that it was set up for future success.

Other trees that were planted include:

- 3 Zelkova along Belvoir, *example at right* >
- 1 Serviceberry by Student Health Services
- 1 Chamaecyparis at the back of Murphy Hall
- 1 Crabapple at the front of Rodman Hall
- 2 Zelkova near the Breen Learning Center

This brings the **total number of trees on the John Carroll University campus to 998**. The University is planning to achieve a total of 1000 trees by Spring 2019. Dr. Debra Zawislan has asked to have another tree planting event to be held during the an Arbor Day celebration. We are currently planning this service initiative and are looking forward to another opportunity to work with the students, in addition to getting closer to the completion of obtaining the Tree Campus USA goal.

Mowing:

Turfscape's efforts to create and maintain sustainable campus grounds range from everyday mowing to installing and maintaining native plant gardens.

When the grass is mowed on campus, the clippings are dispersed over the mowed area through the machine, rather than being collected in a catcher and thrown away. This replaces the original nutrients in the soil to keep a healthy lawn with less need to water or fertilize. The height at which the grass is mowed is chosen to reduce water evaporation, thus preventing the need to use more water to hydrate the lawn. Any run-off water on campus goes to storm sewers, which lead directly to Lake Erie. Fertilizers used on grass usually contain phosphorous, which is a leading cause of Algae-Blooms. By reducing water and fertilizer usage, less water is wasted and fewer chemicals pollute our source of fresh drinking water.

Fertilizers and Pesticide use:

When using pesticides to kill fungus, insects and weeds on campus, Turfscape choses to spot treat the affected areas rather than using chemicals campus-wide in a pre-emptive attempt to prevent the disease. This keeps chemicals from being used excessively. A threshold is determined on *when* to use pesticides and then only the *right* amount is used to control the issue. This is known as integrated pest management (IPM). When a disease or pest threatens plant growth on site, the first solution is not to use pesticides. Turfscape looks at the biological conditions of the landscape and looks

to alter the environmental conditions to make it uninhabitable for pests or disease. Pesticides are only used after determining a need, and then used as a spot treatment. This prevents future entire replacement of a group of plants or tree, which could become costly. Soil samples are taken to determine what areas of campus may or may not need fertilizer. When the product is used on an as-needed basis, it keeps phosphorous from fertilizers out of the drains.

Native plants:

Where possible, native perennial plants are left to go to seed when they have stopped their growing process for the season. Instead of immediately cutting down the plant before winter, it is left to spread its seeds for growth in the spring. This costs JCU less money to replace perennial plants and keeps energy from being wasted on planting in the spring. Turfscape uses a plant pallet to diversify plant species within a design. These pallets use Native plants which fight insects and disease, thus making chemicals unnecessary. The most recent example of this design is the pollinator garden next to the Johnson Natatorium. It contains Ohio native plants that attract bees and butterflies, which increases pollination, resulting in healthier surrounding plant life.

Recycling and Reducing:

Any yard waste collected on campus is put into a specific yard waste dumpster that uses the waste for composting. Turfscape recycles scrap metal, used oil from the mowers and vehicles, and the pallets used to transport material. The materials the company uses are bought in bulk to reduce transportation and cut down on fuel emissions. Each of the Turfscape trucks is equipped with routing software to reduce transportation and find the most direct route. In the winter season, liquid salt brine is sprayed on campus walkways to prevent snow accumulation and slippage. The liquid brine is a sustainable substitute for rock salt applications. Preserving JCU's healthy foliage is a constant task. By using hand pruners to maintain the shape of a plant instead of gas shears, the air is kept cleaner and free of fuel emissions.

Water:

The irrigation systems on campus are checked regularly for leaks. The new installations at the back of the Dolan Science Center had many new trees that use "Gator Bags." These bags are filled with water a couple times a week and dispense the appropriate amount of water directly to the trees on its own. This eliminates the need to water the trees daily and waste time hooking up a hose and inevitably wasting water as the spigot is turned on and off.

Available Resources:

Field Manager Jon Kuss is a member of the Sustainability Committee and can provide suggestions and comments within the group. Kuss earned his degree in Sustainability from Baldwin Wallace University and is willing to share his background knowledge to

improve sustainable efforts on campus. He has spoken with Jeff Your, Sustainability Chair about the tree planting on campus and the upcoming Tree Campus USA initiative. Turfscape continues to incorporate sustainable practices in its daily work at John Carroll. The pollinator garden and fresh enhancements at Dolan Science Center extend beyond giving campus a fresh look. They serve as an example to the exterior community of Turfscape's passion for sustainable efforts and desire to improve.

Do the Right Thing

Summary:

- Brine used to reduce rock salt use
- Bulk materials purchased to reduce transportation costs and emissions
- Development of a sustainable Plant Palette
- Grasscycling
- Integrated Pest Management to reduce toxic pesticides
- Monitoring of irrigation and run off
- Proper fertilizer applications by understanding plant needs and soil chemistry
- Recycling oil and metal
- Recycling yard waste
- Reduced phosphorus in fertilizers
- Routing software
- Some work done by hand, rather than machine, to reduce emissions

Recycling / Waste Reduction

University environment:
JCU Fast Facts from 2018/2019 provided by the Office of Institutional Effectiveness states 3076 Undergraduate, 451 Graduate and 28 Post-Baccalaureate students. On-Campus Residents total 1,603 with 32 states and 25 countries represented. Faculty numbers of 179 full-time and 253 part-time with a staff of 322 full-time and 88 part-time employees. These are just numbers, the reality is there are many people from a variety of cultures and mind sets that need to be educated in the importance of recycling on campus with support from the University Leadership and the Sustainability Committee.

Move in/Move out protocol:
At the beginning and end of each school year, Auxiliary services utilizes large containers that are placed around the campus. These collect materials used to bring in the items that students bring to set up their residence hall rooms for the year. Items include cardboard, Styrofoam, plastic strapping and a variety of move-in event items like water bottles. By collecting these items in a controlled environment, the goal is to create a clean stream of recyclable items. In order to improve the program, JCU will need more volunteers to assist with the proper placement of items into the containers provided. Metrics can then be created to measure quantities and provide needed information to the sustainability committee.

Waste Contract:
While it is important to maintain a living environment for numerous people at this institution, waste removal including recycling is an outside vendor contract. JCU was under contract with Rumpke over the last 5 years, and switched to Waste Management during the fall semester of 2018. This change has made the university look at new factors that will impact the pricing as we move forward. We have a dual stream of trash that is removed from the university on a 6 day weekly schedule that is altered during down times to save. Waste Management maintained the same number of containers that have been on campus in the recent years. There are (8) 8 yard recycle, (6) 8 yard waste. There is a university owned 20 yard compactor located at the Dolan Science Center loading dock that is serviced on demand. Green Road Annex also has 1 recycle and 1 waste service 2 times per month. ABM is the janitorial service under contract that currently removes all waste and recycling from the university's main campus. The university purchases liners for the removal of these items. Current trends with recycling request a clean stream of plastics, aluminum/steel, and paper products only. Waste Management and the industry is asking to have the liners removed from the process with only the three streams being collected and in the containers.

Recycling containers:
The university is responsible to purchase all trash and recycling containers in the buildings and resident halls. The current system for recycling is to have two containers in strategic public areas to provide an experience for the university community. One container is for general waste and the second is for the multi-stream recycling. There are custom units on campus purchased over the last decade that allow this experience

and provide a message area to help inform and educate the community. Recently, the economic environment has forced auxiliary service department to create alternate lower cost units to accomplish the space outcome. These units are attached together and with signage are being placed in needed areas. Individual faculty and staff offices, classrooms and bathrooms all are equipped with only one trash can and the process does not work as designed in this current fashion. One solution would be to remove the trash containers from the classrooms and push the streams to community locations where the containers can be monitored and controlled. The university could also educate faculty and staff to utilize their office container as only a recycle unit. All food and other waste would need to be removed by the individuals daily. This would also help with the need to remove liners from the stream.

Education:

The current method for education on the recycling program at John Carroll University is to use signage. These signs are placed on the units and walls close to the containers explaining the process. Many signs are in need of updates and a new message with sustainability branding. The Sustainability committee web page is also used for education but needs to be marketed and awareness created for the community. Some departments recycle items but no education is provided as a whole to assist. The need to educate is paramount to the success of the programs. One community one brand is needed.

Available Resources:

The University Sustainability committee is the best resource available. Other resources need to be developed and or defined to the best ways to help the program. The Boler College of Business is open to assist but in what capacity. The Communications Department also has the ability to help with class projects that can help built needed awareness and provide education. Student organizations (Student Union, Environmental Issues Group, Fair Trade) are invested in the subject of recycling. These groups need to be involved and their involvement increased in both funding and education. Research of like-minded universities is needed to enhance the recycling program on campus. Both the Office of Mission and Identity and Facilities Department have proven to be allies of the programming and also need to be utilized as a funding resource to help with needed capital.

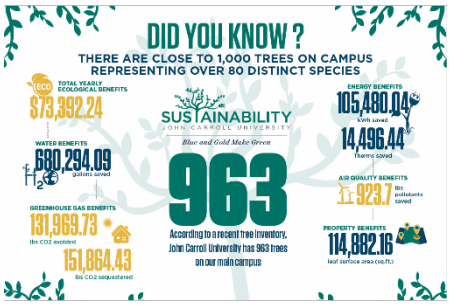
Summary and future:

- Work with Waste Management to keep cost down
- Work with Student Organizations to research and educate community
- Work with University departments and Senior Leadership to brand and market program
- Maintain presence on Sustainability Committee
- Work with external partners in local community for best practices
- Monitor program and create metrics
- Investigate need for a sustainability coordinator on staff and funding

Create and implement education programming for Faculty, Staff and Students

Residence Life / Student Engagement

- The Office of Residence Life continues its reduced posting in Residence Halls, reducing postings from 50 flyers per event, to 12 per event.
- Housing Records for the First Year Class of 2022 are 100% electronic, paper files are discontinued for classes moving forward, reducing approx. 1600+ files over four years.
- Incoming students were given reusable shopping bags in an effort to reduce waste and provide a talking point for Resident Assistants.
- Resident Assistants continue to be issued reusable shopping bags from program shopping and supplies.
- Resident Assistants were trained on the option of Zero Waste Programming Events and compostable/recyclable supply materials.
- Resident Assistants continue to push for proper separation of recycled materials from trash in their education and programmatic efforts.
- A new ***Trees on Campus*** poster was completed just before Christmas for use as a traveling display and at New Student Orientation sessions.
- Sustainability Committee display at each of ten new student orientation resource fairs, summer 2018.



Student Dining Partner - Aramark

Aramark buys locally sourced fruits and vegetables, humanely-raised meats and sustainably caught seafood. Our efforts extend to products like fair-trade certified coffee, and reusable, recyclable and compostable plates, cups, cutlery and paper products. Working with our suppliers, we've taken important steps on responsible sourcing:

- Locally Sourced - We are committed to purchasing local produce, grown within 250 miles of our locations.
- Humanely Raised - With policies and positions for cage-free eggs, group-housed pork, we address animal welfare concerns.
- Sustainable Seafood - We are committed to meeting our goal to source 100% sustainable seafood.
- Climate-Healthy Menus – We are addressing climate risks through our purchasing practices and menu options.
- For more information: https://www.aramark.com/industries/education/colleges-universities/dining-services

Across our operations, we've implemented practices that decrease the impact – and the cost – of waste. Starting with what we purchase, and continuing through to how we dispose of waste, we work hard every day to reduce our environmental footprint.

As a global food service company, we're proud to be recognized by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) as a Food Loss and Waste 2030 Champion for our commitment to reduce food loss and waste in our operations by 50 percent by 2030.

Our approach to managing food waste is aligned with the EPA's food recovery hierarchy, and with our "behind the scenes" food management programs, we make sure we are ordering accurate amounts of food, preparing and serving it in a way that limits waste, and tracking our progress.

Sometimes unique circumstances, like an event cancelled at the last minute, or an unexpected snow storm that closes dining facilities, causes us to make other plans. In those cases, we implement our food donation program to provide safe, unserved food to hunger relief agencies in our communities.

We partner with our clients to create robust recycling and composting programs to keep waste out of landfills. We also offer them solutions that help reduce waste at the source – like reusable to-go food and beverage containers, and "trayless" dining programs, which are proven to cut down on the amount waste created.

***

Full-Cycle Organics continue to collect food scraps from Aramark operations totaling more than 20 tons per year. These are composted at their E. 55th location for production of mulch.

Tree Campus USA

The Tree Campus USA program of the Arbor Day Foundation recognizes college and university campuses that:

- Effectively manage their campus trees.
- Develop connectivity with the community beyond campus borders to foster healthy, urban forests.
- Strive to engage their student population utilizing service learning opportunities centered on campus, and community, forestry efforts.

Colleges and universities across the United States can be recognized as a Tree Campus USA college by meeting five standards developed to promote healthy trees and student involvement.

JCU pursued Tree Campus USA designation in 2018 under the able leadership of Mitch Tabol, Director of Physical Plant, Facilities Dept. The application involves

- Formation of a campus tree advisory committee – March 2018
- Development of a campus tree care plan – April '18
- Dedication of annual funding for tree program – June '18
- Arbor Day observance – April '19, planned
- Establishing a service learning project – September '18

Facilities Dept contracted with Davey Tree to inventory all the trees on campus. Here are a few statistics as a result of that work:

998 total trees (each tree is defined as a singular larger, woody stemmed plant. Shrubbery and groupings in hedgerows of Arbor vitae, e.g., were not included in this number). For a breakdown by species, see Appendix 6.

Total Yearly Eco Benefits
$73,392.24

Greenhouse Gas Benefits
$2,064.51
131,969.73 lbs CO_2 avoided
151,864.43 lbs CO_2 sequestered

Water Benefits
$18,435.97
680,294.09 gallons saved

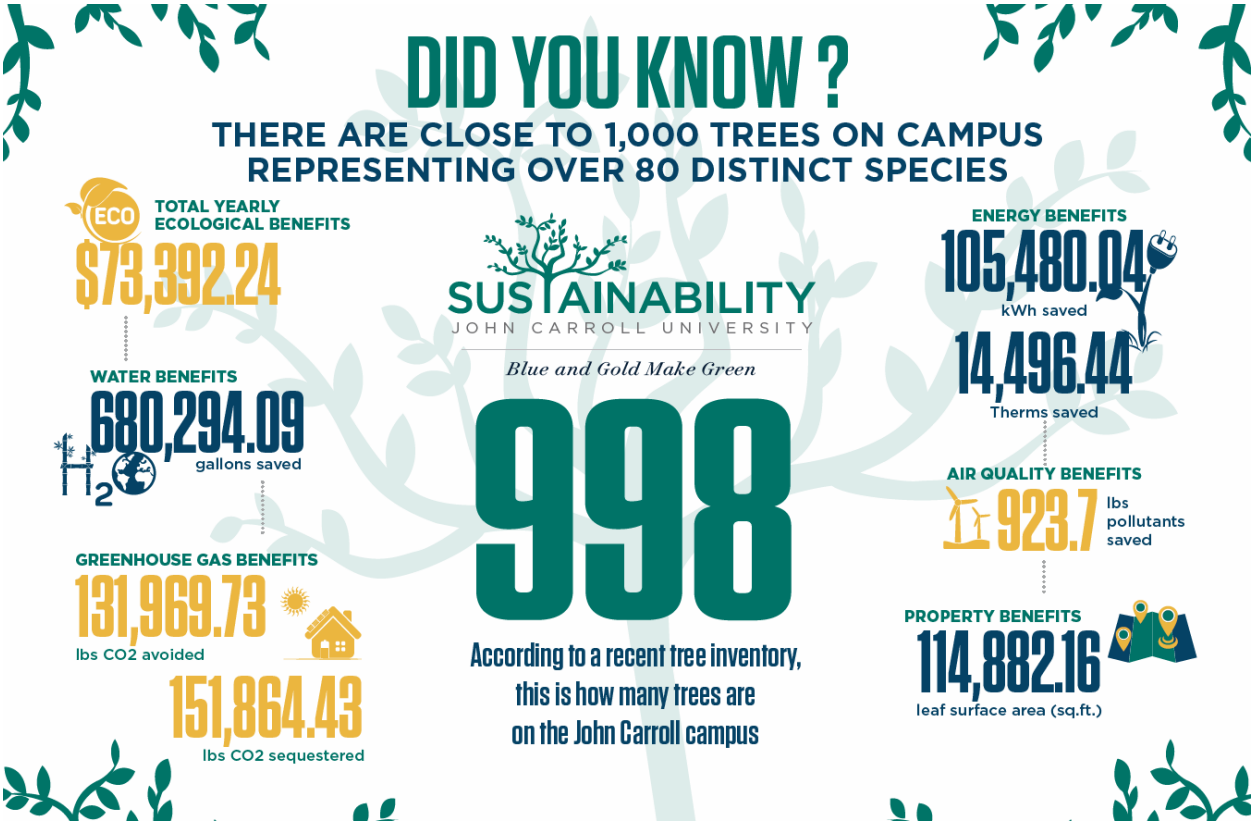
Energy Benefits
$22,212.45
105,480.04 kWh saved
14,496.44 Therms saved

Air Quality Benefits
$2,887.38
923.7 lbs pollutants saved

Property Benefits
$27,791.92
114,882.16 leaf surface area (sq.ft.)

The Tree Benefit Calculator allows anyone to calculate a first-order approximation of the benefits individual street-side trees provide. This tool is based on i-Tree's street tree assessment tool called STREETS. With minimal inputs of location, species and tree size, users will get an understanding of the environmental and economic value trees provide on an annual basis.

The Tree Benefit Calculator is intended to be simple and accessible. As such, this tool should be considered a starting point for understanding trees' value in the community rather than a scientific accounting of precise values.



Website and Communications

A new sub-committee was begun in 2018 to improve committee visibility in the campus community and beyond. The primary scope of this sub-committee will include:

- Sustainability website on JCU site – http://sites.jcu.edu/sustainability
- Facebook account -- https://www.facebook.com/jcusustainability/
- Instagram account – future plans
- InsideJCU communications
- Carroll News / WJCU inclusions
- Annual Report
- The committee submitted our current logo to Integrated Marketing and Communication for alignment with JCU branding and style guidelines. The resulting new logos will be used on all future committee communications.

SUSTAINABILITY
JOHN CARROLL UNIVERSITY

Blue and Gold Make Green

This will replace our older versions from past years:

Other Committee Initiatives

Fund-Raising

- Plant sales in October 2018 hosted by EIG and CSSLSS (Campus Sustainability Month) raised $250. This sale raised $85 in 2017 and $130 in 2016.
- Sale of scrap metal has netted about $100.
- Permanent funding of committee is being pursued. All projects in last seven years have been funded through energy savings and rebates.

Sustainability Efforts Campus-Wide

We would like to acknowledge the everyday efforts of constituents across campus

- **Staff Council** for a zero-waste event in January 2018 **–** Soups & Stews Cook-Off
- **Grasselli Library** for its diversion of 16,540 pounds of old books and journals to pulp recycling rather than to a landfill. Also, student employee-led initiative to make ‘no paper receipt’ the default on book check-outs.

Student Initiatives

Students met with Mr. Jon Powers, Co-Founder and President of CleanCapital, and served as President Obama's chief sustainability officer, on campus April 4. Mr. Powers was invited to speak through the Mellen Speaker Series, hosted by the Boler College of Business.

JCU students also attended a community meeting in University Hts with Mike Foley, Director of Sustainability in Cuyahoga County, Councilman Mike Houser, and Luke Sulfridge of Solar United Neighbors to discuss the creation of a local solar cooperative.

Environmental Issues Group (EIG)

The Environmental Issues Group is composed of students who are interested in making the John Carroll community more sustainable in its practices through recycling, composting, and gardening.

The Coburn Bike Co-op Program makes daily bike check outs available through the joint efforts of the Environmental Issues Group and the Recreation Dept. Covered bike racks are available in some areas on campus and bike racks are located throughout campus for resident and commuter use. Five campus gates were removed in 2012 to encourage bike and pedestrian access to and traffic on campus.

Pictured at left is an EIG-created awareness campaign on the JCU quad about the environmental impact of single-use water bottles.

The student Environmental Issues Group has a presence on Facebook and Instagram and content is refreshed regularly.

https://www.facebook.com/groups/EIGJCU/ https://www.facebook.com/GREENJCU/

https://www.instagram.com/jcueig/

EIG also hosted a plant sale and performed beach and stream cleanups

The EIG student group performed a waste audit in the fall and published these results on their Instagram feed.

APPENDIX 1 – Courses with Sustainability Content

MAJORS IN SUSTAINABILITY

Environmental Science major is intended for students seeking careers in environmental and ecological fields, including environmental consulting, government, parks and recreation, teaching, research, environmental law, and other areas requiring strength in environmental science. This major also prepares students for graduate programs in ecology and environmental science.

Program Learning Goals in Environmental Science. Students will:

1. Demonstrate a broad knowledge of environmental science and develop competency in biology, chemistry, and earth science.
    a. Understand the basic chemical principles, cell structure and organization, and metabolism of living organisms.
    b. Understand plant and animal anatomy and physiology, with an emphasis on form and function.
    c. Understand the diversity of organisms, systemic biology and phylogeny, and biological interactions over geological time.
    d. Understand the role of evolution in generating the diversity of form and function seen in life on Earth.
    e. Understand the role of the environment in determining the outcome of biological interactions.
    f. Identify the consequences of environmental changes arising from human activities.
2. Use critical thinking to evaluate and interpret biological and environmental phenomena.
    a. Critically assess and accurately interpret scientific data presented in visual or tabular form.
    b. Identify the scientific underpinnings of current environmentally-themed news.
3. Collect and analyze scientific data and communicate its importance through effective oral and written presentation.
    a. Demonstrate competence in conducting original research.
    b. Present research results orally and in writing.

Major Requirements: 35-38 credit hours of biology courses, plus 23-28 credit hours of required support courses in other departments. Courses are to be chosen with advisor approval and always include applicable laboratory corequisites. Students should refer to the registration website to identify appropriate courses to complete the core within the major (i.e., additional writing (AW) and oral presentation (OP), and capstone courses.
Required Courses*:* BL 155, 156, 157, 158, 159, 160, 222, 224 or 435, 331, 424 or 447, 444;
plus two courses from BL 224, 295 (3 cr.), 399 (3 cr.), 406, 417, 419, 423, 424, 426,

435,
447, 454.
Required Support Courses*:* CH 141-144 (or 151H, 153); MT 135, DATA 228; PH 115, 115L,
206; plus one course from PO 361, 363, SC 292, 380.
Strongly Recommended: CH 221-224.

Peace, Justice, and Human Rights (PJHR) Major
The fundamental goal of the Peace, Justice, and Human Rights program is to equip students with the knowledge, skills, and creativity to seek justice and promote peace. It combines research and study with experiential and service learning to help students gain both a theoretical and empirical understanding of the challenges and possibilities of peacebuilding, conflict transformation, and social justice. PJHR is an interdisciplinary program and benefits from the diverse interests and rich experience of faculty members from several disciplines and departments. Consistent with Catholic social teaching that sees peace as inseparable from justice and the extension of human rights as a fundamental ethical obligation, PJHR also emphasizes the importance of political pluralism, cultural and religious diversity, ecological balance, and nonviolent conflict resolution and transformation. The program prepares students to pursue careers in a wide number of fields, including law, mediation, advocacy, government service, non-profit work, ministry, and social work.
Program Director: P. J. Metres, III
Program Learning Goals in Peace, Justice, and Human Rights. Students will:

1. Describe, explain, and critically analyze the complex and systematic nature of peace building, justice, and human rights.
2. Identify global, national, or local situations affected by violence, injustice, and oppression; explain their causes and consequences; and explore possible solutions.
3. Articulate a worldview that demonstrates concern for victims of violence, injustice, and/or human rights violations.
4. Apply this worldview to peace building; social justice, and human rights both on and off campus.

Required courses**:** EN 231; HS 230, HS 231, HS 400, HS 410; SC 111.
Additional courses: One additional course (3 credit hours) at the 400 level, drawn from the list of PJHR-approved courses. To access the list, please go to http://sites.jcu.edu/pjhr/pages/courses/ Six courses (18 credit hours), at least five of which must be taken at the 300-400 level, from the list of PJHR-approved courses. Normally, these courses will be chosen from three different disciplines or departments but have a certain coherence of focus.

MINORS IN SUSTAINABILITY

Interdisciplinary minor in Population and Public Health
The responsibilities of public health professionals include identifying the causes of disease outbreaks, monitoring air and water quality, vaccinating communities, preparing

for emergencies, and inspecting restaurants. In recent years, public health has taken on a broader set of issues such as global environmental challenges and social factors that lead to health disparities among populations.
This interdisciplinary minor is for students in any major interested in protecting and improving the health of communities. The minor addresses biological, social and cultural, environmental, ethical, and public policy influences on a population's health and requires critical, cross-disciplinary thinking applied to solving health problems.
The course of study consists of three parts: prerequisite courses, core areas in public health, and a capstone internship. The prerequisite courses total 9-10 credit hours: Biology: BL 112/112L or EPAS 205/205L with a grade of B or better, or BL 156/BL 158. Statistics: a grade of C or better must be earned in DATA 122, DATA 228, DATA 229, EC 208, or PO 105.
Social and behavioral science: SC 101 or SC 245. In addition to the prerequisite courses, students will fulfill 22-23 credit hours of requirements in the core areas of Population and Public Health, including one elective. Public health: SC 273 and PPH 273. Epidemiology: BL 240.
Environmental studies: Choose one from BL 137, BL 222, or SC 380. Social and behavioral health: Choose one from BL 260, SC 275, SC 285, SC 315, SC 343, SC 370, SC 385, or PS 226. Policy studies: Choose one from PO 304 or PO 337. Global health: Choose one course not taken to fulfill other PPH requirements from BL 260 or SC 370. Elective course: Choose one course not taken for other PPH minor requirements from PPH 274, BL 260, BL 310/310L, BL 410, CO 455, EN 300, EPAS 200, HS 237, PL 316, PO 304, PO 337, PS 226, SC 275, SC 285, SC 315, SC 330, SC 343, SC 370, or SC 385.
To complete the minor, students are required to complete a 4-credit-hour capstone internship and seminar in Public Health Practice, PPH 473. Admission to the minor is limited by the enrollment cap for this course. CoCoordinators: Dr. James Lissemore, Department of Biology; and Dr. Susan Long, Department of Sociology and Criminology.

Peace, Justice, and Human Rights (PJHR) Minor

***Required courses*:**

1. Two of the following three courses (6 credit hours): PJHR 230, HS 230, SC 111.
2. At least four additional 3-credit courses (12 credit hours), normally from at least two different disciplines or departments. Please see the list of approved courses at http://sites.jcu.edu/pjhr/pages/courses/

LINKED COURSES

Chemistry of Food & The Global Table:

CH 174 Molecular Gastronomy: The Chemistry of Food
IC 109 Food in Film and Culture: The Global Gendered Banquet

Food Chemistry (CH174) linked to Food, Film and Culture (IC109), we talk about the environmental impact of commercial farming and meat consumption, content makes up 15% of the course.
Instructors: Katie Doud, PhD and Martha M. Pereszlenyi-Pinter, PhD

Energy and Entrepreneurship:

CH 173 Energy, An Important Commodity

ER 20x Creativity, Innovation, Idea Development
173. ENERGY, AN IMPORTANT COMMODITY 3 cr. Prerequisites: EN 125 (or equivalent); corequisite: ER 20x. Focuses on the impact of chemical and physical discoveries on our way of life. Enables the student to develop an appreciation of chemistry's influence on life and to apply that knowledge in making important personal and societal choices regarding energy usage. CH 173 and ER 201 fulfill the linked course requirement of the Integrated Core Curriculum.
ER20x: Coreq CH 173. This course focuses on developing creativity by understanding the creative process and its relationship to the entrepreneurial mindset; also, improving your ability to generate ideas and recognize opportunities using different creative approaches in various settings and fields. Students work with a team to study issues and principles in their EPA class and in their ER class, develop ideas related to addressing these issues (social or business), identify an audience for it, and devise a way to communicate the idea to that audience. The students present their idea as a signature joint project for both classes.
Instructors: Reiko Simmons, PhD and Daniel Clifford, PhD

Environment:
BL 291 Climate Change in North America
EN 291 American Environmental Literature

Instructors: Debby Rosenthal, PhD and Jeff Johansen, PhD (or Ruth Jacob)

Islam and Environmental Science:
BL 331 Climate Change: Global Impacts
TRS 342 Islam and the Environment
BL331: Historical overview of climate change; global water and carbon cycles; effects of greenhouse gases, aerosols, and radiative forcing mechanisms on climate processes and feedbacks; effects of rapid climate change on selected ecosystems; human influences on climate; predicted future changes.
TRS342: Overview of environmental issues and Islamic approaches to these challenges based on the major sources of Islam: the Qur'an and the Hadith. Islamic principles regarding the natural world and humanity's place within it, and Islamic legal strictures to protect the environment. Special emphasis on contemporary Islamic activism to protect the natural world.
Instructors: Z. Saritoprak and J.Johansen

Science & Policy of Climate Change:
CO 251 Intro to Journalism with Environmental Focus
PH 117 Science of Climate Change
Composition of the atmosphere, energy balance of the Earth, evidence of recent changes in the composition of the atmosphere and climate, natural and human-induced climate changes, future climate scenarios, impacts of climate change, and climate change mitigation and adaptation policies.
Instructors: Carlo DeMarchi, PhD and Carrie Buchanan, PhD

Catholic Social Teaching in Business
TRS
AC
Among encyclicals we will address for their potential business impact is *Laudato Si',* and we spend two full weeks of the class talking about the environmental impact of business from a Catholic Social Teaching perspective.
Instructors: Megan Wilson-Reitz and Mariah Webinger

COURSE DESCRIPTIONS BY DEPARTMENT

BIOLOGY

109. ENVIRONMENTAL BIOLOGY 4 cr. Corequisite: BL 109L. For non-science majors. Three hours of lecture per week. Relationship between human activity and the natural environment; food production, water supplies, air and water pollution, nuclear and non-nuclear energy, hazardous and toxic materials in the environment, climate changes and world population growth. Economic implications of, and possible solutions to, these problems.

109L. ENVIRONMENTAL BIOLOGY LABORATORY 0 cr. Corequisite: BL 109. Two hours of laboratory per week. Laboratory and field experiences intended to explore the scientific basis of environmental issues of the past, present, and future. Emphasizes a general understanding of the impact of human activity on the world and strategies for managing human activity for the good of the human population and the planet.
137. CLIMATE CHANGE 3 cr. Theory of anthropogenic climate change, evidence for recent climate change, predictions for future change, political and ethical issues surrounding the implementation of policy to combat anthropogenic climate change.
222. GENERAL ECOLOGY 3 cr. Prerequisites: BL 155-160 or permission of instructor. Three hours of lecture per week. Interactions among plants, animals, and the physical environment. Ecological theory as it relates to population ecology, community dynamics, biogeochemical cycles, and biomes.
224. TERRESTRIAL ECOLOGY 3 cr. Prerequisite or corequisite: BL 122, DATA 228, BL 224L. One hour of lecture per week. Ecological data collection and analysis. Students study model organisms to examine various aspects of terrestrial ecology, including animal behavior, food web dynamics, competition, and population dynamics.
BIOLOGY 162
224L. TERRESTRIAL ECOLOGY LABORATORY 0 cr. Corequisite: BL 224. Four hours of laboratory per week.
240. EPIDEMIOLOGY 3 cr. Prerequisites: BL 155-158 or grade of B or higher in BL 112-112L; grade of C or higher in DATA 122, DATA 228, DATA 229, or EC 208. Three hours of lecture per week. Basic epidemiological principles, concepts, and methods used in surveillance and investigation of global and domestic health-related events; discussion of historical and current examples from epidemiologic studies; focus on populations living in resource-limited settings.
260. POVERTY AND DISEASE 3 cr. Prerequisites: BL 155-158. Three hours of lecture

per week. Global and U.S. poverty; public health; epidemiology; U.S. health disparities, e.g., diabetes, obesity, HIV/AIDS; global health disparities, e.g., HIV/ AIDS, tuberculosis, malaria; evolutionary factors in chronic and infectious disease; ethical issues in public health.
291. CLIMATE CHANGE IN NORTH AMERICA
331. GLOBAL CLIMATE CHANGE 3 cr. Prerequisite: BL 155-160. Three hours of lecture/discussion per week. Historical overview of climate change; effects of greenhouse gases, aerosols, and radiative forcing mechanisms on climate processes and feedbacks; effects of rapid climate change on selected ecosystems; predicted future changes; climate denial; political and ethical considerations in implementation of mitigation policies
406. TROPICAL FIELD BIOLOGY 3 cr. Prerequisites: BL 155-160 and permission of instructor. BL 222 is recommended. Three hours of lecture per week; spring break field trip to a tropical rain forest in Central or South America required. Introduction to the biology and ecology of the tropics, with an emphasis on tropical field research. Includes experimental design, data analysis, write-up, and presentation. Group research project and program fee required.
415. INTRODUCTION TO SYSTEMATIC BIOLOGY 3 cr. Prerequisites: BL 155-160, BL 370, or instructor permission. Three hours of lecture per week. Identification, naming, description, classification, and organization of extant and extinct biological diversity. Philosophy and practice of methods of reconstructing evolutionary history.
417. INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS 4 cr. Prerequisites: BL 155-160. Three hours of lecture per week. Introduction to analysis of spatial data using ArcGIS software. Students will acquire hands-on experience with a variety of analytical techniques and spatial data types, and apply their skills to investigate environmental problems using GIS.
417L. INTRODUCTION TO GEOGRAPHICAL INFORMATION SYSTEMS LABORATORY 0 cr. Corequisite: BL 417. Three hours of lab per week. 419. CONSERVATION BIOLOGY 3 cr. Prerequisites: BL 155-160; BL 222 is recommended. Three hours of lecture per week. Overview of the causes and consequences of biodiversity loss at gene, species, ecosystem, and global scales; identification of ecological and evolutionary principles underlying conservation strategies; critical analysis of conservation problems and solutions.
424. AQUATIC RESOURCES 4 cr. Prerequisites: BL 155-160; corequisite: BL 424L. Three hours of lecture per week. Study of aquatic organisms and their environment. Study of algae, insects, and fish as biological indicators of water and habitat quality in stream, lake, and wetland ecosystems. Impacts of water pollution, acidification, and other anthropogenic disturbances on aquatic systems.
424L. AQUATIC RESOURCES LABORATORY 0 cr. Corequisite: BL 424L. Four hours of laboratory per week. Saturday laboratory with field trips to a variety of Ohio aquatic habitats and analysis of aquatic life in those systems.
435. PLANT ECOLOGY 4 cr. Prerequisites: BL 155-160. Three hours of lecture per week. Study of the distribution and abundance of plants from organismal, population, and community perspectives. Emphasizes both seminal and novel research.
435L. PLANT ECOLOGY LABORATORY 0 cr. Corequisite: BL 435. Four hours of laboratory per week.

444. ADVANCED ECOLOGY 4 cr. Prerequisites: BL 222, DATA 228; corequisite: BL 444L. Three hours of lecture/discussion per week. Topics include predator-prey interactions, global change, niche theory, competition, null models, and community assembly rules.
444L. ADVANCED ECOLOGY LABORATORY 0 cr. Corequiste: BL 444. Three hours of laboratory per week. Students work in teams on a project of their own choosing. Includes experimental design, data analysis, write-up, and presentation.
447. ALGAE AS BIOINDICATORS 4 cr. Prerequisites: BL 159, 160; corequisite: BL 447L. Two hours of lecture per week. Theory and practice of using algae as bioindicators of water quality in streams and lakes; covers taxonomy of indicator groups.
447L. ALGAE AS BIOINDICATORS LABORATORY 0 cr. Prerequisites: BL 159, 160; corequisite: BL 447. Four hours of laboratory per week. Some weekend field trips required. Emphasis is on diatoms, but cyanobacteria, green algae, euglenoids, and other indicator taxa will also be examined. Research projects required.
454. DESERT BIOLOGY 3 cr. Prerequisites: BL 155-160. Three hours of lecture per week; optional field trip to Western U.S. at end of semester (see BL 454L). Introduction to abiotic and biotic factors influencing desert ecosystems. Group literature review project required.
454L. DESERT FIELD BIOLOGY 1 cr. Prerequisite: permission of instructor; corequisite: BL 454. Weeklong field trip to deserts of the Western U.S. Program fee required.

CHEMISTRY
103. ENVIRONMENTAL CHEMISTRY 3 cr. Corequisite: CH 103L. Application of chemical principles to environmental and ecological problems. Fulfills the distributive natural science requirement of the Integrated Core Curriculum.
103L. ENVIRONMENTAL CHEMISTRY LABORATORY 1 cr. Corequisite: CH 103. Two hours of laboratory per week. Laboratory experience in specific environmental problems.
105. CHEMISTRY IN SOCIETY 3 cr. Corequisite: CH 105L. Basis of science literacy which enables non-science students to make better informed decisions on issues relating to science and technology. Ethical issues, air and water quality, stratospheric ozone depletion, global warming, energy sources and use, plastics, drugs, and medications. Fulfills the distributive natural science requirement of the Integrated Core Curriculum.
105L. CHEMISTRY IN SOCIETY LABORATORY 1 cr. Corequisite: CH 105. Two hours of laboratory per week. Laboratory experience in topics discussed in CH 105.
171. INFORMED HEALTH DECISIONS 3 cr. Prerequisites: EN 125 (or equivalent); corequisite: ER 201. Basics of biochemical literacy which enables non-science students to make better informed decisions on issues related to health, including diseases, nutrition, and medications. CH 171 and ER 201 fulfill the linked course requirement of the Integrated Core Curriculum
173. ENERGY, AN IMPORTANT COMMODITY 3 cr. Prerequisites: EN 125 (or equivalent); corequisite: ER 201. Focuses on the impact of chemical and physical discoveries on our way of life. Enables the student to develop an appreciation of chemistry’s influence on life and to apply that knowledge in making important personal

and societal choices regarding energy usage. CH 173 and ER 201 fulfill the linked course requirement of the Integrated Core Curriculum.
174. MOLECULAR GASTRONOMY: THE CHEMISTRY OF FOOD.
261. ANALYTICAL CHEMISTRY 3 cr. Prerequisites: CH 141-144 (or 151, 153); corequisite: CH 263. Three hours of lecture per week. Overview of chemical analysis; hypothesis testing, analysis of variance, correlation and regression confidence intervals, estimation, sampling distributions; equilibria; redox chemistry; basic principles of modern electrochemical, spectroscopic, and chromatographic analysis; sampling and sample preparation. CH 261 and 263 fulfill the foundational Quantitative Analysis (QA) requirement of the Integrated Core Curriculum.
263. ANALYTICAL CHEMISTRY LABORATORY 1 cr. Corequisite: CH 261. Four hours of laboratory per week. Practice in classical analysis, sampling and sample preparation, and introductory instrumental analysis. Experiments are designed to illustrate the principles discussed in CH 261, including principles of the collection, display, and analysis of data. CH 261 and 263 fulfill the foundational Quantitative Analysis (QA) requirement of the Integrated Core Curriculum
441. INSTRUMENTAL ANALYSIS 3 cr. Prerequisites: CH 261; prerequisite or corequisite: CH 365 or CH 361; corequisite: CH 443. Three hours of lecture per week. In-depth treatment of modern chemical instrumentation; quantitative analysis using UV/VIS, IR, NMR, MS, AAS, ICP, electrochemistry, chromatography; qualitative characterization of pure substances through interpretation of IR, NMR, and mass spectra. Emphasis will be on the unique capabilities and limitations of each technique. Highly recommended for students interested in pursuing a career in chemical research and/or development.
443. INSTRUMENTAL ANALYSIS LABORATORY 2 cr. Prerequisite: CH 263; corequisite: CH 441. Four hours of laboratory per week. Practice in instrumental analysis and experimental design, reflecting quantitative determinations and qualitative characterization of substances. Experiments are designed to utilize principles discussed in CH 441. CH 443 satisfies the Capstone, Additional Writing and Oral Presentation requirements of the Integrated Core Curriculum.

COMMUNICATIONS
251. INTRODUCTION TO JOURNALISM-ENVIRONMENTAL FOCUS. This course is linked to PH 117 - Climate Change. It introduces students to journalism, its roles in society, values and practices, and explores how these things influence the way journalists cover climate change and other environmental issues. Students will learn newsgathering and newswriting techniques for print, online and social media, and build practical experience in verifications, interviewing, reporting on events and issues, and writing news and features. Brief introductions to journalism history, current ethical and practical issues, and legal hazards faced by journalists. Some assignments are shared with PH 117, including a Signature Assignment in which students present work from both courses on a website.
301. INTERCULTURAL COMMUNICATION 3 cr. Concepts and theories of communication to understand the interactions of values, beliefs, traditions, identities, and food in multiple cultures. Examination of issues of diversity, globalization, and social

justice, communicative interactions, and power dynamics among people with different cultural, social, national, racial/ethnic, linguistic, historical, and religious backgrounds

ECONOMICS

101. INTRODUCTION TO ECONOMIC PROBLEMS AND POLICIES 3 cr. Survey of current socioeconomic issues and problems: market structure, costs and competition, international trade, environmental concerns, economic growth, financial panics, inflation, and unemployment. Uses basic economic concepts and analytical tools.

201-202. PRINCIPLES OF ECONOMICS I, II 3 cr. each. Economic principles and problems, 201 (Microeconomics): the nature of economics and its method, the economic problem, demand and supply analysis, costs of production, market structures, product and resource pricing, and international trade. 202 (Macroeconomics): economic goals, basic information about the American economy, national income accounting, international finance, theories of income determination, economic growth and instability, money and banking, monetary and fiscal policy, the public debt, and selected economic problems. Algebra is used in both courses.

315. ENVIRONMENTAL ECONOMICS 3 cr. Prerequisites: EC 201-202. Designed to acquaint students with analytical tools of environmental economics, including cost-benefit analysis, user charges, rationing of scarce resources, investment allocation criteria, and public expenditure criteria. 321. LABOR AND HUMAN RESOURCE DEVELOPMENT 3 cr. Prerequisites: EC 201-202. Examines the organization, functioning, and outcomes of labor markets; the decisions of prospective and present labor market participants; and public policies that relate to the employment and payment of labor resources. Typical topics include determination of wages, prices, profits; individual human capital acquisition and labor supply decisions; labor unions and collective bargaining; labor law and public policy; contemporary issues such as discrimination, immigration, and health.

331. INDUSTRIAL ORGANIZATION AND PUBLIC POLICIES 3 cr. Prerequisites: EC 201-202. Analysis of imperfectly competitive markets, focusing interactions among market structure, firm behavior, and market outcomes. Topics include measures of concentration, merger theory and policy, barriers to entry, monopolization, oligopoly models, pricing strategies, vertical strategies, market power, game theory, collusion and cartel theory, technological progress, and antitrust legislation.

342. INTERNATIONAL ECONOMICS 3 cr. Prerequisites: EC 201-202. International trade theory, commercial policy, and economic interdependence. Exchange rates and the foreign exchange market, the balance of payments, parity conditions, and the international monetary system.

343. ECONOMIC DEVELOPMENT 3 cr. Prerequisites: EC 201-202. Theoretical and policy issues in economic growth and development with emphasis on specific country policies and experience; alternative development paths; problems of development planning; policies for achieving growth and development in emerging countries; and conditions necessary for continued growth in advanced countries.

ENGLISH

291. AMERICAN ENVIRONMENTAL LITERATURE 3 cr. Study of American environmental writing; place-based literature by authors whose work is deeply concerned with how humans interact with the natural world and how various literary interpretations of the land have influenced attitudes towards the environment.

406. WRITING AND THE ENVIRONMENT 3 cr. Prerequisite: EN 250, 290, 300-304, or CO 225. Study of the competing discourses that define our relationship to the natural world, frame environmental problems, and argue for public action.

407. WRITING ABOUT OUR HEALTH 3 cr. Prerequisite: EN 250, 290, 300- 304, or CO 225. Medical science writing, writing as healing, or other topics in health writing.

EXERCISE SCIENCE AND SPORTS STUDIES

340. LIFESTYLE WELLNESS 3 cr. Overview of the holistic nature of lifestyle wellness, the multiple factors that contribute to, or influence, wellness, prevalent themes and types of programs related to wellness, and the role of exercise science and allied health professionals in the wellness process. Examination of the wellness culture within our society and the factors that influence lifestyle wellness throughout the lifespan.

407. EXERCISE PHYSIOLOGY 3 cr. Prerequisites: EPA 206 and 206L; prerequisites or corequisites: BL 231 and BL 231L. Study of human physiology during exercise and as a function of physiological problems associated with physical stress. Emphasis on bioenergetics and neuromuscular concepts of exercise, as well as cardiorespiratory and environmental consideration in exercise.

HISTORY

275. LATIN AMERICAN DICTATORSHIPS: GLOBALIZATION, U.S. FOREIGN POLICY, AND HUMAN RIGHTS 3 cr. Introduction to military-run regimes in Latin America as a way to understand the global influences at work in the area. The impact of dictatorships on human rights, as well as of the multi-layered responses by civil societies to cope with state-run terrorism. Impact of U.S. foreign policy in Latin America.

280. MODERN EAST ASIAN HISTORY 3 cr. Impact of imperialism, revolution, and war from the mid-nineteenth century to the present on East Asian modernization and globalization; focus on China, Japan, and Korea.

INTERNATIONAL CULTURES

208. FOOD FOR THE SOUL AND SOUL FOOD: THE ROLE OF FOOD, FAMILY, AND FEASTING ACROSS HUMAN EXPERIENCE 3 cr. Analysis of fiction and non-fiction as well as dramatic and documentary films that deal with food as it relates to family structures and relationships, foreign and domestic ethnic identity, and religion/spirituality. Exploration of the ethics of the globalization of food production.

INTERNATIONAL CULTURES 325 INTERNATIONAL CULTURES

209. FOOD IN FILM AND CULTURE: THE GLOBAL GENDERED TABLE 3 cr. Viewing and discussion of feature films and documentaries that deal with some aspect of food, food and culture, or the globalization of food production. How food is biological and cultural, personal and political, national and international, and may even define social class/caste, race, ethnicity, and socially or culturally imposed gender roles. Films are supplemented with academic and scholarly readings.

PHYSICS

115. ENVIRONMENTAL EARTH SCIENCE 3 cr. Corequisite: PH 115L. Interdisciplinary approach to the study of our planet, from its origins to current challenges. Formation of the earth, matter and minerals, the rock cycle, plate tectonics, earthquakes, volcanism, and climate change.

115L. ENVIRONMENTAL EARTH SCIENCE LABORATORY 1 cr. Corequisite: PH 115. Experiments and field trips designed to complement PH 115. Two hours of laboratory per week.

117. CLIMATE CHANGE SCIENCE & POLICY 3 cr. Corequisite: CO 250. Composition of the atmosphere, energy balance of the earth, evidence of recent changes in the composition of the atmosphere and climate, natural and human induced climate changes, future climate scenarios, impacts of climate change, and climate change mitigation and adaptation policies.

POLITICAL SCIENCE

203. GIS I 3 cr. Introduction to the theory and practice of geographic information science through computer-based processing tools, specifically geographic information systems (GIS). Students study fundamentals of GIS components, spatial data models, integration of coordinate systems, digital data sources, spatial database functions, spatial analysis, thematic mapping, and data quality. Applications include political analysis, land use planning, public health mapping, environmental management, and demographic mapping.

205. HEALTHCARE ACCESS IN LATIN AMERICA 2 cr. Integrates immersion experience with the realities of healthcare access in Latin America. Topics include the cycle of poverty in Latin American countries, the link between healthcare access and poverty, and the specific case of the rural Honduran healthcare system.

242. ISSUES IN SOCIAL JUSTICE 3 cr. Explores what counts as an issue of social justice. Includes a critical introduction to rights-based thinking, structural and ideological foundations of injustices, importance of narration and writing, and approaches to social change.

243. GLOBAL DEBT AND JUSTICE 3 cr. Examines debt from an interdisciplinary perspective, including how different religions and cultures understand debt, interest, profit, and obligation; the political economy of debt between nation-states and global institutions; and debt justice movements.

256. GLOBALIZATION AND ECONOMIC DEVELOPMENT 3 cr. Introduction to the major political and economic forces of historical development from the explosive encounter of Europe with the Americas at the start of the “Colombian exchange” to the collapse of time and distance with the introduction of digital technology and the Internet.

337. COMPARATIVE HEALTH POLICY 3 cr. Introduction to the basic concepts, issues, and dilemmas of public health and healthcare policy. Provides students with the vocabulary and tools of comparative public health/healthcare policy analysis by examining in detail the promises and problems of various healthcare systems worldwide.

PRE-HEALTH PROFESSIONS

273. CURRENT ISSUES IN POPULATION AND PUBLIC HEALTH 1 cr. Prerequisite: instructor permission. Interdisciplinary seminar on current population and public health issues in the U.S. and globally. Topics include disease outbreaks, current health policy debates, and community health implications of environmental issues and lifestyles, with special focus on diversity and ethics.

275. GLOBAL HEALTHCARE DELIVERY 3 cr. Fundamentals of global issues in healthcare. Emphasizes effects of the increasing interconnectedness of healthcare among global cultures due to advances in information, communication, and the economy; also, how these developments will change healthcare delivery and health policy globally.

473. INTERNSHIPS IN POPULATION AND PUBLIC HEALTH 4 cr. Prerequisites: senior standing, permission of instructor, SC 273, and BL 240; prerequisites/corequisites: four additional courses in the Population and Public Health minor. Capstone for PPH minor: a supervised internship in a public health setting in conjunction with on-campus seminar focused on career development, public health systems, and interdisciplinary analysis of the varieties of public health practices.

SOCIOLOGY AND CRIMINOLOGY

111. INTRODUCTION TO SOCIAL JUSTICE 3 cr. Overview of the theories of social justice, including discussion and analyses of social inequalities both domestic and global, and issues related to civic engagement, social responsibility, and change. Service-learning component required.

195. GLOBAL DEBT AND JUSTICE 3 cr. Examines debt from an interdisciplinary perspective, including how different religions and cultures understand debt, interest, profit, and obligation; the political economy of debt between nation-state and global institutions; and debt justice movements.

THEOLOGY AND RELIGIOUS STUDIES

130. A WORLD OF GRACE - Seven Principles of Catholic Social Teaching including Care for Creation.

337. GLOBALIZATION THEOL & JUSTICE

342. ISLAM AND THE ENVIRONMENT 3 cr. Overview of environmental issues and Islamic approaches to these challenges based on the major sources of Islam: the Qur'an and the Hadith. Islamic principles regarding the natural world and humanity's place within it, and Islamic legal strictures to protect the environment. Special emphasis on contemporary Islamic activism to protect the natural world.

366. Social Justice and the Economy. This course addresses the human and environmental impact of various economic structures and policies around the globe. It is an ISJ course as well as a Catholic Studies class and serves as an elective in the program for Peace, Justice and Human Rights.

The course I intend to teach in Fall 2019, assuming we receive Core approval to do so, is a new linked course with Mariah Webinger in Accountancy that we are calling "Catholic Social Teaching in Business." Among encyclicals we will address for their potential business impact is *Laudato Si',* and we spend two full weeks of the class talking about the environmental impact of business from a Catholic Social Teaching

perspective.
Instructors: Megan Wilson-Reitz and Mariah Webinger

ENDOWED PROFESSORSHIPS RELATED TO SUSTAINABILITY

Coburn Professor of Environmental Science
Named for Dr. Miles Coburn (’75G), an environmentalist and biology professor from 1982 to 2008, the Coburn Professor of Environmental Science enhances the University’s commitment to environmental stewardship through the education of biology and environmental science students. Additionally, funds to support environmental research are available to undergraduates. The professorship was established in 2015 through the generosity of Peggy Spaeth (Dr. Coburn’s wife), the Coburn family, Ride for Miles, Inc., and other generous donors. The first Coburn Professor of Environmental Science is Dr. James I. Watling.

[per 2017-2019 Undergraduate Bulletin]

APPENDIX 2 – Evaluation of Campus Social Responsibility

CSR at John Carroll University
Tom Gittinger
John Carroll University – Corporate Social Responsibility

As an MBA student of John Carroll University (JCU), I was curious about the CSR efforts of the organization and how these efforts compare to my undergrad university, Case Western Reserve. I was fortunate enough to speak with Jeff Your, the chair of the JCU Sustainability Committee. During our discussion, areas of strength, focus for improvement, and weakness emerged. A full breakdown of the CSR rubric ratings for JCU can be found below.

One area of strength for JCU in its CSR strategy is its efforts to minimize environmental impact. John Carroll is involved in several programs in the area of reducing electrical use and the resulting carbon footprint. JCU also participates in several recycling programs and food composting initiatives. Another area the university excels in is encouraging its students, faculty, and staff to participate in community service and social justice programs. According to Jeff, students are an important part of the Sustainability Committee and its initiatives. Students and staff also participate in several volunteer, donation, and mission programs.

One area JCU is looking to improve on in the near future is building its employee health and wellness programs. The university has had strong employee driven interest and efforts in starting a wellness program. Several new initiatives are being rolled out and this will be an area of CSR efforts moving forward. Jeff says the Sustainability Committee will also be focusing on new ways to communicate to stakeholders the CSR

efforts the committee and university participate in. In terms of weaknesses in JCU's CSR strategy, there is limited measurement and benchmarking that takes place on the efforts currently. The complexity and costs associated with collecting this data are current barriers identified. Additionally, the Sustainability Committee is looking to drive further alignment among all levels of the organization on CSR. Jeff is happy with the strides the university has made and looks forward to seeing even further CSR growth.

CSR Rubric

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
The organization has a clearly defined CSR strategy		x		
The organization widely shares and communicates their CSR strategy with internal and external stakeholders		x		
Leadership drives commitment in the CSR strategy within the org		x		
The organization is aligned at all levels on the importance of CSR		x		
The organization regularly assesses and adjusts their CSR strategy and how it fits into corporate strategy			x	
The organization is measuring or benchmarking their CSR initiatives	x			
The organization balances and aligns the needs and interests of all five groups of stakeholders outlined in FOE book			x	
The organization works with strong outside partners to develop their CSR strategy		x		

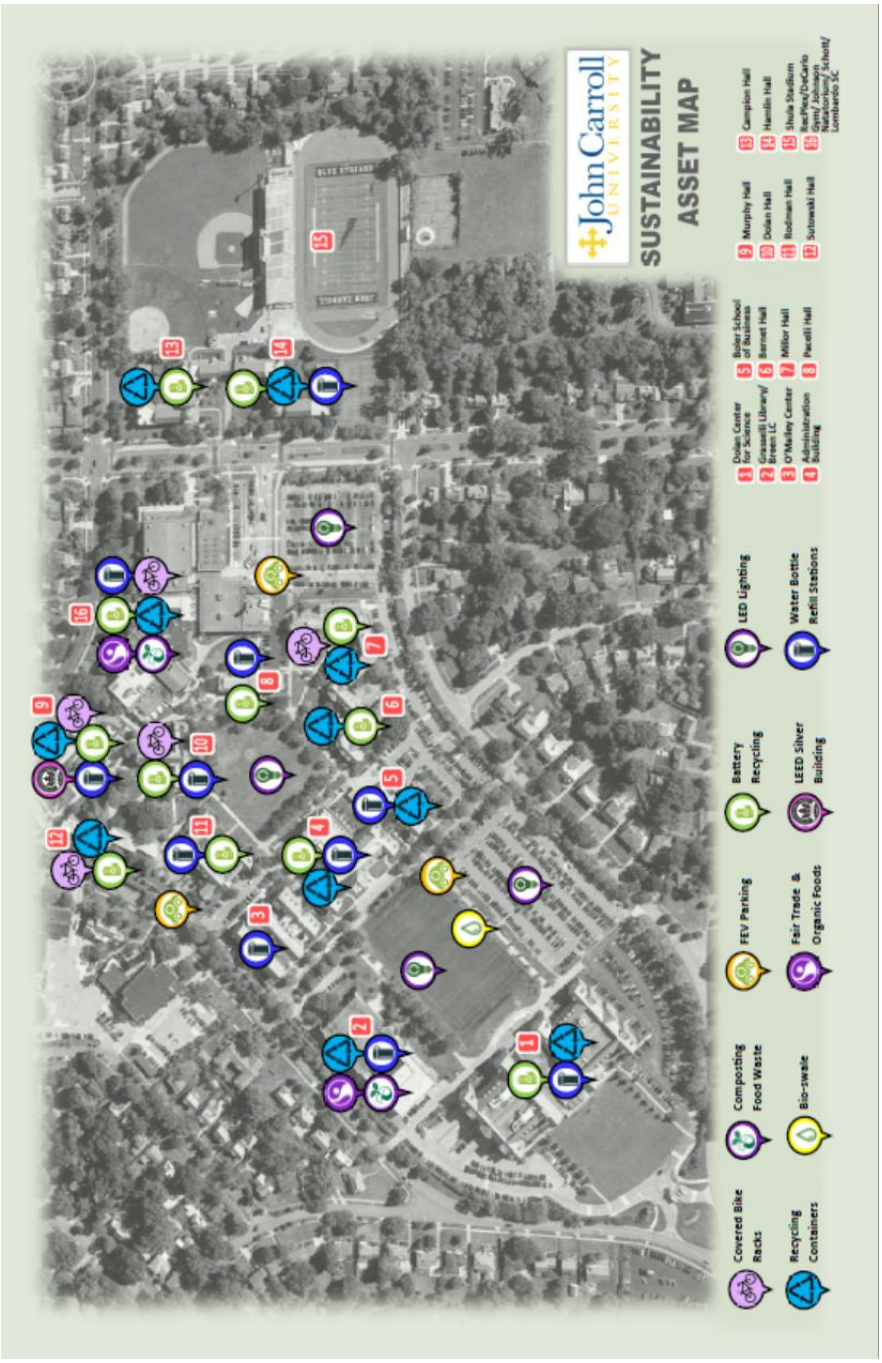
The organization has strong participation in programs and initiatives that help encourage diversity and gender equality			x	
The organization has strong participation in programs and initiatives that help ensure employee safety and wellness			x	
The organization has strong participations in programs and initiatives to minimize negative environmental impact of their operations				x
A strong corporate culture built on key organization values exists at the organization		x		
The organization has intensely loyal customers that have been endeared to the organization			x	
The organization participates and encourages employees to participate in community, charity, and social justice initiatives				x
Decision making is driven by long term orientation rather than short term, result driven reasons			x	

APPENDIX 3 – U.S. Jesuit Universities' Sustainability Website Links

Boston College
Canisius College
College of the Holy Cross
Creighton University
Fairfield University
Fordham University
Georgetown University
Gonzaga University
Le Moyne College
Loyola Marymount University
Loyola University Chicago
Loyola University Maryland
Loyola University New Orleans
Marquette University
Regis University
Rockhurst University
Saint Joseph's University
Saint Louis University
Saint Peter's University
Santa Clara University
Seattle University
Spring Hill College
University of Detroit Mercy
University of San Francisco
University of Scranton
Wheeling Jesuit University
Xavier University

APPENDIX 4 – Sustainability Asset Map

This **ASSET MAP** shows our sustainability resources across campus. Recycling and composting locations, covered bike racks, FEV parking, Fair Trade and organic food outlets, water bottle refill stations, LED lighting and LEED certified renovations are all part of our **CARE FOR CREATION**



APPENDIX 5 – Conferences attended

Loyola University Chicago Climate Change Conference Focuses on Public Health Issues

May 9, 2018 — Loyola University Chicago hosted its fifth annual climate change conference in March, bringing together students, professors, experts from Jesuit universities and partners from across the United States, Canada and the world. “Climate Change and Human Health: 21st Century Challenges” examined how we must continue to work together to address the global challenge of climate change.

Gina McCarthy, senior leadership fellow at the Harvard T.H. Chan School of Public Health and former U.S. EPA administrator under President Barack Obama, delivered the keynote address. She highlighted the need to protect public health and the direct effects environmental degradation imparts on humanity’s well-being.

Gina McCarthy delivers the keynote address at the climate change conference.

“I think it's really important for people to understand that climate change is not just real but has potential to impact them and their kids. It does have direct and indirect impacts on public health, but they're not well known,” she said. People think it's about floods and wild fires, but there’s more to it, she explained, such as the quality of our air and drinking water, which both impact our health.

The second day of the conference was devoted to five panels that featured discussions from climate change experts, physicians and public health advocates surrounding environmental issues. Panelists discussed major climate change issues, such as catastrophic weather events, the U.S. federal government’s lack of commitment to the Paris Agreement and the increasing prevalence of climate refugees.

Dr. Michael Tiboris, global water fellow at the Chicago Council on Global Affairs, during a conference panel.

Panelist Susan Crate, an anthropologist from George Mason University, told conference attendees that we are all climate refugees. "We are all being displaced by the climate" and very often "wars and conflict have deep roots in climate change," she said. As our climate changes, storms will become more powerful and situations like the one occurring in Puerto Rico will continue to happen, so we must be prepared and willing to help those affected.

Dr. Susan A. Crate during the panel on climate refugees.

"The increasing intensity and frequency of climate-related disasters that directly affect human health points to the need for a comprehensive, immediate and humane solution," said Nancy Tuchman, Ph.D., founding dean of Loyola's Institute of Environmental Sustainability.

The conference also shared **eight important takeaways** after it concluded. These included reiterating that change happens on the grassroots level and young people have a unique voice in that change; that taking action on the grassroots level means listening to underrepresented voices like those from indigenous communities; and the importance of taking time to examine your relationship with creation and the planet, using resources like the **Ecological Examen**.

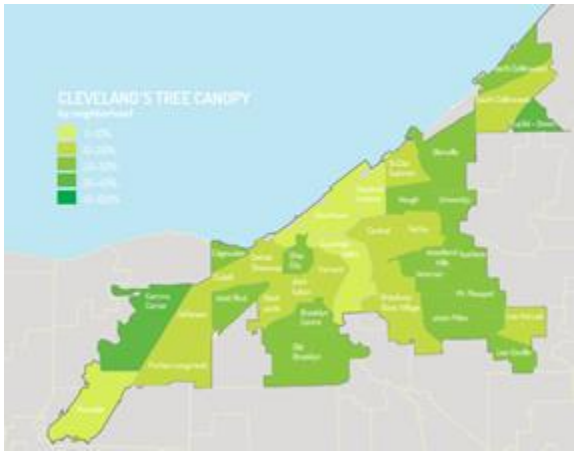
For more information on the conference, visit **www.luc.edu/climatechange**. [Source: **Loyola University Chicago**]

APPENDIX 6 – Tree Species Census

	(Common) Species	(Botanical) Species
1	apple, common	Malus pumila
2	arborvitae, eastern	Thuja occidentalis
3	ash, green	Fraxinus pennsylvanica
4	ash, white	Fraxinus americana
5	aspen, quaking	Populus tremuloides
6	bald cypress, common	Taxodium distichum
7	beech, American	Fagus grandifolia
8	beech, European	Fagus sylvatica
9	birch, river	Betula nigra
10	blackgum	Nyssa sylvatica
11	buckeye, Ohio	Aesculus glabra
12	buckthorn, common	Rhamnus cathartica
13	cherry, Snow Fountain	Prunus x 'Snofozam'
14	cherry/plum, spp.	Prunus spp.
15	cottonwood, eastern	Populus deltoides
16	crabapple, flowering	Malus spp.
17	dawn redwood	Metasequoia glyptostroboides
18	dogwood, cornelian cherry	Cornus mas
19	dogwood, flowering	Cornus florida
20	dogwood, hybrid	Cornus x
21	dogwood, Kousa	Cornus kousa
22	douglas fir	Pseudotsuga menziesii
23	elm, American	Ulmus americana
24	elm, Chinese	Ulmus parvifolia
25	elm, hybrid	Ulmus x
26	elm, Siberian	Ulmus pumila
27	falsecypress, Hinoki	Chamaecyparis obtusa
28	falsecypress, Japanese	Chamaecyparis pisifera
29	falsecypress, Nootka	Chamaecyparis nootkatensis
30	falsecypress, spp.	Chamaecyparis spp.
31	fir, white	Abies concolor
32	ginkgo	Ginkgo biloba
33	hawthorn, cockspur	Crataegus crusgalli
34	hawthorn, spp.	Crataegus spp.
35	hawthorn, Washington	Crataegus phaenopyrum
36	hemlock, eastern	Tsuga candensis
37	hickory, bitternut	Carya cordiformis
38	hickory, shagbark	Carya ovata
39	holly, American	Ilex opaca

40	honey locust, thornless	Gleditsia triacanthos inermis
41	horse chestnut	Aesculus hippocastanum
42	lilac, Japanese tree	Syringa reticulata
43	linden, American	Tilia americana
44	linden, Crimean	Tilia x euchlora
45	linden, hybrid	Tilia x
46	linden, littleleaf	Tilia cordata
47	linden, silver	Tilia tomentosa
48	magnolia, hybrid	Magnolia x
49	magnolia, saucer	Magnolia x soulangiana
50	magnolia, star	Magnolia stellata
51	magnolia, sweetbay	Magnolia virginiana
52	maple, Freeman	Acer x freemanii
53	maple, Japanese	Acer palmatum
54	maple, Norway	Acer platanoides
55	maple, paperbark	Acer griseum
56	maple, red	Acer rubrum
57	maple, sugar	Acer saccharum
58	mountain ash, Korean	Sorbus alnifolia
59	mulberry, white	Morus alba
60	oak, northern pin	Quercus ellipsoidalis
61	oak, northern red	Quercus rubra
62	oak, pin	Quercus palustris
63	oak, scarlet	Quercus coccinea
64	oak, swamp white	Quercus bicolor
65	pear, callery	Pyrus calleryana
66	pine, Austrian	Pinus nigra
67	pine, eastern white	Pinus strobus
68	pine, Japanese red	Pinus densiflora
69	pine, red	Pinus resinosa
70	pine, Scotch	Pinus sylvestris
71	plane tree, London	Platanus x acerifolia
72	redbud, eastern	Cercis canadensis
73	serviceberry, spp.	Amelanchier spp.
74	smoke tree, American	Cotinus obovatus
75	smoke tree, European	Cotinus coggygria
76	snowbell, Japanese	Styrax japonicus
77	spruce, Colorado	Picea pungens
78	spruce, Norway	Picea abies
79	spruce, Serbian	Picea omorika
80	spruce, white	Picea glauca
81	sweetgum, American	Liquidambar styraciflua
82	sycamore, American	Platanus occidentalis

83	tulip tree	Liriodendron tulipifera
84	walnut, English	Juglans regia
85	yew, spp.	Taxus spp.



Why are trees important? The current canopy, even at its low level, provides Clevelanders with over $28 million in services every year. Benefit data were derived using U.S. Forest Service's i-Tree modeling and EPA's Environmental Benefits Mapping and Analysis Program (BenMAP). Cleveland's canopy today:

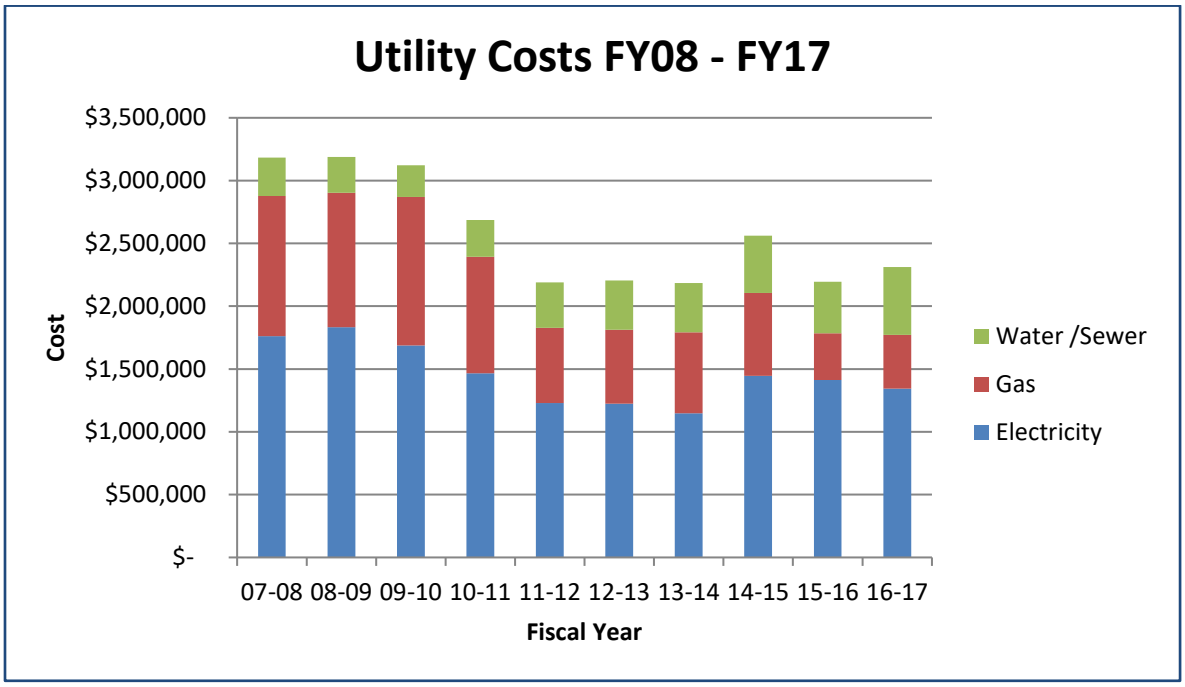
- Intercepts 1.8 billion gallons of rainwater every year (value: $11 million).
- Removes just under 830,000 lbs. of air pollution every year (value: $1.8 million).
- Saves residents and business owners $3.5 million in energy costs each year.
- Reduces stress from high heat days, which has significant impacts on human health and energy needs.
- Removes 42,000 tons of carbon dioxide from the atmosphere each year (value: $800,000). Additionally, across the lifetime of the canopy, Cleveland's trees store another 1.3 million tons of carbon, valued at over $25 million.
- Improves public health by preventing approximately 1,200 incidents of health problems across a range of issues, including asthma, obesity, diabetes, and mental health (value: $6.9 million).
- Increases property values by an estimated $4.5 million. This in turn increases city revenues.
- Improves business districts by attracting consumers that shop longer and spend more.
- Helps maintain habitat for wildlife, both aquatic and forest, which is critical to wildlife conservation.
- Prevents erosion and high sediment levels in waterways and shipping channels.
- Builds stronger communities and revitalizes neighborhoods.
- Creates safer spaces for the public by slowing traffic speeds, lowering stress, and providing buffers for pedestrians.
- Blocks noise and pollution by almost 50% for those living near highways.

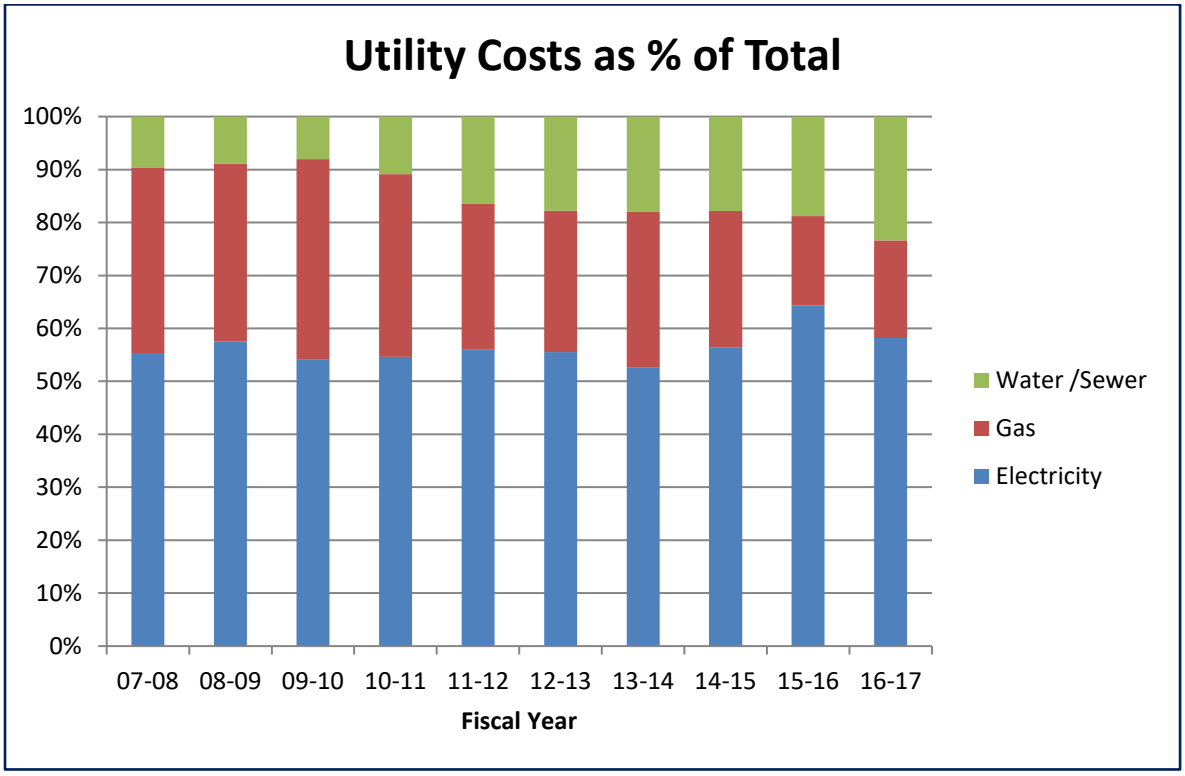
(courtesy of the Cleveland Tree Plan)

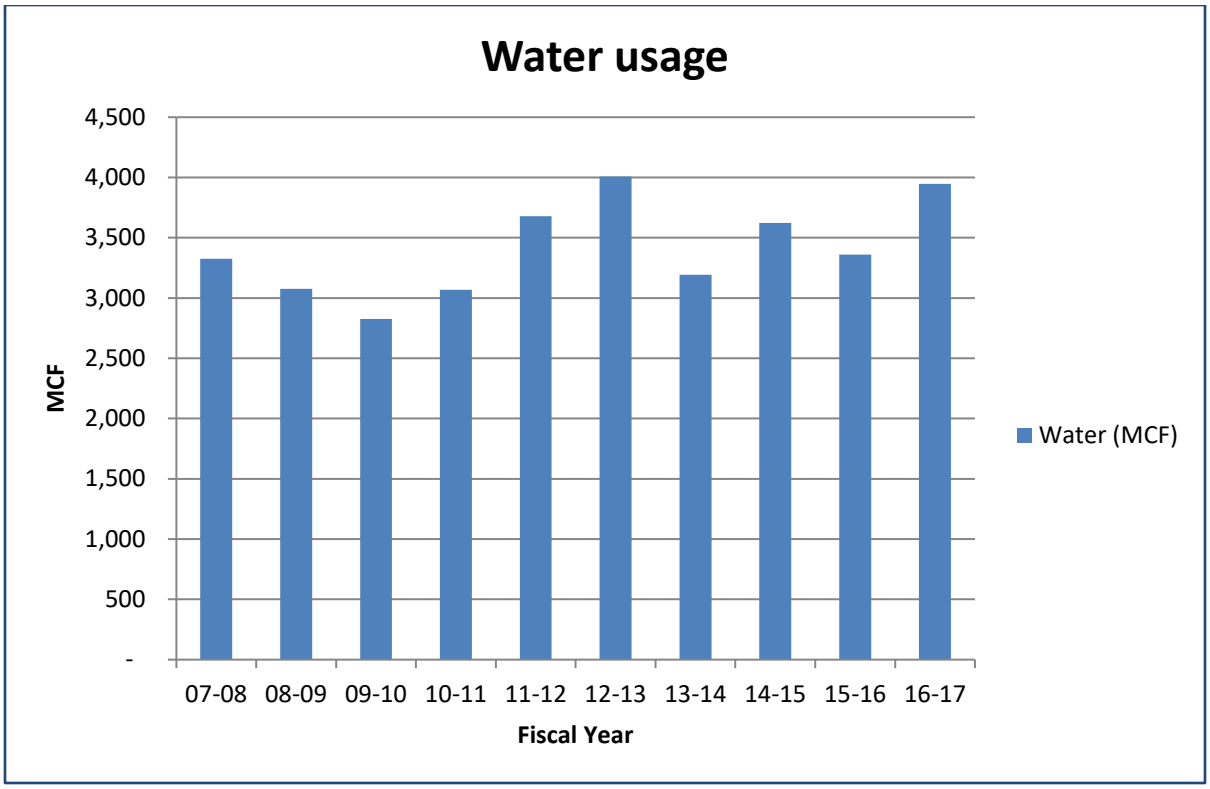
APPENDIX 7 – Battery Recycling Locations

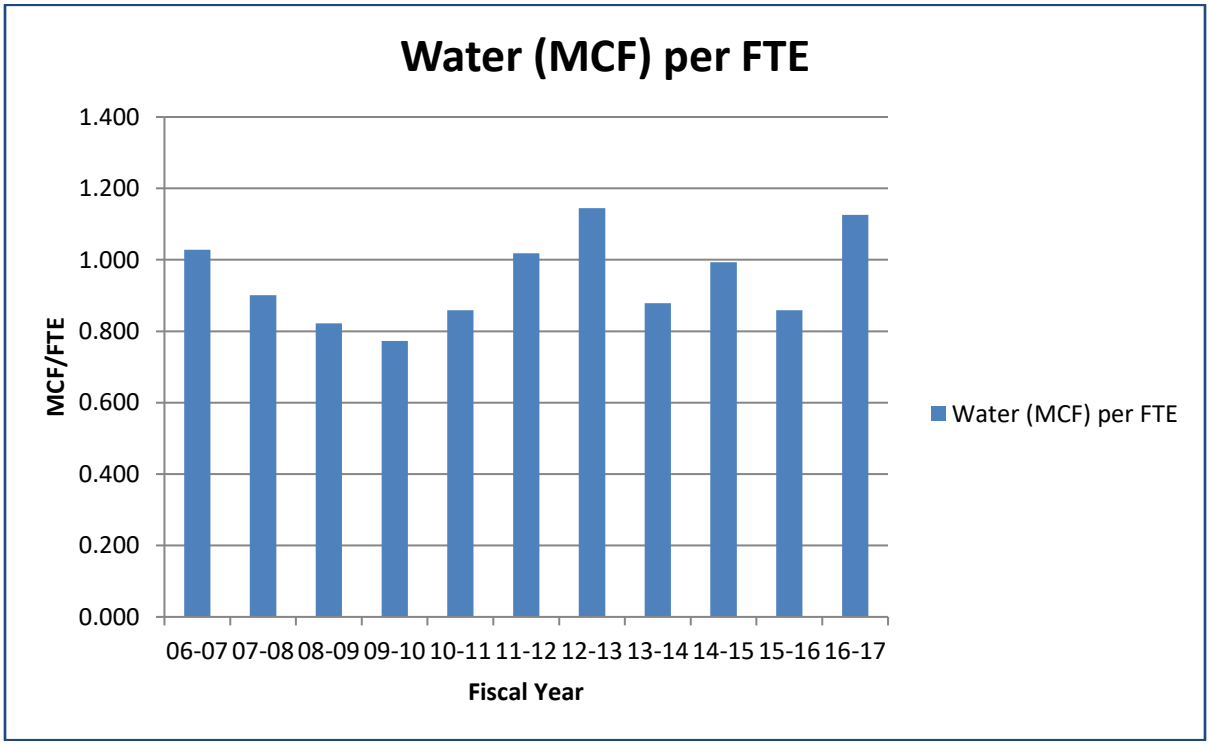
- Aramark Dining Service Office, the 'Underground'
- Biology Dept – Dolan Science Center, 2W
- Campus Ministry – Lombardo Student Ctr, 1st floor
- Central Science Stores – DSC, West Ground floor
- Chemistry Dept – Dolan Science Center, 3W
- Each residence hall main office
- Facilities Office – RecPlex Ground floor, rm 7
- Grasselli Library lobby
- Information Tech Services – Rodman, 4th floor
- Mail Center – AD Garden level, below Kulas Aud.
- Office of Mission and Identity – AD 128
- Physics Dept – Dolan Science Center, 1E
- Psychology Dept – Dolan Science Center, 3E
- Theology and Religious Studies – B250

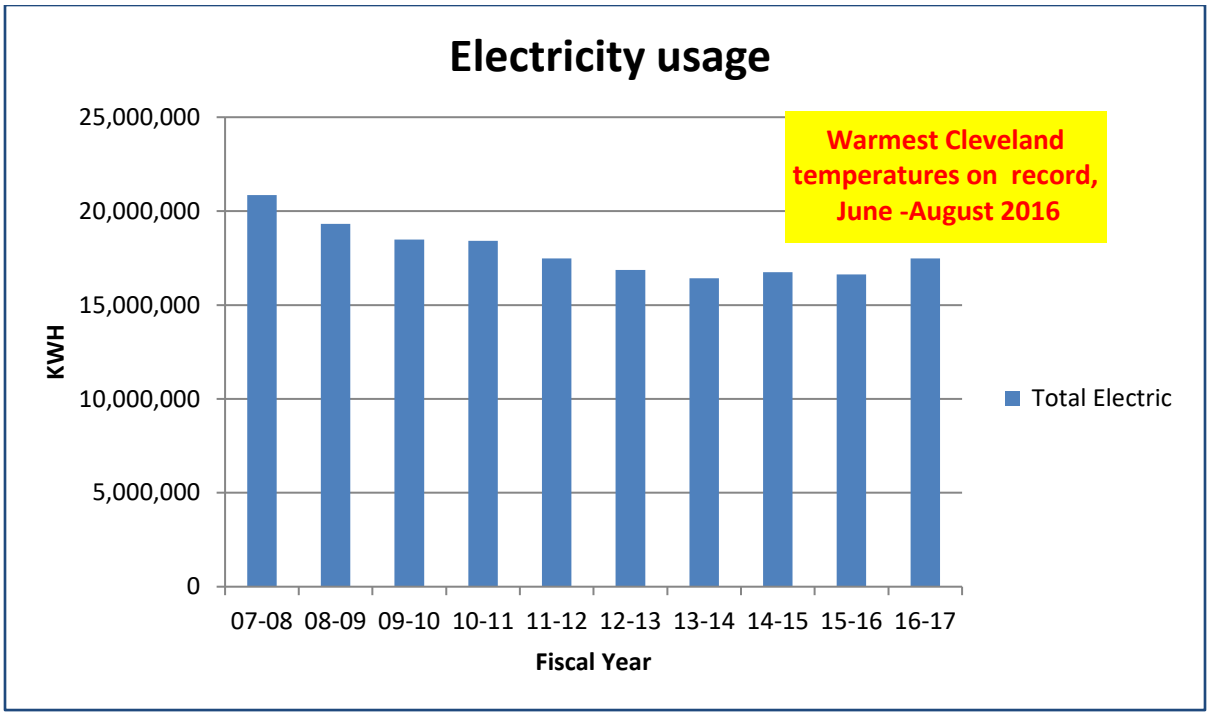
APPENDIX 8 – Utility metrics 2007-2017

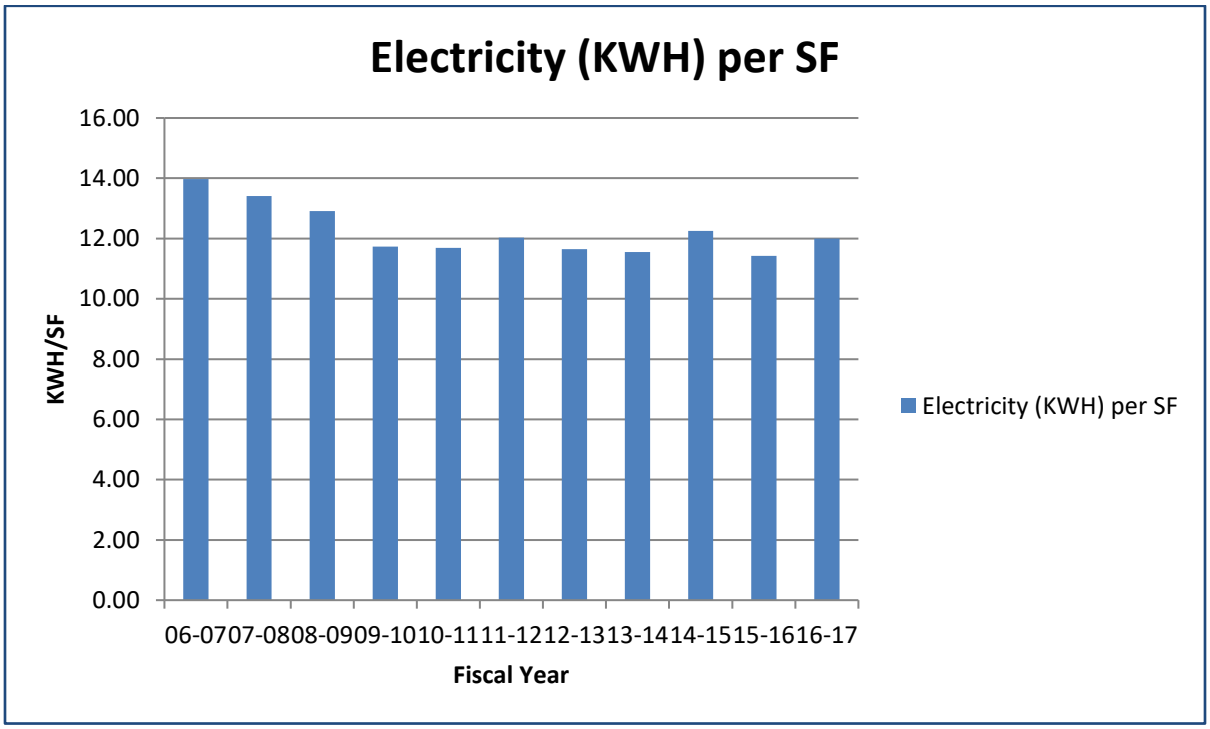


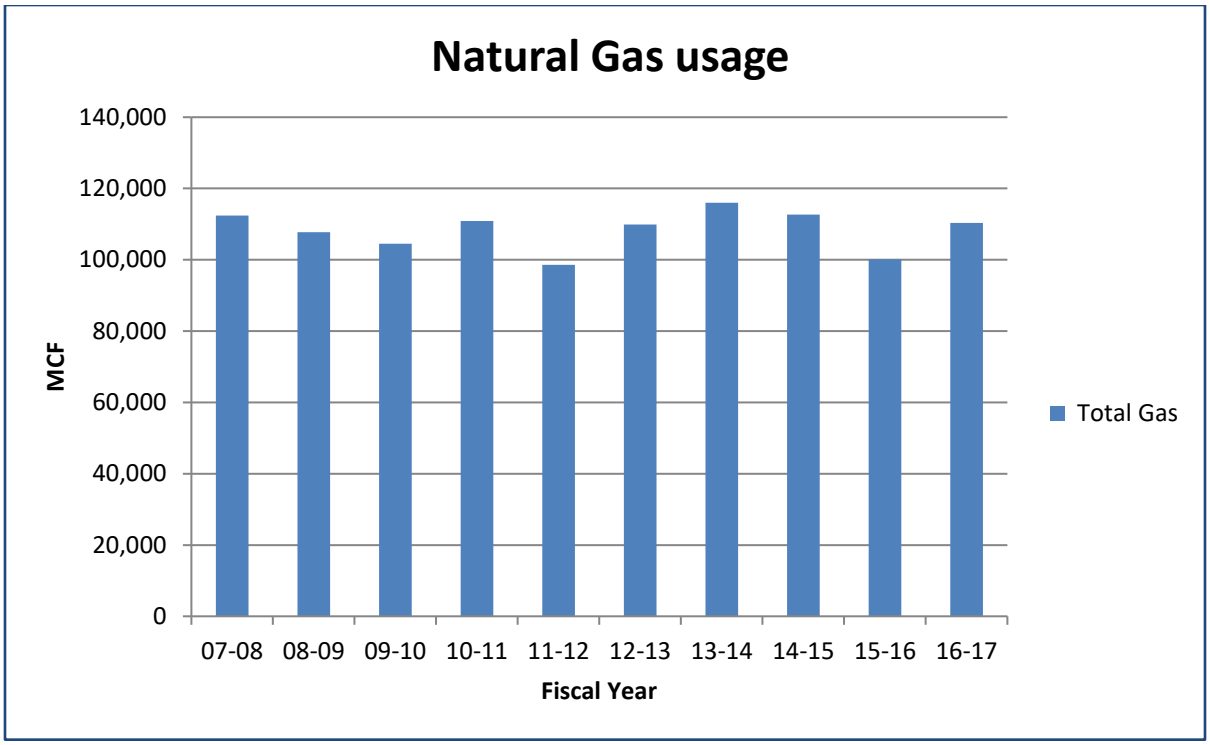


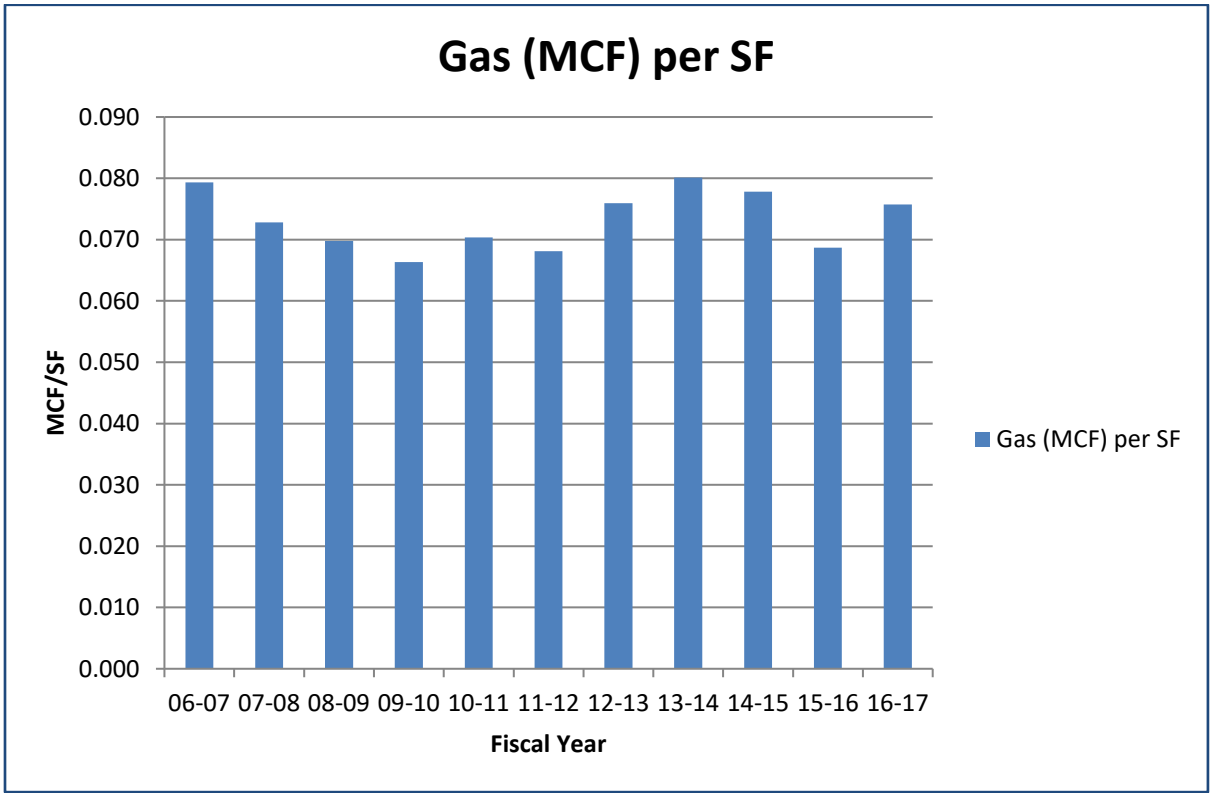

Water usage
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
-
MCF
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
Fiscal Year
Water (MCF)


Water (MCF) per FTE
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
MCF/FTE
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
Fiscal Year
Water (MCF) per FTE


Electricity usage
Warmest Cleveland temperatures on record, June -August 2016
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
KWH
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16 16-17
Fiscal Year
Total Electric


Electricity (KWH) per SF
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
KWH/SF
06-07 07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16 16-17
Fiscal Year
Electricity (KWH) per SF


Natural Gas usage
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
MCF
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
Fiscal Year
Total Gas


Gas (MCF) per SF
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
MCF/SF
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
Fiscal Year
Gas (MCF) per SF

APPENDIX 9 – Foundational Documents

(rationale for the creation and continuing work of the Sustainability Committee)

Reconciliation with Creation

Following the directive of GC 34, Fr. Peter-Hans Kolvenbach commissioned a study and invited all "Jesuits and those who share our mission to show ever more effective ecological solidarity in our spiritual, communal, and apostolic lives." This invitation calls us to move beyond doubts and indifference to take responsibility for our home, the earth.

Care of the environment affects the quality of our relationships with God, with other human beings, and with creation itself. It touches the core of our faith in and love for God, "from whom we come and towards whom we are journeying." It might be said that St. Ignatius teaches us this care of the environment in the Principle and Foundation when speaking of the goodness of creation, as well as in the *Contemplatio ad Amorem* when describing the active presence of God within creation.

The drive to access and exploit sources of energy and other natural resources is very rapidly widening the damage to earth, air, water, and our whole environment, to the point that the future of our planet is threatened. Poisoned water, polluted air, massive deforestation, deposits of atomic and toxic waste are causing death and untold suffering, particularly to the poor. Many poor communities have been displaced, and indigenous peoples have been the most affected.

In heeding the call to restore right relationships with creation, we have been moved anew by the cry of those suffering the consequences of environmental destruction, by the many postulates received, and by the recent teaching of the Holy Father and many episcopal conferences on this issue.

This Congregation urges all Jesuits and all partners engaged in the same mission, particularly the universities and research centres, to promote studies and practices focusing on the causes of poverty and the question of the environment's improvement. We should find ways in which our experiences with refugees and the displaced on one hand, and people who work for the protection of the environment on the other hand, could interact with those institutions, so that research results and advocacy have effective practical benefits for society and the environment. Advocacy and research should serve the poor and those who work for the protection of the environment. This ought to shed new light on the appeal of the Holy Father that costs should be justly shared "taking due account of the different levels of development."

In our preaching, teaching, and retreat direction, we should invite all people to appreciate more deeply our covenant with creation as central to right relationships with God and one another, and to act accordingly in terms of political responsibility, employment, family life, and personal lifestyle.[2]

[2] The Decrees of General Congregation 35, d.3, 31-36 (2008). Citation from https://www.saintpeters.edu/jesuit-identity/files/2012/08/GC35_Decrees.pdf, accessed on January 29, 2018

SOCIETY OF JESUS AND ECOLOGY

Care of the environment affects the quality of our relationships with God, with other human beings, and with creation itself. It touches the core of our faith in and love for God … The drive to access and exploit sources of energy and other natural resources is very rapidly widening the damage to earth, air, water, and our whole environment, to the point that the future of our planet is threatened (GC 35, d. 3, no. 32-33).

Photo Credit: Annuario 2015, Year of the Society of Jesus, © 2014.
http://www.sjweb.info/resources/annuario/pdf/Annuario2015_en.pdf